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The Chairman, Regional Rural Banks
The Managing Director, State Cooperative Banks
The Managing Director/ Chief Executive Officer,
District Central Cooperative Banks
(Applicable to banks identified under Enhanced CAMELSC based Supervision)

Madam/Dear Sir,

Guidelines for Stress Testing

Risk management is the process of identifying, assessing and controlling threats to an organisation's capital, earnings and operations. A robust risk management system helps an organisation consider the full range of risks it faces and the risk management also examines the relationship between different types of risks and the cascading impact they could have on an organisation's strategic goals.

2. NABARD had issued guidelines on Credit Risk and Operational Risk Management to the Supervised Entities wherein they were advised to put in place an effective risk management process to identify, measure, monitor, report and control/mitigate various risks to which they are exposed. The effectiveness of the follow-up action taken by the banks on these guidelines are reviewed and commented upon in the inspection reports.

3. Banks are increasingly relying on statistical models to measure and manage the financial risks to which they are exposed. These models are gaining credibility because they provide a framework for identifying, analysing, measuring, communicating and managing these risks. Development of risk management systems in banks has made "stress testing" an important tool in the overall governance, risk management and capital planning infrastructure of the bank.

4. Stress tests are forward-looking exercises that aim to evaluate the impact of severe but plausible adverse scenarios on the resilience of financial institutions. It complements a financial institution's other quantitative risk management tools by providing insights into its risk profile and alerting management to vulnerabilities in the case of exceptional events. Broadly two categories of stress tests are used in banks viz. sensitivity tests and scenario tests. These may be used either separately or in conjunction with each other.

(i) Sensitivity analysis: Sensitivity tests, also known as what-if analysis, are normally used to assess the impact of change in one variable such as interest rate,

increase in deposit run-off factors or rise in non-performing assets, etc., under certain pre-defined conditions. These tests assess the approximate impact of movement in a single risk factor at a time on the banks' capital or profitability. In sensitivity analysis, generally, the source of the shock on risk factors is not identified and usually, the underlying relationship between different risk factors or correlation is ignored. For example, the impact of adverse movement in interest rate or foreign exchange rate on profitability is considered separately but the fact that movement in interest rate and foreign exchange rate is inter-related is ignored to keep stress test simple.

(ii) Scenario analysis: Scenario tests include simultaneous movement in a number of variables based on single event experienced in the past. This will normally involve changes in a number of risk factors that have series of effects that follow logically from these changes and related management and regulatory actions. Scenario testing uses a hypothetical future state of the world to define changes in risk factors affecting a bank's operations. It involves the Bank determining macro-economic scenarios that it believes could occur in the near future with varying degrees of probability.

5. The need for robust risk management has become more significant as the supervisory expectations and stakeholder scrutiny have risen on account of the ever evolving banking ecosystem. In the circumstances, the need for SEs to adopt 'stress tests' as a risk management tool has been felt and accordingly, it has been decided that SEs are required to carry out the stress tests involving shocks prescribed in Appendix I at a minimum. Banks are advised to ensure that their formal stress testing frameworks, which are in accordance with the guidelines in Appendix I, are operational **from 31 March 2024.**

6. The SEs shall place the results of stress tests before the Board and the Board shall ensure compliance by way of an Action Taken Report to be submitted to NABARD at periodical intervals. NABARD would expect the degree of sophistication adopted by banks in their stress testing programmes to be commensurate with the nature, scope, scale and the degree of complexity in the bank's business operations and the risks associated with those operations.

7. Banks should document the stress tests undertaken by them, the underlying assumptions, the results and the outcomes. The documentation should be preserved at least for five years.

8. **Remedial Actions:** The remedial actions that banks may consider necessary to activate when the various stress tolerance levels are breached may include:

a) Reduction of risk limits.
b) Reduction of risks by enhancing collateral requirements, seeking higher level of risk mitigants, undertaking securitisation and hedging.

c) Amend pricing policies to reflect enhanced risks or previously unidentified risks.
d) Augmenting the capital levels to enhance the buffer to absorb shocks.
e) Enhancing sources of funds through credit lines, managing the liability structure, altering the liquid asset profile, etc.

9. The triggers for remedial actions may be identified clearly, e.g. with reference to the size of the potential loss or the impact on earnings and / or capital. In addition, the level of authority for determining the remedial action to be initiated should be clearly identified. The triggers, the remedial actions, the guiding principles for activation and the designated authorities should be properly documented and adopted/ applied as and when relevant.

10. Please acknowledge the receipt of this circular to our Regional Office in your State/ UT.

Yours faithfully

(Sudhir Kumar Roy)
Chief General Manager

Encl: Annexure I

Guidance Notes
on
Stress Testing

NABARD

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1. Table of Contents

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Guidance note on Stress Testing

1. Introduction and Background

1.1 General description

1.1.1 Stress testing is a risk management technique that assesses the stability of a bank and the overall financial system under severe but plausible scenarios. At the bank level, it helps a bank to quantify the impact of stress scenarios on its performance and assists senior management in making business strategy, risk management and capital management decisions. At a supervisory level, stress testing framework helps identify resilience of banks against financial and economic shocks enabling early identification and resolution of banks' vulnerabilities.

1.1.2 The emphasis on stress tests is to prepare banks for adverse scenarios and manage bank's solvency and liquidity position. On one hand, solvency stress tests help to assess banks' capital planning as well as their capital adequacy, thereby preparing them to reduce the likelihood of failure. On the other hand, stress tests also focus on liquidity, by examining if a bank has enough cash inflows to withstand cash outflows in a stressed scenario. Against this backdrop, the Basel Committee on Banking Supervision (BCBS) issued the Principles for Sound Stress Testing Practices and Supervision in May 2009. In tune with these principles, the extant guidelines on stress testing for scheduled commercial banks (excluding RRBs) have also been updated by Reserve Bank of India (RBI) in 2013.

1.2 Objective

1.2.1 The main objective of stress-testing exercise is to determine whether a bank has sufficient capital to manage itself during tough or stressed times. It helps banks, supervisors and regulators understand a bank's financial strength and identify vulnerability in the risk areas so that timely actions can be taken. It brings into notice different perspectives of risks, shedding light on risk interactions in stress environment that might otherwise be overlooked. At bank level, the objective of stress testing is to aid banks in capital management decisions. Additionally, another objective of stress testing is to provide an additional risk perspective to other quantitative risk metrics that may be used by banks and supervisors to assess the strength of banks.

1.2.2 Stress testing serves as a central tool in identifying, measuring, and controlling risks for assessing the bank's resilience to stress events. It plays an important role in the communication of risk within the bank and external communication with

supervisors in order to provide support for internal and regulatory capital adequacy assessments on a regular basis. These tests serve as the basis for supervisory actions and to ensure that banks have enough capital to withstand losses in stress scenarios.

1.2.3 This guidance note is to assist banks to understand the objective and importance of stress testing and expectations of the Supervisor while undertaking stress tests. The note lays down the broader principles of stress testing that would enable banks to use stress testing results to identify, interpret and address weaknesses in their financial health.

2. Principles of Stress Testing

2.1 Capture material and relevant risks:

Stress testing frameworks should capture material and relevant risks, as determined by a sound risk identification process. The risk identification process should include a thorough evaluation of risks, from both on- and off-balance sheet exposures, earnings vulnerabilities, operational risks and other factors that can affect the solvency or liquidity position of the bank.

2.2 Principle of proportionality:

Stress testing should incorporate the principle of proportionality in both quantitative and qualitative aspects. This implies that for small and less complex banks, the focus should be more on the qualitative aspects while for larger or more complex banks, advanced stress testing techniques may be required. The frequency of the tests should consider the stress test's scope and type, bank's characteristics and other aspects such as political / economic conditions in a country. In this regard, the scope of stress testing may vary from simple individual risk level analysis or portfolio level sensitivity to comprehensive institution-wide scenario stress testing based on the complexities of banks.

2.3 Severe but plausible scenario:

The stress test scenarios designed to capture the identified risk should be sufficiently severe and diverse to effectively gauge banks' resilience during stressed conditions. The scenarios and sensitivities used in stress tests should be reviewed periodically to ensure that they remain relevant. Historical events and hypothetical future events that consider new information and emerging risks in the present and foreseeable future should be taken into account.

2.4 Common framework:

RRBs, StCBs and RCBs, would be subject to same stress testing framework.

2.5 Existing norms of Risk Weighted Assets (RWA) and Provisions:

The stress testing exercise would take into consideration the existing regulations for provisioning and RWA requirements.

2.6 Three levels of stress:

The stress testing exercise would consider three levels of stress tests under each scenario. These would include baseline, medium and severe levels of stress tests.

2.7 Tool to facilitate informed decision making:

As a forward-looking risk management tool, stress testing should assist Supervisor and Banks in activities related to risk identification, monitoring and assessment. As such, stress testing should also contribute to formulating and pursuing strategic and policy objectives. The stress testing results should assist in taking informed and timely decisions.

2.8 Frequency of stress testing exercise

The frequency of stress testing exercise may vary for different types of banks based on their level of complexities. Supervised Entities may carry out stress testing exercise on an annual basis.

3. Stress Testing Framework

3.1 Organizational structure required at bank level

3.1.1 A bank's organisational structure should have a suitably robust infrastructure in place, which clearly defines the role and responsibility of the officials involved in the stress-testing exercise. The governance framework should identify all key stakeholders and ensure a comprehensive and consistent oversight and monitoring of the actions taken at the different stages of the stress testing exercise. Additionally, the infrastructure should be sufficiently flexible to accommodate distinct as well as uncertain stress scenarios at an appropriate level of granularity and capable of aggregating comparable risks and exposures across the bank.

3.1.2 The stress testing framework should require collaboration of all necessary stakeholders and the appropriate communication of assumptions, methodologies, scenarios, and results. The ultimate responsibility and accountability for the overall implementation, management and oversight of the stress testing programme in a bank should be assumed by senior management. However, some aspects of stress testing, such as design of methodologies, identification of risk factors, implementation of

stress testing exercise, potential actions based on the results, etc., may be delegated, as and when required.

3.1.3 To ensure that the information used in stress-testing is of adequate quality to meet the objectives of the stress testing framework, banks should put in place a robust data infrastructure capable of retrieving, processing and reporting information used in stress tests.

3.2 Integration at all levels

3.2.1 Stress testing should be integrated in a bank's risk management activities at various levels to facilitate the identification and control of risk, e.g. ranging from risk mitigation policies at a detailed or portfolio level to adjusting the bank's business strategy. It includes the use of stress testing for the risk emanating from the exposures to individuals or groups of borrowers and transactions at a granular level. It should necessarily address existing or potential firm-wide risk exposures and concentrations. It should be imbibed into the bank's decision-making process, establishing exposure limits and evaluating strategic choices in long term business planning.

3.2.2 Stress testing should be embedded in enterprise-wide risk management and it should play an important role in facilitating the development of risk mitigation or contingency plans across a range of stressed conditions. It should form an integral part of the decision-making process around capital and liquidity planning. The assumptions used for stress testing should be identified, analysed, recorded and updated considering the dynamic market conditions. It should be backed up by an effective management information system that ensures flow of information to the senior management to take proper measures to avoid certain extreme conditions. Moreover, the effectiveness of the stress testing program, as well as the robustness of individual components, should be assessed regularly and independently.

3.3 Policies, procedures and documentation

3.3.1 The assumptions and fundamental elements for each stress testing exercise should be appropriately documented, including the rationale underlying the scenarios chosen and the sensitivity of stress testing results, range and severity of the scenarios. The level of documentation should be based on the nature and purposes of the stress testing. However, it should necessarily cover the following aspects:

a) the type and specification of stress testing and scenarios and the main purpose
b) frequency of stress testing exercises
c) the methodological details of each component, including the definition of relevant scenarios and the role of expert judgement
d) the range of remedial actions envisaged, based on the purpose, type and result of the stress testing, including an assessment of the feasibility of corrective actions in stress situations.

3.3.2 The fundamental assumptions should be evaluated regularly considering dynamic external conditions. The results and rationale of the stress testing assessments should be documented which would support the reasoning and judgments underlying the chosen scenarios.

4. Scope of Stress Test

The scope of the stress test is limited to broadly two categories of stress tests used in bank viz. sensitivity tests and scenario tests. Refer the section below for detailed guidance on Sensitivity and Scenario tests.

4.1 Sensitivity tests

4.1.1 Sensitivity analysis estimates the impact on a bank's financial position due to predefined movements in a single risk factor like interest rate, increase in deposit run-off factors or rise in non-performing assets, etc. In the sensitivity analysis, generally, the source of the shock on risk factors is not identified and usually, the underlying relationship between different risk factors or correlation is ignored. For example, the impact of adverse movement in interest rate or foreign exchange rate on profitability is considered separately but the fact that movement in interest rate and foreign exchange rate is inter-related is ignored to keep stress test simple. These tests assess the approximate impact of movement in a single risk factor at a time on the banks' capital or profitability.

4.1.2 Banks should identify risk drivers relevant to their unique portfolio and exposure. Some of the illustrative risk drivers are as follows:

a) Interest rate risk: Parallel shift in the yield curve, steepening of the yield curve, inversion of the yield curve, etc.
b) Credit risk drivers: Deterioration in asset quality, concentration risk, etc.
c) Liquidity risk: Increase in deposit run-off factors, increase in haircuts on investments, etc.

4.1.3 The identified risk drivers should then be stressed using different degrees of severity. For example, a sensitivity test might explore the impact of a range of increases in interest rates such as by 200, 250, 300 basis points. The severity of single risk factor is likely to be influenced by long-term historical data, but banks are advised to supplement this with hypothetical assumptions of wide range of possibilities to test their vulnerability to specific risk factors.

4.1.4 Banks and supervisors can conduct sensitivity analysis at various exposure levels ranging from individual, portfolios or business units based on the purpose of stress testing. In addition, single factor analysis can be supplemented by simple multi-factor

sensitivity analyses, where a combined occurrence of some risk drivers is assumed, without necessarily having a scenario in mind.

4.2 Scenario tests

4.2.1 Scenario test uses a hypothetical future state of the world to define changes in risk factors affecting a bank's operations. This involves changes in a number of risk factors that have series of effects and impacts that follow from these changes and related management and regulatory actions. Scenario testing is typically conducted over the time horizon appropriate for the business and risks being tested. It entails determining macro-economic scenarios that the bank perceives might occur in the near future with varying degrees of probability.

4.2.2 Considering the scale at which Regional Rural Banks (RRBs) and Rural Co-operative Banks (RCBs) operate, scenario tests may be used in a limited manner.

5. Coverage for Stress Testing

5.1 Shocks, scenarios and risks covered

5.1.1 The guidance note covers the three financial risks namely, Credit Risk, Market Risk and Liquidity Risk. Additionally, it should be noted that other non-financial risks including operational resilience, IT risk, cyber risk, reputation risk, etc., fall outside the purview of this document.

5.1.2 Different stress scenarios for credit, market and liquidity risks are required to be identified and used for the stress testing. Certain levels of shocks to the individual risk components have been specified under section 6.2 to aid banks undertake stress tests. Over the period, banks may take the decision of creating different scenarios for stress testing considering its risk profile.

5.2 Suite of techniques and methodologies

5.2.1 In general, in order to achieve comprehensive coverage in stress testing programme multiple perspectives and a wide range of techniques and methodologies should be used. The suite may include quantitative and qualitative techniques to support and complement the use of other risk management techniques and to extend stress testing to areas where effective risk management requires greater use of judgments. An institution should be able to integrate the range of its stress testing activities to deliver a complete picture of institution-wide risk.

5.2.2 Banks are expected to employ a combination of stress testing techniques that are most appropriate to the size and complexity of their business activities, as also their

objectives in mind. Banks wherein data issues (availability or quality of data or structural breaks in historical data) do not allow for meaningful estimates should supplement quantitative analyses with qualitative expert judgements. Even where the underlying modelling process is robust, expert judgement should play a role in challenging model outputs.

5.2.3 The outcome of stress tests is evaluated using various measures depending on the specific purpose of the stress test, the risks & portfolios being analysed and the particular issue under examination. To adequately represent the effect of stressed market condition, it is necessary to consider a range of measures. Some of the common measures used to evaluate the impact are as follows:

- Asset and liability values
- Level of NPAs and write-offs
- Net Interest Income (NII)
- Required and available regulatory capital
- Liquidity and funding gaps

5.3 Level of severity of shocks

5.3.1 Stress testing should be based on exceptional but plausible events. The bank should consider severe economic downturn and/or a system-wide shock to liquidity. The level of stress in use should be different for different time period, based on the judgement of the supervisor/bank, prevailing market conditions and future expectations.

5.3.2 Stress test shall be carried out assuming three different levels of severity of shocks:

- Baseline Shocks: These represent small shocks to the risk factors i.e., level of severity is the least.
- Medium Shocks: It represents shocks with medium level of severity i.e., a little more severe than baseline shocks.
- Severe Shocks: It represents shocks with highest degree of severity.

It should be noted that the shocks mentioned in Appendix I are minimum and the level of severity can be changed upwards based on the discretion and rationale of the supervisors/banks.

6. Sensitivity Analysis

6.1 Single and multi-factor Stress Tests

6.1.1 Sensitivity analysis is conducted through single-factor stress tests and multi-factor stress tests. Single-factor stress test involves an analysis of the impact of economic and/or financial vulnerabilities in a single risk factor. Multi-Factor Stress Test refers to a stress test applying a combination of two or more economic and/or financial vulnerabilities simultaneously. Single factor analysis can be supplemented by simple multi-factor sensitivity analyses, where a combined occurrence of some risk drivers is assumed, without necessarily having a scenario in mind.

6.1.2 The shocks have been simplified considering the business models and sophistication levels of RRBs and RCBs. Banks may also endeavour to assess their resilience to the possibility of more than one shock materialising simultaneously.

6.2 Level of shocks

6.2.1 Credit Risk – Single factor stress test

The stress test for credit risk aims to assess the impact of credit risk factors on bank's financial performance and capital adequacy. It is observed that in an economic downturn, the major risk challenges banks face include deterioration in credit quality, difficulty in recovery and deterioration in the asset quality. On the other hand, in an economic upturn, there is likely to be a sense of abundance due to under-pricing of risk, leading to excessive credit growth in select sensitive sectors.

To address the stressed market conditions, banks may require increase in provisions and/or risk weights on the exposure and to survive such a rise during the economic upturn. Against this backdrop, the stress tests as indicated in Appendix I should be carried out at the minimum on the credit portfolio of RRBs and RCBs.

6.2.2 Market Risk - Single factor stress test

The prime objective of market risk linked stress tests is to study the impact of adverse market movements on Profit and Loss account and the resultant erosion in capital. As RRBs and RCBs are largely exposed to exposures in domestic currency, they are most likely exposed to Interest Rate Risk (IRR).

Interest rate risk is the risk where changes in market interest rates might adversely affect a bank's financial condition. The immediate impact of changes in interest rates is on bank's earnings through changes in its Net Interest Income (NII). As a starting point, impact of parallel shift in yield curve on the capital of RRBs and RCBs should be assessed at regular intervals. Banks should conduct sensitivity analysis using

methods that reflect their specific interest rate risk characteristics using gap analysis. Banks, at a minimum, should assess their resilience using the baseline factors given in Appendix I.

6.2.3 Liquidity Risk – Multi-factor stress test

Liquidity risk stress test involve multi-factor stress tests wherein stress on liquidity gap is assessed together with stress on funding sources. Whether a bank can be regarded as having sufficient liquidity depends to a great extent on its ability to meet obligations under a funding crisis. Therefore, in addition to conducting cash-flow projections to monitor net funding requirements under normal business conditions, banks should perform stress tests regularly by conducting projections based on "what if" scenarios on their liquidity positions to:

- identify sources of potential liquidity strain,
- ensure that current liquidity risk exposures remain in accordance with the established liquidity risk tolerance,
- analyse any possible impact of future liquidity stresses on cash flows, liquidity position, profitability and solvency.

Banks, at a minimum, should assess their resilience using the baseline factors given in Appendix I**.**

Minimum stress period for liquidity risk: Banks are expected to have sufficient funds (including those funds that can be generated from its available liquid assets and other funding sources) to take care of its liquidity needs and to enable it to continue its business for a minimum stress period under each of the crisis scenarios, without resorting to emergency liquidity from external sources (Govt., supervisor, sponsor bank, etc.)

Therefore, a bank should assume the minimum stress period for a bank-specific crisis scenario to last for no less than five business days, and for a general market crisis scenario (systemic liquidity crunch) and a combined scenario (a bank-specific liquidity crisis accompanied by a general liquidity crunch), to last for no less than one calendar month. Banks should adopt longer minimum stress periods if their liquidity risk profile require them to do so.

7. Management Action - Use of Stress Test Results

7.1 Identification of actions: The senior management of the bank should identify actions addressing the outputs of stress tests which are aimed at ensuring bank's ongoing solvency through the stressed scenario. The bank should consider a broad range of management actions against a range of plausible stressed conditions with a focus on at least baseline scenario.

7.2 Determination of timeframe: To assess possible responses to a stress situation, the management should identify credible actions that are most relevant and the potential timeframe in which they should be undertaken. Bank's management should take into consideration the actions that may be contingent on happening of specific events, in which case clearly defined triggers for action should be identified in advance.

7.3 Impact analysis: The bank should explain the qualitative and quantitative impacts of the stress before and after management actions. The impact of stress before management actions should include strategy, growth assumptions but should exclude management actions that would not be available in a stress event such as winding down a business line or raising capital.

7.4 Acceptable management actions: The acceptable management actions will be subject to the guidance and judgement of bank's top management and may include the following:

- review of internal risk limits
- review of the use of risk mitigation techniques
- revision of policies such as those that relate to liquidity and funding or capital adequacy
- changes in the overall strategy and business plan
- raising of capital or funding

7.5. Documentation and reporting: The anticipated management actions differentiated by scenario and adjusted to the severity of the scenario should be well documented.

7.6 Implementation and monitoring: The bank shall implement management actions as agreed upon by the top management and continuously monitor performance and effectiveness of actions taken. There shall be periodic review of stress test results and management actions to ensure ongoing solvency. The bank should adjust management actions and strategies as needed based on changing conditions and new stress test outcomes.

8. Review of Stress Testing

8.1 Given the importance of stress testing in decision making process, the stress testing framework should be reviewed periodically, both qualitatively and quantitatively, to determine its efficacy and to consider the need for modifying any of the elements with respect to the changing environment.

8.2 In this regard, the framework should be subject to at least annual reviews, which should cover, among others, the following aspects:

- The program's efficacy in achieving its outlined objectives.
- The extent to which stress testing is integrated into risk management procedures.
- Ensuring that the stress levels applied are realistic and meaningful.
- A check on systems' implementation and their robustness.
- Oversight by the management to ascertain they are abreast of potential risks and mitigation techniques.
- Quality of data used and the effectiveness of the Management Information System (MIS).
- Detailed documentation of the stress testing process and its outcomes.
- Review of the underlying assumptions and their continued relevancy

8.3 Given that stress test development and maintenance processes often imply judgmental and expert decisions (e.g. assumptions to be tested), the independent control functions, such as risk management and internal audit, should also play a key role in the process.

8.4 An important corollary of review and assessment of stress testing programme involves updating of the processes to keep them relevant and suitable to the unique portfolio of the supervised entities. The results of the stress testing should make intuitive sense and where feasible, be supported by validation framework. The framework should be competent enough to challenge the models and control infrastructure critical to ensure the credibility and usefulness of the framework.

9. Future course of action and upskilling

9.1 Given the practical difficulties and deficiency in knowledge related to stress testing at bank's level, sufficient guidance may be sought from time to time from the experts to understand and appreciate the stress testing exercise.

9.2 Additionally, efforts should be made to build capacity around infrastructure and organizational structures that are adequate to meet the stress testing objectives in a phased manner followed by gradual upskilling. Governance processes should ensure the adequacy of resources for stress testing, including ensuring that the resources have the appropriate skill sets to execute the stress testing framework.

There should be established processes to ensure resources have the appropriate skill sets, which include building the skills of internal staff, ensuring knowledge transfer to internal staff, as well as hiring personnel with specialized stress testing skills. The set of skills typically required includes (but are not limited to) expertise in liquidity risk, credit risk, market risk, capital rules, financial accounting, modelling and project management.

10. Appendix I

Introduction to Stress Testing	
Document	Standard Operating Procedure (SOP) for conduct of Stress Testing at SEs

1. Scope: The stress testing exercise is intended to capture material and relevant risks as determined by a sound risk identification process. These tests shall contribute to formulating & pursuing strategic and policy objectives. All set of Supervised Entities (SEs) RRBs, StCBs and DCCBs would be subject to same stress testing framework.

The banks shall consider shocks and scenarios mentioned in this annexure at a minimum for conduct of stress tests**.**

2. Objective: The outcomes of stress testing should facilitate the making of well-informed and timely decisions pertaining to capital sufficiency, credit exposure, and liquidity needs.

3. Method: The banks shall perform sensitivity tests that involve the impact of a large movement in a single/multiple factors. In the case of credit risk and market risk, a single-factor test is conducted to ascertain the impact on capital adequacy. Multi-factor test is performed in case of liquidity risk to ascertain the liquidity gap. The stress testing exercise would take into consideration the existing regulations for provisioning and RWA requirements.

The level of severity considered in three scenarios viz. Baseline, Medium and Severe are as specified for each type of risk. These are the minimum levels of severity the banks must consider while carrying out stress tests. The banks may decide more severe levels under the three scenarios considering various factors such as risk prevalent in the operations, events in the banking industry, etc.

3.1 Input / Output data: The stress tests involve following elements -

Step no	Step Name	Remarks
1	Shocks	Description of stress / shocks under baseline, medium and severe conditions.
2	Input data	Input data that is required to be filled by the user
3	Sensitivity Analysis	Computation / Working
4	Output	Assessment of impact on capital/ CRAR

4. Procedure: The procedure for conduct of stress test for each type of risk is as follows:

4.1 Credit Risk: The stress test for credit risk aims to assess the impact of credit risk factors on bank's financial performance and capital adequacy.

The stress tests for credit risk assess the impact of an increase in the level of non-performing assets (NPAs). This has a two-way impact:

1. On the bank's NPA levels - The shock considers the impact of downgrade of standard assets to sub-standard asset category and downgrade of sub-standard asset to doubtful assets category.
2. On the provisioning level – The additional provisioning requirements which would have a consequent impact on the bank's profits and the CRAR.

It is to be noted that the stress tests for credit risk are conducted to assess primarily the impact on capital adequacy and as such, the provisioning requirements considered in stress testing shall impact the actual financial position of the bank.

Credit risk shocks: The shocks to be applied for conducting stress tests are as follows:

Shock No.	Stress Scenarios		Baseline	Medium	Severe
Shock 1	Deterioration in Standard Asset quality (SMA - 0, SMA - 1 to SMA - 2)	Proportion of portfolio under stress	10%	15%	20%
	Deterioration in Sub-Standard and Doubtful Assets quality	Proportion of portfolio under stress	10%	15%	20%
		Stressed Risk Weight	125%	125%	125%
Shock 2	Concentration risk-Borrowers	Default by largest borrowers	Top 1 borrower	Top 2 borrowers	Top 3 borrowers
		Stressed Risk Weight	100%	100%	100%
Shock 3	Concentration risk-Industries/ Sectors	Default in all exposures to largest industries/sectors	Top 1 sector	Top 2 sectors	Top 3 sectors
		Stressed Risk Weight	100%	100%	100%

4.1.1 Shock 1: Deterioration in asset quality

a) Input data:

1. This shock is divided into two parts. Part I includes stress on a proportion of standard asset and Part II includes stress on proportion of sub-standard and doubtful assets. Standard assets may be further bifurcated into SMA-0, SMA-

1 and SMA-2. Standard assets shall be stressed including stress on amount outstanding in SMA-2 at the year-end.

2. The details of input data required for conduct of stress testing by the banks is shown below:

	Input data	Amount	Remarks/ Reference Documents
Standard Assets	SMA – 0	700	1. Total amount of loans and advances classified as standard assets. 2. The standard assets shall be further classified as SMA-0, SMA-1 and SMA-2 as per RBI/2021-2022/125 DOR.STR. REC.68/21.04.048/2021-22 dated 12 November 2021.
	SMA – 1	200	
	SMA – 2	100	
	Total Standard Assets	**1000**	
	Provision Made (Regulatory requirement)	2.5 (1000 * 0.25%)	1. The provision made has been kept at 0.25% considering provision on standard asset- Agriculture loans as per the guidelines "RPCD.RRB.No.BC.97 /03.05.34/2000-01 dated 11 June, 2001". 2. The banks may input actual amount of provisions made for standard assets.
	Provision Made for SMA - 2	1%	It is assumed to be 1% for the stressed value for SMA-2. (RBI/2013-14/390 DBOD.BP.BC.No. 75 /21.04.103/2013-14 date 02 December 2013) Additional provision at 1% to be made for portfolio under stress.
	Risk Weight (as applicable)	100%	Considering 100% RW under normal scenario- as per the RBI/2014-15/270 RPCD.CO.RRB.BC.No.35/03.05.33/2014-15 dated 21 October 2014.
Sub - Standard and Doubtful Assets	**Input data**	**Amount**	**Remarks/ Reference Documents**
	Credit Exposure	1500	Total amount of sub-standard and doubtful assets.
	Provision Made (Regulatory requirement)	150	For the purpose of this illustration, provision at 10% is considered. The bank may consider actual provision made.
	Risk Weight (as applicable)	100%	Assumed. The value has been kept 100% uniform.

**Data is required to be filled by the bank in the columns highlighted.*

Further, stress testing shall take into account pre-stress capital and RWA as follows:

	Pre-stress input data	Amount (in Rs.)	Reference Documents
Credit risk Capital and RWA	Credit Risk Capital	250	Total Capital (Tier 1 + Tier 2) for the purpose of CRAR computation.
	Credit RWA	2,347.5	Risk Weighted Assets relating to loans and advances.
	Target Credit Risk CRAR	9%	Regulatory requirement.
	Credit Risk CRAR	10.6%	
	Comment (if any)		The bank is above target CRAR level under normal condition

b) Sensitivity analysis:

Example A: The downgrade from Standard to NPA (sub standard) is assumed to be 10% (i.e., the extent of present level of gross NPAs) and the provisioning requirements under stress situation are assumed as in example A above:

	Normal condition			Stress situation		
Asset Classification	**Rate of provision**	**Exposure**	**Provision**	**Revised rate of provisioning**	**Exposure**	**Provision**
Standard	1	6,600	66	1	5,940	59
Sub-standard	10	50	5	25	710	13
D1	20	40	8	100	40	40
D2	30	30	9	100	30	30
D3	100	80	80	100	80	80
		6,800	**168**		**6,800**	**222**
Addl. Provisions						54
Capital funds			600			540
RWA			6,698			6,638
CRAR			8.96%			8.13%

Capital funds under stress = 600 – 54 – (66 – 59) = 540
RWA under stress situation = 6,800 – (13 + 40 + 30 + 80) = 6,638

The risk weights are assumed to be at 100% in both, normal and stressed condition.

Example B: The downgrade from Standard to NPA and downgrade from Sub-standard & doubtful asset to Doubtful asset is seen independently. Risk weight of 125% under stressed condition is considered instead of additional provision at 25% as made in Example A.

Part I: Standard Asset (Deterioration of standard asset to NPA)

Pre-stress:

Amount in Rs.

Credit Exposure	Provision Made	Net Exposure	Risk Weight	Target CRAR	Capital Required
1000	2.5	997.5	100%	9%	89.775

1. The net exposure shall be considered for calculation of 'Portfolio under stress' in the post-stress scenario.
2. The capital required indicates minimum amount of capital the bank must have to maintain a CRAR of 9%.

Post-stress:

Amount in Rs.

Sr. No.	Particulars	Baseline	Medium	Severe
1	Shock or Stress *(linked to shocks)*	10%	15%	20%
2	SMA - 0 & SMA – 1	797.75	747.87	698.00
3	SMA – 2 *(Source: Input data)*	100.00	100.00	100.00
4	Portfolio under Stress (SMA -2)	99.75	149.63	199.50
5	Net Exposure (2) + (3)+ (4)	997.50	997.50	997.50
6	Additional Provision for SMA – 2 and portfolio under stress	1.75	2.25	2.75
7	Risk Weights of stressed assets	125%	125%	125%
8	**RWA**	**1,047.44**	**1,059.91**	**1,072.38**
9	Capital Requirement for SMA - 0 & SMA – 1 [(SMA-0 & SMA-1*100%*9%]	71.80	67.31	62.82
10	Capital Requirement for SMA-2 and portfolio under stress	22.47	28.08	33.69
11	Post - Stress Capital Requirement	94.27	95.39	96.51
12	Additional Capital Required due to stress (Post stress capital requirement - Pre stress capital requirement)	4.49	5.62	6.74

Notes:

1. It is assumed that amount of SMA-2 remain same in all stress scenarios.

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2. Portfolio under stress shall be calculated as = Total net exposure as calculated in pre-stress * stress level under each scenario.
   Baseline: 997.5 * 10% = 99.75
   Medium: 997.5 * 15% = 149.63
   Severe: 997.5 * 20% = 199.50

3. The SMA-0 and SMA-1 is the balance amount of net exposure after deducting amount of SMA-2 and 'portfolio under stress'.

4. Under the post stress scenario, additional provision shall be made to give effect to deterioration of SMA-2 and standard asset quality. The additional provision requirement is to be calculated at 1% (0.75% on SMA-2 considering 0.25% provision already made) and portfolio under stress.

   Baseline: (99.75 * 1%) + (100 * 0.75%) = 1.75
   Medium: (149.63 * 1%) + (100 * 0.75%) = 2.25
   Severe: (199.5 * 1%) + (100 * 0.75%) = 2.75

5. Capital requirement for SMA-0 and SMA-1 shall be calculated considering risk weight of 100%.

6. The risk weights for assets under post stress scenario is assumed at 125%. Capital requirement for balance portfolio (SMA-2 and portfolio under stress) shall be calculated considering a risk weight of 125%.

Part II: Sub-standard and Doubtful Asset

Pre-stress

Amount in Rs.

Credit Exposure	Provision Made	Net Exposure	Risk Weight	Target CRAR	Capital Required
1500	150	1350	1	9%	121.5

1. The total credit exposure classified under sub-standard and doubtful asset category.
2. The provision made is considered at 10%. Alternatively, banks may consider actual provision required to be made for category of assets.
3. The capital required is the minimum capital the bank shall have to maintain a CRAR of 9%.

Post-stress

Amount in Rs.

Particulars	Baseline	Medium	Severe
Shock or Stress	10%	15%	20%
Portfolio under Stress	135	202.5	270
Risk Weight of portfolio under stress	125%	125%	125%
Balance sub-standard and doubtful asset portfolio	1215	1147.5	1080
Risk weight of Balance Portfolio	100%	100%	100%
RWA	**1,383.75**	**1,400.63**	**1,417.5**
Post - Stress Capital Requirement	**124.53**	**126.06**	**127.58**
Additional Capital Required (Post stress capital requirement - Pre stress capital requirement)	**3.03** (124.53 – 121.5)	**4.55** (126.06 – 121.5)	**6.08** (127.58 – 121.5)

1. Portfolio under stress = Net Exposure * Level of stress under each scenario.
   Baseline: 1350 * 10% = 135
   Medium: 1350 * 15% = 202.5
   Severe: 1350 * 20% = 270

2. The risk weight for portfolio under stress is assumed to be at 125%. The same is considered for calculation of post-stress RWA under sub-standard and doubtful asset category. It is to be noted that risk weight of portfolio not under stress is kept at 100%.

3. Balance Sub-standard and doubtful assets portfolio is net exposure after deducting 'portfolio under stress:
   Baseline: 1350 - 135 = 1215
   Medium: 1350 – 202.5 = 1147.5
   Severe: 1350 - 270 = 1080

4. Risk Weighted Assets under three levels of severity is computed as below:
   Baseline: (135 * 125%) + (1215 * 100%) = 1383.75
   Medium: (202.5 * 125%) + (1147.5 * 100%) = 1400.63
   Severe: (270 * 125%) + (1080 * 100%) = 1417.5

5. The post-stress capital requirements is the minimum amount of capital the bank must carry to maintain a CRAR of 9%. It is calculated as (Net exposure * stressed RWA*Target Capital %). For three levels of severity is computed as below:

   Baseline: 1383.75 * 9% = 124.53
   Medium: 1400.63 * 9% = 126.06
   Severe: 1417.5 * 9% = 127.58

c) Impact assessment

I. Under Normal Condition

		Normal condition
Normal Condition	Credit Risk Capital	250
	Credit Risk Weighted Assets	2347.5
	Credit Risk CRAR	10.65%
	Capital required to meet Target Credit Risk CRAR under normal condition	211.28
	Comment on Existing Capital (if any)	*The bank is above Target CRAR level under normal condition*

II. Under Stress Condition:

		Baseline	Medium	Severe
Stressed Condition	Capital required to meet Target Credit Risk CRAR under stressed condition	218.81	221.45	224.09
	Additional Capital required under stressed condition	7.53	10.17	12.81
	Post Stress RWA	2,431.19	2,460.53	2,489.88
	Capital post stress (Addl. SMA-2 provision)	248.25	247.75	247.25
	Post Stress CRAR	**10.21%**	**10.07%**	**9.93%**
	Net Impact	**-0.44%**	**-0.58%**	**-0.72%**

Note: The stressed condition summarises the sensitivity analysis of Standard Assets

1. Capital required as computed for Standard assets and Sub-standard & doubtful Assets in the 4.1.2 (b). It is shown below:
   Baseline: (94.27 + 124.54) = 218.81
   Medium: (95.39 + 126.06) = 221.45
   Severe: (96.51 + 127.58) = 224.09
2. The post-stress RWA is total of RWA of Standard assets and Sub-standard & doubtful Assets under stressed condition as computed in 4.1.1 (b).
3. The post stress capital denotes the existing credit risk capital after deducting additional provision required in stress scenario. It is computed as below:
   Baseline: 250 - 1.75 = 248.25
   Medium: 250 – 2.25 = 247.75
   Severe: 250 – 2.75 = 247.25
4. The post –stress CRAR based on the post-stress capital and post-stress RWA.

4.1.2. Shock 2: Concentration Risk - Default by largest borrowers

a) Shock: Default by largest single borrowers: **Baseline -** Default by top one, **Medium -** Default by top two, **Severe -** Default by top three

b) Input data: Top three borrowers based on amount outstanding shall be considered as input for this shock.

Illustration:

Amount in Rs.

Description of Borrower	Total Outstanding	Risk Weight	RWA
Largest borrower by exposure size	3000	100%	3000
Second largest borrower by exposure size	2000	100%	2000
Third largest borrower by exposure size	1000	100%	1000

Existing capital	50,000
Existing RWA	5,25,000

c) Sensitivity analysis:

Assumptions:

Risk weight	for Standard Asset as well as Substandard asset	100%
Provisioning	For Standard Assets	0.4%
	For Substandard	25%

Credit risk stress test template for Shock 2:

Stress	Baseline	Medium	Severe
(A) Exposure at stress	3,000	5,000	6,000
(B) Addl. Provision on NPA (Exposure at stress * 25%)	750	1,250	1,500
(C) Provision on Standard Assets (Exposure at stress * 0.40%)	12	20	24
(D) Incremental Provision [(B) – (C)]	**738**	**1,230**	**1,476**
(E) Risk Weighted Assets on additional NPA as per provisioning matrix [(A) – (B)]	2,250	3,750	4,500
(F) Old RWA of Standard Asset @100%	3,000	5,000	6,000
(G) Incremental Risk Weighted Assets	**-750**	**-1,250**	**-1,500**

Note: As per the shock as stated in 6.1.2 (a) above, the exposure at stress is:
Baseline: Default of top borrower (by amount outstanding) = 3000
Medium: Default of top two borrowers = 3000 + 2000
Severe: Default of top three borrowers = 3000 + 2000 + 1000

d) Impact assessment:

Particulars	Baseline	Medium	Severe
Existing Capital*	50,000	50,000	50,000
Revised Capital	49,262	48,770	48,524
Existing Risk Weighted Assets*	5,25,000	5,25,000	5,25,000
Revised Risk Weighted Assets	5,24,250	5,23,750	5,23,500
Existing CRAR	9.52%	9.52%	9.52%
Revised CRAR	9.40%	9.31%	9.27%
Additional Capital required to meet target CRAR	-	-	-

**As per input data shown in para 4.1.2 (b)*

Note:

1. Incremental provision shall be taken into account while calculating revised Capital.
2. The revised Risk Weighted Assets shall take into account the amount of incremental Risk Weighted Assets.

It is observed from above assessment that the revised CRAR remains above 9% in post-stress scenario. Hence, on the basis of this stress test alone, bank does not require additional capital.

4.1.3. Shock 3: Concentration Risk – Sector

a) Shock: Bank's exposure to different sectors: **Baseline -** Stress in topmost sector, **Medium -** Stress in top two sectors, **Severe -** Stress in top three sectors

b) Input data: The bank shall calculate total amount of exposure to each sector outstanding at the end of Financial Year. The bank top three sectors to which maximum the bank has maximum exposure shall be identified and be considered for conducting stress test.

Illustration:

Amount in Rs.

Description of Borrower	Total Outstanding	Risk Weight	RWA
Exposure to top most industry	8000	100%	8000
Exposure to second top sectors	6000	100%	6000
Exposure to third top sectors	5000	100%	5000

Particulars	Amount in Rs.
Existing capital	50,000
Existing RWA	5,25,000

c) Sensitivity analysis:

Assumptions	
Risk Weighted Assets for Standard Asset	100%
Risk Weighted Assets for NPA (substandard)	100%
Provisioning for Standard Assets	0.4%
Provisioning for Substandard	25%

Credit risk stress test template for Shock 3:

Stress	Baseline	Medium	Severe
(A) Exposure at stress	8,000	14,000	19,000
(B) Addl. Provision on NPA (Exposure at stress * 25%)	2,000	3,500	4,750
(C) Provision on Standard Assets (Exposure at stress * 0.40%)	32	56	76
(D) Incremental Provision [(B) – (C)]	**1,968**	**3,444**	**4,674**
(E) RWA on additional NPA as per provisioning matrix [(A) – (B)]	6,000	10,500	14,250
(F) Old RWA of Standard Asset @100%	8,000	14,000	19,000
(G) Incremental RWA	**-2,000**	**-3,500**	**-4,750**

Note:
1. This shock analysis the impact of stress to top three sector to which the bank is exposed to. Based on 4.1.3 (a), exposure at stress is calculated as follows:
Baseline: Default of top one sector i.e. 8,000
Medium: Default of top two sectors i.e. 8,000+6,000
Severe: Default of top three sectors i.e. 8,000+6,000+5,000

d) Impact Assessment

	Baseline	Medium	Severe
Existing Capital	50,000	50,000	50,000
Revised Capital	48,032	46,556	45,326
Existing RWA	5,25,000	5,25,000	5,25,000
Revised RWA (Existing RWA + Incremental RWA)	5,23,000	5,21,500	5,20,250
Existing CRAR	9.52%	9.52%	9.52%
Revised CRAR	9.18%	8.93%	8.71%
Additional Capital required to meet CRAR of 9%	0	379	1497

It is observed from above assessment that the revised CRAR remains above 9% in Baseline scenario. However, it falls below 9% in Medium and Severe levels. In order to maintain a CRAR of 9%, the bank will need to obtain additional capital of Rs. 379 in medium stress scenario and Rs. 1,497 in severe stress scenario.

Computation of Additional Capital:

Under stress condition, in case of the revised CRAR falling below 9%, the additional capital requirement shall be computed as (Target CRAR 9% - Revised CRAR) * Revised RWA. As per the illustration above,

Baseline: Since revised CRAR is 9.18% i.e. above target CRAR of 9%, additional capital requirement is 'nil'.

Medium: (9% - 8.93%) * 5,21,500 = 379

Severe: (9% - 8.71%) * 5,20,250 = 1497

6.1 Market Risk / Interest Rate Risk

a) Shocks: Upward and downward shift in the interest rate on the asset-liability gap. Level of shocks to be applied under each scenario:

Shocks	Upward	Downward
Baseline	2%	-2%
Medium	2.5%	-2.5%
Severe	3%	-3%

b) Input data: Statement of Interest Rate Sensitivity as on the year ended on 31 March shall form the input data for this stress testing exercise.

c) Sensitivity analysis: The stress tests on interest rate risk in banks involve calculation of impact on NII after considering downward and upward shocks.

Computation of Asset-Liability gap:

Particulars	Rate Sensitive Assets (RSAs) and Rate Sensitive Liabilities (RSL)							Non- Sensitive Assets & Liabilities	Total RSA & RSL
Buckets in Months	**0 to 1M**	**1 to 3M**	**3 to 6M**	**6 to 12M**	**12 to 36M**	**36 to 60M**	**Over 60M**	**-**	
(A) Liabilities	1,53,892	2,47,514	2,36,160	3,02,949	73,834	17,939	1,945	2,90,762	10,34,233
(B) Assets	1,66,611	1,53,521	2,37,512	2,87,639	89,294	55,960	2,34,231	1,00,226	12,24,768
(C) Gap (B-A)	12,719	-93,993	1,352	-15,310	15,460	38,021	2,32,286	-1,90,536	1,90,536
(D) Total Other Products	-	-	-	-	-	-	-	-	-
(E) Net Gap (C-D)	12,719	-93,993	1,352	-15,310	15,460	38,021	2,32,286	-1,90,536	1,90,536

Assumptions: Assets & Liability will reprice at the mid-point of the bucket

Calculation of mid-point of the bucket & repricing period

Buckets in Months	0 to 1M	1 to 3M	3 to 6M	6 to 12M
Bucket Start Point	0	1	3	6
Bucket End Point	1	3	6	12
Mid-Point of Bucket	0.50	2.00	4.50	9
No. of months in a year	12	12	12	12
Repricing period	0.96	0.83	0.63	0.25

Formula:

1. Mid-point of bucket = (Bucket end point + Bucket start point) / 2

2. Repricing Period = (No. of months in a year – Mid-point of the bucket)/ No. of months in a year

3. Bucket-wise Impact = (Repricing Period * Net Gap * Shock %)

4. Total NII Impact (yearly) = Sum of impact on Bucket 1,2,3,4

Market risk stress test template

Upward Shift

Scenario	Shocks	Bucket-wise Impact				NII Impact (Current year)	NII Impact (Previous year)	NII Impact as % of Tier 1 Capital
		0 to 1M	1 to 3M	3 to 6M	6 to 12M			
Baseline	2.0%	244	-1,567	17	-77	-1,382	2,000	-5.53%
Medium	2.5%	305	-1,958	21	-96	-1,728	2,000	-6.91%
Severe	3.0%	366	-2,350	25	-115	-2,074	2,000	-8.29%

Downward Shift

Scenario	Shocks	Bucket-wise Impact				NII Impact (Current Year)	NII Impact (Previous year)	NII Impact as % of Tier 1 Capital
		0 to 1M	1 to 3M	3 to 6M	6 to 12M			
Baseline	-2.0%	-244	1,567	-17	77	1,382	2,000	5.53%
Medium	-2.5%	-305	1,958	-21	96	1,728	2,000	6.91%
Severe	-3.0%	-366	2,350	-25	115	2,074	2,000	8.29%

(Note- NII impact of Previous Year (PY) is given as comparative figures)

NII Impact as a % of Tier I Capital denotes the risk to the interest income under baseline scenario. In an upward shift of interest rates, it is calculated as NII Impact / Tier I capital and is shown below under stress scenarios:
Baseline: -1,382 / 25,000
Medium: -1,727 / 25,000
Severe: -2,074 / 25,000

d) Impact on Net Interest Income (NII)

Upward Shift

Severity	Shocks	Tier 1 Capital	NII Impact (PY)	NII Impact (CY)	NII Impact as % of Tier 1 Capital*	*Interpretation
Baseline	2%	25,000	2,000	-1,382	-5.53%	Excessive Risk
Medium	2.50%	25,000	2,000	-1,728	-6.91%	Excessive Risk
Severe	3%	25,000	2,000	-2,074	-8.29%	Excessive Risk

Downward Shift

Severity	Shocks	Tier 1 Capital	NII Impact (PY)	NII Impact (CY)	NII Impact as % of Tier 1 Capital*	*Interpretation
Baseline	-2%	25,000	2,000	1,382	5.53%	Normal
Medium	-2.50%	25,000	2,000	1,728	6.91%	Normal
Severe	-3%	25,000	2,000	2,074	8.29%	Normal

Interpretation: If the NII impact as a percentage of Tier 1 Capital is greater than or equal to 5%, the IRR is considered excessive in bank's book.*

4.3 Liquidity Risk:

The liquidity risk stress test assesses the amount of short-term funds required in case of stress scenario.

a) Liquidity risk shocks:

Shocks	Baseline	Medium	Severe
Savings Deposits – 10%/15%/20% of core portion is withdrawn in 1 day - 28 days buckets	10%	15%	20%
Current Deposits - 10%/15%/20% of core portion is withdrawn in 1 day - 28 days buckets	10%	15%	20%
Time Deposits - 10%/15%/20% of core portion is withdrawn in 1 day - 28 days buckets	10%	15%	20%
Unscheduled draws on committed but unused credit and liquidity facilities – 20%/25%/30% of the limits above 28 days is drawn in 1 day - 28 days buckets	20%	25%	30%
Un-availed CC/OD limits – 20%/25%/30% of undrawn CC/OD limits above 28 days is drawn in 1 day - 28 days buckets	20%	25%	30%
Letters of Credit/ Guarantees – 20%/25%/30% of Letter of Credit / Guarantees limits above 28 days is invoked / devolved in 1 day - 28 days buckets	20%	25%	30%
Advances – 5%/10%/15% of accounts will turn to NPA thus reducing inflows in 1 day - 28 days buckets and will be repaid after 1 year	5%	10%	15%
Haircut on investments	2%	5%	10%

****Core portion:** *Core deposits is the sum of all deposits (including current and savings accounts) with maturity of more than a year (as reported in structural liquidity statement) and net worth*.

b) Input data: Structural Liquidity Statement (SLS) shall be used for the stress testing of liquidity risk. Hence, accuracy of data while preparing of SLS is of supreme importance.

c) Sensitivity analysis: The banks shall conduct undertake multi-factor stress test on liquidity risk to assess the impact on bank's cash flows, liquidity, solvency and profitability. The multiple factors considered for the stress testing on liquidity risk are cash inflows and cash outflows.

The bucket wise inflows and outflows shall be adjusted as per the stress level under each scenario. The cumulative gap between cash inflows and cash outflows as a percentage to Cumulative outflows indicate the Savings deposit and advances under post-stress scenario are shown below:

Illustration 1: Savings Deposits - 10% of core portion will be withdrawn in **1 day - 28 days** buckets:

	1 to 14 days	15 to 28 days	29 days and up to 3 months	Over 3 months and up to 6 months	Over 6 months and up to 1 year	Over 1 year and up to 3 years	Over 3 years and up to 5 years	Over 5 years	Total
Savings deposits – pre stress	100	150	120	-	-	250	160	90	1000
Savings deposits – post stress	125*	175**	120			225#	144	81	1000

Core deposits = 250 + 160 + 90 = 500. Under stress scenario, 10% of core deposits i.e. 50 is withdrawn in 1 day to 28 days bucket that is equally distributed in *'1 day to 14 days' and '15 days to 28 days'* bucket each.

*125 = 100+ (10% * (250+160+90)/2)
**175 = 150 + (10% * (250+160+90)/2)
#225 = 250 * (1 - 10%)

Illustration 2: Advances – 5% of accounts will turn to NPA thus reducing inflows in 1 day - 28 days buckets and will be repaid after 1 year

	1 to 14 days	15 to 28 days	29 days and up to 3 months	Over 3 months and up to 6 months	Over 6 months and up to 1 year	Over 1 year and up to 3 years	Over 3 years and up to 5 years	Over 5 years	Total
Advances – pre stress	120	150	130	100	210	150	100	40	1000
Advances – post stress	114*	142.50*	130	100	210	154.50	104.50	44.50	1000

Amount of Advances turning NPA under stress scenario = 5% of 270 (120 + 150) i.e. 13.5, thus reducing inflows in 1 – 28 days buckets.

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This amount viz. 13.5 is equally distributed between three buckets *'Over 1 year and up to 3 years', 'Over 3 years and up to 5 years', 'Over 5 years'*.

*114 /142.50 = 120/150 * 95%
152.50 = 150 + [((120+150)*5%)/3]
104.50 = 100 + [((120+150)*5%)/3]
44.50 = 40 + [((120+150)*5%)/3]

Liquidity risk stress test template

Liquidity risk stress test – Baseline scenario:

Amounts in Rs.

Particulars	1 to 14 days	15 to 28 days	29 days and up to 3 months	Over 3 months and up to 6 months	Over 6 months and up to 1 year	Over 1 year and up to 3 years	Over 3 years and up to 5 years	Over 5 years	Total
A. Inflows									
Advances - Pre stress scenario	1,38,065	30,550	1,62,211	2,55,405	6,56,941	1,12,785	81,801	3,02,088	17,39,845
Advances - Post stress scenario	*1,31,161*	*29,023*	*1,62,211*	*2,55,405*	*6,56,941*	*1,15,595*	*84,611*	*3,04,898*	*17,39,845*
Investments - Pre stress scenario	600	-	39,739	101	500	7,519	46,395	2,69,303	3,64,158
Investments - Post stress scenario	*588*	-	*38,945*	*99*	*490*	*7,368*	*45,467*	*2,63,917*	*3,56,875*
Total Inflows - Post Stress#	***2,27,480***	***29,023***	***2,01,156***	***2,75,514***	***6,57,431***	***2,33,119***	***1,45,146***	***7,10,232***	***24,79,099***
B. Outflows									
Deposits - Pre stress scenario	1,11,203	60,571	1,53,980	2,57,412	4,54,431	6,18,272	22,032	10,065	16,87,966

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Particulars	1 to 14 days	15 to 28 days	29 days and up to 3 months	Over 3 months and up to 6 months	Over 6 months and up to 1 year	Over 1 year and up to 3 years	Over 3 years and up to 5 years	Over 5 years	Total
Deposits - Post stress scenario	*1,43,721*	*93,089*	*1,53,980*	*2,57,412*	*4,54,431*	*5,56,445*	*19,829*	*9,059*	*16,87,966*
Savings Deposits	*88,985*	*27,605*	-	-	-	*4,96,896*	-	-	*6,13,486*
Current Deposits	*4,826*	*1,198*	-	-	-	*21,572*	-	-	*27,597*
Time Deposits	*49,910*	*64,286*	*1,53,980*	*2,57,412*	*4,54,431*	*37,977*	*19,829*	*9,059*	*10,46,883*
Unavailed Portion of Cash Credit/ Overdraft/ Demand Loan Component of Working Capital - Pre stress	19,421	-	-	-	-	1,10,038	-	-	1,29,459
Unavailed Portion of Cash Credit/ Overdraft/ Demand Loan Component of Working Capital - Post Stress	*30,425*	*11,004*	-	-	-	*88,030*	-	-	*1,29,459*
Invocation of Letters of Credit/ Guarantees - Pre stress	863	-	-	-	-	-	-	-	863
Invocation of Letters of Credit/ Guarantees - Post Stress	*863*	-	-	-	-	-	-	-	*863*
Total Outflows – Post stress#	**2,54,163**	**1,04,093**	**2,36,480**	**5,17,420**	**5,01,383**	**6,81,523**	**63,310**	**1,28,010**	**24,86,382**
C. Gap (A-B)	-26,683	-75,070	-35,324	-2,41,907	1,56,047	-4,48,404	81,836	5,82,221	-7,283
D. Cumulative Gap	-26,683	-1,01,753	-1,37,077	-3,78,984	-2,22,937	-6,71,340	-5,89,504	-7,283	-14,566

Particulars	1 to 14 days	15 to 28 days	29 days and up to 3 months	Over 3 months and up to 6 months	Over 6 months and up to 1 year	Over 1 year and up to 3 years	Over 3 years and up to 5 years	Over 5 years	Total
E. Cumulative Outflows	2,54,163	3,58,256	5,94,736	11,12,156	16,13,539	22,95,062	23,58,372	24,86,382	49,72,764
F. [Cumulative Gap / Cumulative Outflows] (D/E)	**-10.50%**	**-28.40%**	**-23.05%**	**-34.08%**	**-13.82%**	**-29.25%**	**-25.00%**	**-0.29%**	**-0.29%**
G. Regulatory Limit on Negative Gap	-10%	-20%							
Funding Required to be within (1 to 28 day) limit	1,267*	30,102*							

*Funding requirement is calculated as
1 to 14 days: [(-10.50%)-(-10%)] * 2,54,163
14 to 28 days: [(-28.40%)-(-20%)] * 1,04,093

#The total inflows and outflows in post stress scenarios includes other inflows and outflows (linked to Structural Liquidity Statement) which are not stressed but are to be included for calculating the Cumulative liquidity gap

The difference between *'Cumulative gap as a percentage to Cumulative Outflows*' at 10.50% is higher than '*regulatory limit'* of 10% under 1 day to 14 days bucket. The excess gap 0.5% indicates shortfall in bank's liquidity position and bank will need additional funding requirement under stress scenario.

The additional funding requirement is calculated as (Excess of Cumulative gap% over regulatory limit) * Total Cash Outflow.

The above template indicates funding requirement under Baseline scenario. Similar test shall be undertaken for Medium and Severe scenarios.

d) Impact assessment:

The impact of liquidity stress test is seen as a percentage of Tier 1 Capital.

Funding Requirement / Sources	Baseline	Medium	Severe	Remarks
Funding required to be within the prescribed (1 to 28 day bucket) limit	30,102	68,967	1,07,844	Derived from gaps under various scenarios
Assuming, 20% of funding required is raised through deposits at normal rates	6,020	13,793	21,569	Raising of demand and term deposits at normal rates
Further Funding Required	24,082	55,174	86,275	-
50% of the further funding through raising deposits at some additional cost*	30	138	431	Raising of fund by raising deposits by incurring higher cost
50% of the further funding is raised by selling investments at some haircut*	241	1,379	4,314	Raising of fund by selling 50% of valuable investments at haircut under baseline, medium and severe scenarios
Total Impact due to Stress	271	1,517	4,745	Impact on profitability / capital
Tier 1 Capital (Available)	87,000	87,000	87,000	Impact of raising liquidity as a % of Capital
Net Impact of Loss as % to Tier 1 Capital	**0.31%**	**1.74%**	**5.45%**	

***Assumptions:**

1. It is assumed that banks would raise 20% of the required funding without incurring any additional cost.
2. 50% of the further funding required through raising deposits at some additional cost and remaining 50% would be raised by selling investments at some loss under baseline, medium and severe scenario.
3. It is assumed that the borrowing facility is not available.

Impact on Expense/ Loss for Utilisation of Identified Funding

Funding Source	Baseline	Medium	Severe
Deposits - (Without any additional cost)	-	-	-
Deposits - at additional cost	0.25%	0.50%	1%
Selling of Investments (G-sec)	2%	5%	10%

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