



Data Maturity Assessment of the Civil Registration and Vital Statistics

Department of Civil Registration and Census, Ministry of Home Affairs

National Statistical Bureau

2025

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1 Introduction

1.1 Background

Bhutan's data ecosystem plays a pivotal role in enhancing governance, planning, and the delivery of citizen services. The Department of Civil Registration and Census (DCRC) under the Ministry of Home Affairs manages the Bhutan Civil Registration System (BCRS), a core national database that supports identity management, service delivery, and the production of vital statistics. Through the BCRS, the DCRC maintains and manages citizen and Special Resident Card (SRC) data, including birth and death registration, issuance of Citizenship Identity (CID) and SRC cards, and related administrative functions.

These datasets are essential not only for maintaining accurate population records but also for informing policy formulation and supporting national priorities. Recognizing the strategic importance of data, the National Data Governance Framework (NDGF), 2025 mandates periodic Data Maturity Assessments (DMA) to strengthen institutional capacities and ensure a coordinated national approach to data management. According to the 2024 Baseline Report, about 41% of agencies still lack structured data coordination (GovTech Agency & UN DESA, 2024), underscoring the need for standardized assessment and capacity development across the public sector.

1.2 Purpose of the Assessment

This Data Maturity Assessment evaluates the maturity of DCRC's BCRS data management practices using the Data Maturity Assessment Framework (DMAF), developed by the National Statistics Bureau (NSB). The assessment provides a structured analysis of the department's performance across four key dimensions: Institutional Arrangements, Data Collection and Processing, Data Quality and Metadata, and Data Sharing and Dissemination.

The primary aim is to establish a baseline maturity index for DCRC, identify key strengths and improvement areas across the data lifecycle, and recommend actions that align with the Bhutan Statistical Quality Assurance Framework (BSQAF), 2020 and NDGF 2025. Through this process, DCRC can better plan strategic interventions, enhance interoperability, and foster a culture of evidence-based decision-making.

1.3 Scope

The scope of this assessment is confined to citizen and SRC data maintained within the Bhutan BCRS. The data are administrative in nature, with vital statistics published in collaboration with the NSB. The assessment employs the DMAF, which consists of four dimensions and twelve categories, each rated on a 0–4 maturity scale ranging from Initial to Optimized. The evaluation is based on a self-assessment approach, supported by justifications for each score.

2 Methodology

2.1 Framework Overview

The assessment of BCRS data maturity was conducted using the Bhutan DMAF, developed by NSB. This framework is based on globally recognized models, including the Capability Maturity Model Integration (CMMI), Data Management Maturity (DMM), and DAMA-DMBOK (Data Management Body of Knowledge). It evaluates an organization's data practices across the entire data lifecycle and consists of four dimensions and twelve categories:

1. Institutional Arrangements – Governance, leadership, capacity, collaboration, and compliance/ethics.
2. Data Collection and Processing – Data mandate, standardization, digitization, integration, processing, and storage.
3. Data Quality and Metadata – Quality management, validation, cleansing, metadata management, and reference data.
4. Data Sharing and Dissemination – Data access, dissemination, interoperability, user engagement, and privacy.

Each category is scored on a 0–4 maturity scale:

- Initial (0): No formal processes or documentation.
- Developing (1): Practices exist but are ad hoc and inconsistent.
- Defined (2): Processes are documented but applied inconsistently.
- Managed (3): Processes are systematically applied with monitoring mechanisms.
- Optimized (4): Continuous improvement is embedded into processes and practices.

This framework provides a structured, repeatable, and standardized method to assess data maturity and identify areas for improvement.

2.2 Scoring and Analysis

Each of the twelve categories was evaluated using a 0–4 scale, where 0 represents the absence of formal processes and 4 denotes optimized practices with continuous improvement. Narrative justifications were provided for each score to explain the rationale and evidence supporting the rating.

All dimensions and categories were assigned equal weights in calculating the overall maturity index, ensuring equal importance is given to each category. Dimension indices were computed as the average of their respective category scores, while the overall maturity index was derived as the average of all four dimension indices. This approach provides a consistent and interpretable measure of data maturity, maintaining clarity in reporting strengths, gaps, and opportunities for improvement across the BCRS data lifecycle.

3 Findings

3.1 Summary Findings

The Data Maturity Assessment for the DCRC highlights an overall maturity index of 2.95, which can be leveled as “Defined”. As shown in the Figure 1, the DCRC demonstrates Defined to Managed level of data maturity across four dimensions.

Figure 1: Data Maturity Profile

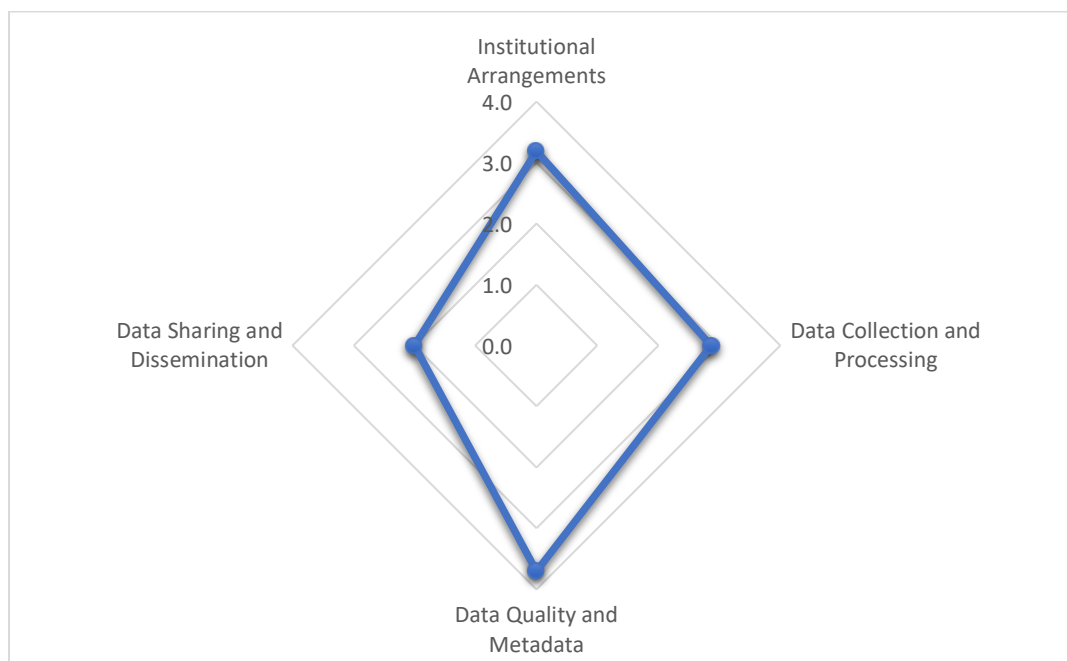
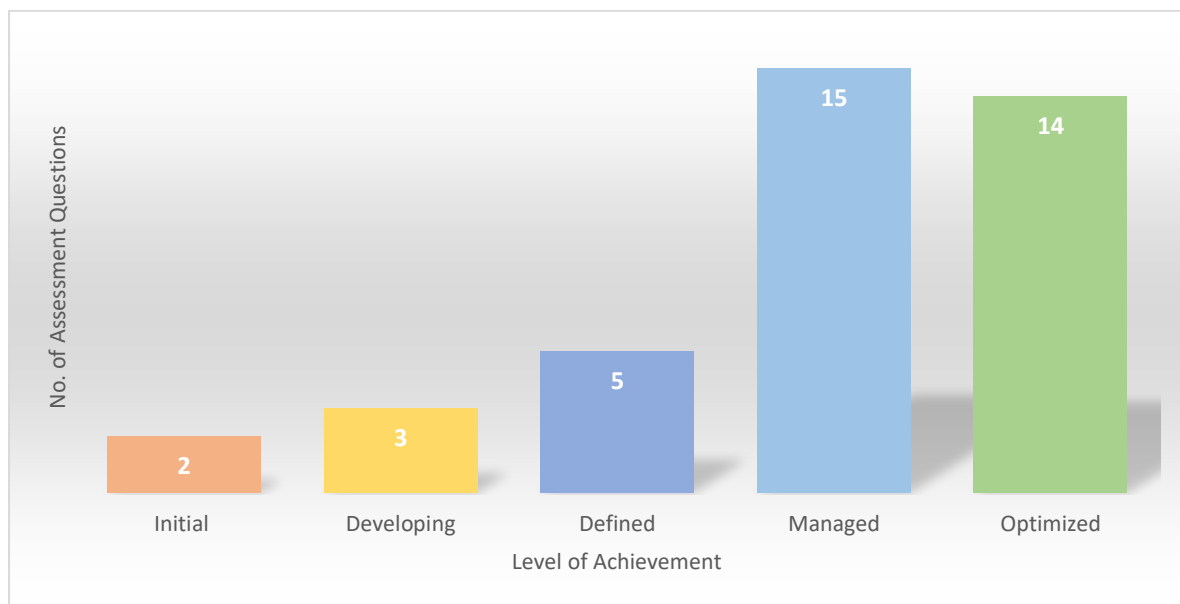


Figure 2 shows the number of assessment questions by the achievement level. Of the 39 assessment questions, 2 were responded as Initial, 3 Developing, 5 Defined, 15 Managed and 14 Optimized, indicating higher level of data maturity level. However, there are notable gaps in data dissemination and user engagement as most of the assessment questions are rated maturity level Defined and below.

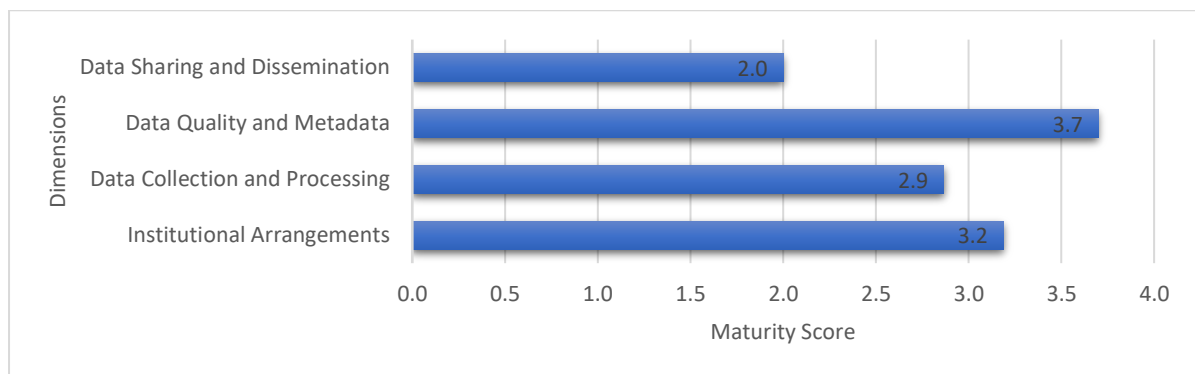
Figure 2: Number of Achievement by Level



3.2 Achievement Across Dimensions

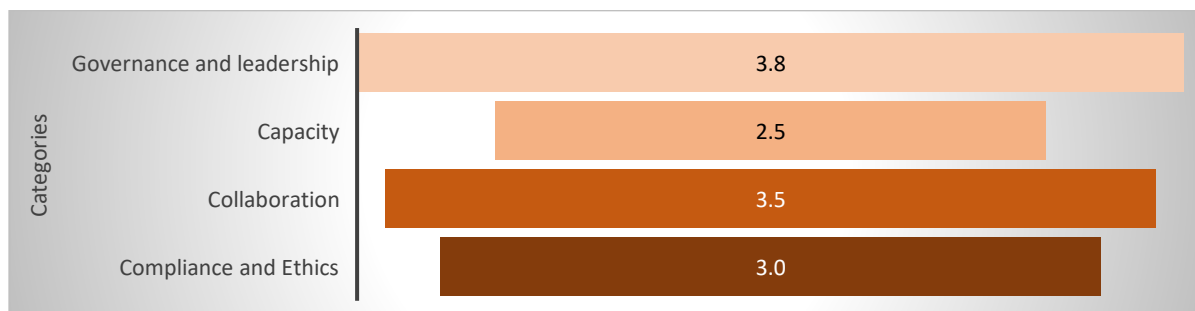
The Data Maturity Profile reveals an uneven distribution of progress across the four assessed dimensions. As shown in Figure 3, *Data Quality and Metadata* stands out with the highest score (3.7), indicating strong systems for maintaining data accuracy, completeness, and documentation. *Institutional Arrangements* follow closely (3.2), reflecting well-defined governance structures and coordination mechanisms. In contrast, *Data Collection and Processing* (2.9) shows moderate advancement, suggesting partial standardization but opportunities for further process optimization. The lowest score is observed in *Data Sharing and Dissemination* (2.0), highlighting significant gaps in interoperability, open data access, and timely dissemination of information.

Figure 3: Maturity Score by Dimensions



Institutional Arrangements (Index: 3.2 – Defined): The DCRC demonstrates strong governance and leadership, supported by clear mandates, defined roles, and accountability mechanisms. As shown in Figure 4, the department scored 3.8 in *Governance and Leadership*, 2.5 in *Capacity*, 3.5 in *Collaboration*, and 3.0 in *Compliance and Ethics*, resulting in an overall maturity index of 3.2 for this dimension. This score reflects the department’s well-established compliance with privacy and ethical standards. Collaboration across divisions promotes consistency in data management; however, capacity gaps persist in advanced data analytics and system optimization.

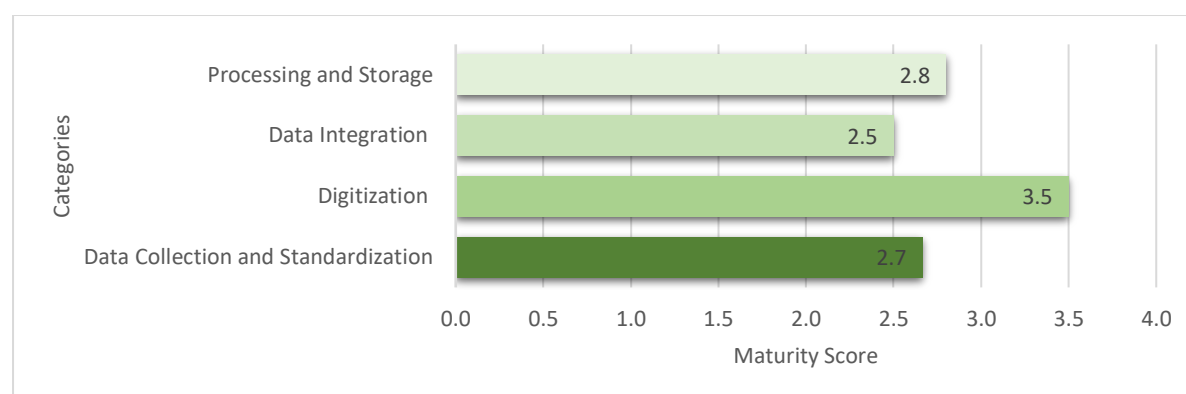
Figure 4: Maturity Score by Category under Institutional Arrangements



Data Collection and Processing (Index: 2.9 – Defined): While data collection processes are well-documented and aligned with national standards, the dimension demonstrates a moderate level of achievement. As illustrated in Figure 5, the department scored 2.7 in *Data Collection and Standardization*, 3.5 in *Digitization*, 2.5 in *Data Integration*, and 2.8 in *Processing and Storage*. The overall maturity index, calculated as the average of these four categories, stands at 2.9, corresponding to the “Defined” level of maturity.

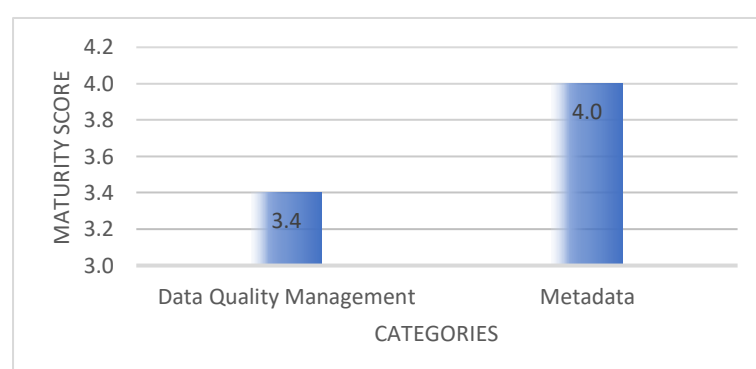
The BCRS is largely digitized, featuring automated validation mechanisms and efficient workflows. Integration within DCRC divisions is functional; however, interoperability with external systems remains limited. Secure storage, backup, and system maintenance procedures are well-established, ensuring data reliability. Nonetheless, some inconsistencies persist in the standardization and management of historical data migrated from earlier systems.

Figure 5: *Maturity Score by Category under Data Collection and Processing*



Data Quality and Metadata (Index: 3.7 – Managed): The DCRC demonstrates strong performance in data quality and metadata management, supported by automated validation, multi-level verification, and continuous monitoring. As shown in Figure 6, the department scored 3.4 in both *Data Quality Management* and *Metadata*, resulting in an overall maturity index of 3.7 for this dimension.

Figure 6: *Maturity Score by Category under Data Quality and Metadata*

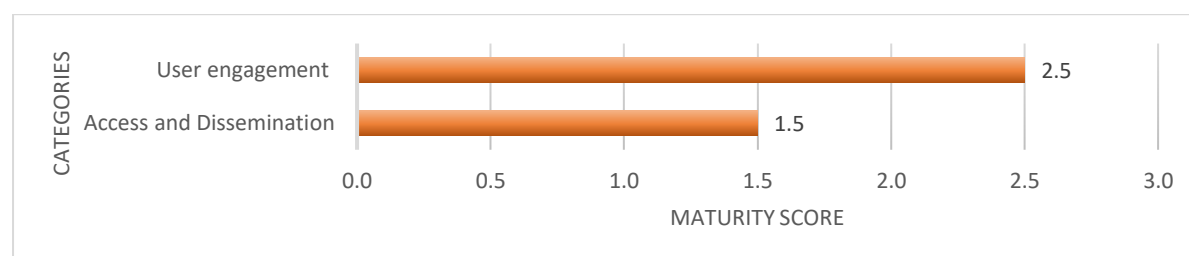


Metadata and reference datasets are comprehensive, standardized, and accessible via APIs, enhancing transparency, interoperability, and the reliable production of vital statistics such as births and deaths.

Data Sharing and Dissemination (Index: 2.0 – Defined): The department shows low maturity in this dimension, reflecting limited progress in data sharing and dissemination. As illustrated in Figure 7, the department scored 1.5 in *Access and Dissemination* and 2.5 in *User Engagement*, resulting in an overall maturity index of 2.0.

Current data sharing mechanisms are primarily limited to API access for select agencies, and internal reports are generated mainly for operational purposes. Public dashboards, structured external reporting, and systematic user engagement processes are largely absent. The lack of feedback loops and monitoring of data use restricts opportunities for wider utilization and continuous improvement.

Figure 7: Maturity Score by Category under Data Sharing and Dissemination



4 Recommendations

4.1 Category Specific Recommendations

This Recommendation Matrix summarizes the key priority actions based on the DCRC's BCRC Data Maturity Assessment. It highlights the current maturity scores, target achievements, and recommended actions for short- and medium-term implementation.

Dimension / Category	Current Score	Target Score	Key Recommendations / Actions	Timeline (Priority)
Governance & Leadership	3.8	Maintain	- Maintain current governance structure - Periodically review and update SoPs, data policies, and accountability mechanisms in line with NDGF	Short-Term (Ongoing)
Capacity	2.5	3.5+	Strengthen technical capacity through regular training on	2026–2027

			analytics, integration, and reporting • Create division-level data capacity/skills.	
Collaboration	3.5	4.0	• Expand API-based data integration agreements with other agencies.	2026-2027
Compliance & Ethics	3.0	3.5+	• Introduce dataset sensitivity classification • Conduct annual privacy and ethics refresher training.	2026-2027
Collection & Standardization	2.7	3.5	• Standardize definitions and data update protocols across Dzongkhags	2026-2027
Digitization	3.5	Maintain	• Continue system optimization by introducing automated error-flagging for real-time anomaly detection.	Ongoing
Data Integration	2.5	3.5	• Expand interoperability via secure APIs • Develop a data integration roadmap in collaboration with GovTech.	2026-2028
Processing & Storage	2.8	3.5	• Develop SoPs for data processing, analysis and visualization. • Implement archiving and retention policy	2026-2027
Data Quality Management	3.4	4.0	• Expand automated validations • Create real-time data quality monitoring dashboards and institutionalize periodic reviews.	2026-2027
Metadata & Reference Data	4.0	Maintain	• Continue maintaining and improving a comprehensive metadata	Ongoing
Access & Dissemination	1.5	3.0	• Review and develop dashboard to enhance dissemination • Continue to provide data access to users with enhanced data sharing mechanism	Ongoing

User Engagement	2.5	3.5	• Establish user feedback channels • Monitor API usage • Organize inter-agency engagement sessions.	2026-2027
Cross-Cutting	—	3.5+	• Align actions with BSQAF 2020 and NDGF 2025 • Conduct periodic reassessments using the DMA tool.	2026–2027

4.2 General Recommendations

To accelerate progress toward a Managed maturity level (Index ≥ 3.5), DCRC should prioritize a set of strategic initiatives designed to strengthen data governance, interoperability, quality, and user engagement:

1. **Develop dataset sensitivity classification and formalize data dissemination protocols:** Implement a structured framework to categorize datasets based on sensitivity, confidentiality, and regulatory requirements. This will guide secure access, sharing, and usage of data, ensuring compliance with privacy standards and reducing the risk of unauthorized disclosures.
2. **Expand API-based interoperability with key agencies through secure integration agreements:** Establish secure, standardized APIs to enable seamless data exchange with partner institutions. Formal integration agreements will clarify roles, responsibilities, and security protocols, improving timeliness and accuracy of shared information while supporting cross-agency analytics and reporting.
3. **Establish data quality monitoring dashboards and real-time validation systems:** Deploy automated dashboards and validation tools to continuously monitor the completeness, consistency, and accuracy of datasets. Real-time alerts and analytics will allow for rapid identification and correction of data issues, enhancing trust and reliability of the information.
4. **Conduct targeted capacity-building programs for technical and operational staff on data analytics, governance, and ethics:** Deliver training programs tailored to strengthen

skills in data management, analytical techniques, ethical handling of sensitive information, and governance best practices. Investing in staff capacity will build institutional expertise and sustain long-term improvements in data maturity.

5 Conclusion

The Data Maturity Assessment of the DCRChighlights both strengths and areas for improvement across the data lifecycle. The department demonstrates strong performance in Data Quality and Metadata (Index: 3.7) and well-defined Institutional Arrangements (Index: 3.2), reflecting effective governance, compliance with standards, and robust quality management practices. Data Collection and Processing (Index: 2.9) is moderately mature, with well-digitized workflows and functional internal integration, though gaps remain in standardization and advanced analytics capacity. The lowest maturity is observed in Data Sharing and Dissemination (Index: 2.0), indicating limited interoperability, weak external reporting mechanisms, and insufficient user engagement.

Overall, the assessment suggests that while foundational systems and quality assurance mechanisms are largely in place, targeted efforts are needed to enhance data sharing, interoperability, and analytical capacity. Prioritizing these areas will enable the DCRcto move toward a fully managed data maturity level, improving the reliability, accessibility, and impact of its data for both operational and policy purposes.

6 References

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7 Annexures

Annexure I: Key of Justification provided by the Department of Civil Registration and Census

Category	Score	Justification
Governance and Leadership	3.8 (optimized)	Clear mandates and defined roles guided by the Citizenship Acts and SoPs; accountabilities are defined at operator, verifier, and approver levels. SoPs are regularly updated to address emerging challenges.
Capacity	2.5 (Defined)	Operational training is ongoing; advanced analytics and data integration skills need strengthening to enhance self-reliance.
Collaboration	3.5 (Managed)	Built-in systems ensure intra-departmental collaboration; opportunities exist to further reduce duplication and improve data quality.
Compliance and Ethics	3 (Managed)	Privacy and ethical standards are enforced via NDAs and controlled information sharing; data protection aligns with GovTech guidelines, though further alignment with ICM regulations is needed.
Data Collection and Standardization	2.7 (Defined)	Data collection is systematic with SOPs and consistent definitions, but minor variations across districts remain.
Digitization	3.5 (Managed)	Fully digitized system with automated validation reduces errors; occasional manual cleaning required for historical data.
Data Integration	2.5 (Defined)	Internal integration is functional; external interoperability is limited, though APIs and barcode/QR code features support selective data sharing.
Processing and Storage	2.8 (Managed)	Secure processing and storage with backups at GDC; historical data maintained and operational safeguards ensure continuity.
Data Quality Management	3.4 (Managed)	Automated validation and multi-tiered verification ensure accuracy; continuous monitoring detects and

		corrects errors. BCRS data supports reliable Vital Statistics Reports.
Metadata and Reference Data	4 (Optimized)	Metadata is standardized, comprehensive, and accessible via APIs, supporting interoperability and cross-agency data sharing.
Access and Dissemination	1.5 (Defined)	Data is shared with select stakeholders via APIs; public dashboards and external reporting are lacking, limiting broader use.
User Engagement	2.5 (Defined)	No formal feedback or monitoring mechanisms; increased user base exists but opportunities for systematic engagement and continuous improvement are limited.

Annexure II: Achievement Level by Number of Questionnaires in Each Category

