International Telecommunication Union
Development Sector

Africa-BB-Maps Baseline Assessment & Maturity Matrix

June 2025

ITU

Maturity Matrix Analysis

To assess the maturity level of each of the beneficiary countries of Africa-BB-Maps, a survey was conducted. This survey allowed ITU to draft a first analysis of the current state of broadband mapping in each of the beneficiary countries, based on the answers provided, on ITU statistics, and the participants' presentations. This annex details the methodology used to evaluate the survey answers, and the results obtained.

Rationale

The survey was divided in 5 sections:

1. Broadband policy and Strategic Planning (12 questions)
2. Broadband infrastructure mapping systems (5 questions)
3. Broadband service mapping and regulatory monitoring (6 questions)
4. Data collection, verification and accuracy (5 questions)
5. Infrastructure, coverage, resilience and expansion (8 questions).

Section 4 concerns only countries already with a broadband mapping system.

The survey thus counts a total of 36 questions. Each question is attributed an importance level (A, B or C) which determines its relative weight in assessing the respondent's country maturity regarding broadband mapping. In practice, this means that type A questions bring maximum 3 maturity points, type B questions maximum 2 points, and type C questions maximum 1 point.

Each question in the survey is one of two types:

- Progressive questions

Those questions measure how advanced a country is advanced in certain areas linked to broadband mapping, for example question 1: "Does your country have government initiatives or public policies related to broadband mapping?" goes from (No formal broadband mapping strategy exists" to "Yes, with a structured plan and budget": the answers are progressive.

In this type of question, the more advanced the country, the better the maturity. Each possible answer is attributed a score from 0 to the maximum allowed by the question's type (1,2 or 3 for C, B or A), with regular spacing (mathematically, $spacing = \frac{Level\ of\ answer}{Number\ of\ possible\ answers}$).

- Multiple choice questions

Some questions can have multiple answers. This is the case for example of question 2: "which types of broadband technologies are most widely deployed in your country?", where a respondent can choose multiple answers between Fibre optic, Coaxial Cable, Wireless Networks, Copper pair and satellite.

In this case, the score attributed to each answer is such that, if a respondent chooses all possible answers, it gets the maximal possible score (depending on whether the question is classified as type A, B or C). In mathematical terms, it means that $answer\ score = \frac{Max.\ possible\ score}{Number\ of\ possible\ answers}$.

This allows for an easily explainable and equitable rating of each question, to get a simple but understandable view of each country's maturity – between advanced, medium and initial stage maturity.

Analysis

With this methodological framework, the maturity level of each respondent country was assessed and is presented graphically. A section-by-section heatmap, a spider graph and plots of countries comparing their relative maturity in 2 dimensions (e.g. infrastructure mapping and service mapping) are presented.
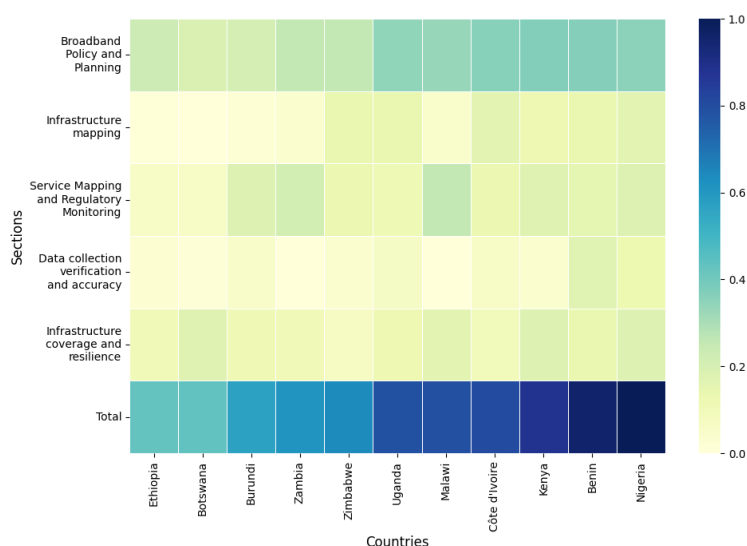
Maturity Matrix Heatmap

Figure 1: Maturity Matrix Heatmap, showing results by country and by survey section
(Source: Graph made by project team)

ITU identifies the 4 first countries (Nigeria, Benin, Kenya, Côte d'Ivoire) as advanced. Malawi, Uganda, Zambia and Zimbabwe follow with medium maturity, and Burundi, Botswana and Ethiopia are still in initial stages.

- For example, Benin is ranked second most-mature country according to this survey and scoring framework. With the heatmap, one can understand that this higher score is partly due to its advancement in "data collection verification – and accuracy", where Benin is the most mature of the 11 countries.
- Another example: Uganda has a quite balanced score in each section, where most of its scores have a colour like the rest of the countries, except regarding "data collection verification – and accuracy" where its score is relatively higher, right behind Benin. These observations can help explain Uganda's position in the maturity spectrum.
- Botswana has a relatively high maturity regarding "Infrastructure coverage and resilience "(between 0.2 and 0.4) but has room for progress when it comes to "Data collection verification and accuracy" or "Infrastructure Mapping".

With the heatmap, the reader can quickly visualize which countries are more advanced, and which ones are still in early stages. The granularity level of the matrix (section by section) allows for better explainability of the results.

Categorized Scatter Plot of Maturity Level

The following graph is a two-dimensional plot of the participant countries' total score against their maturity level.
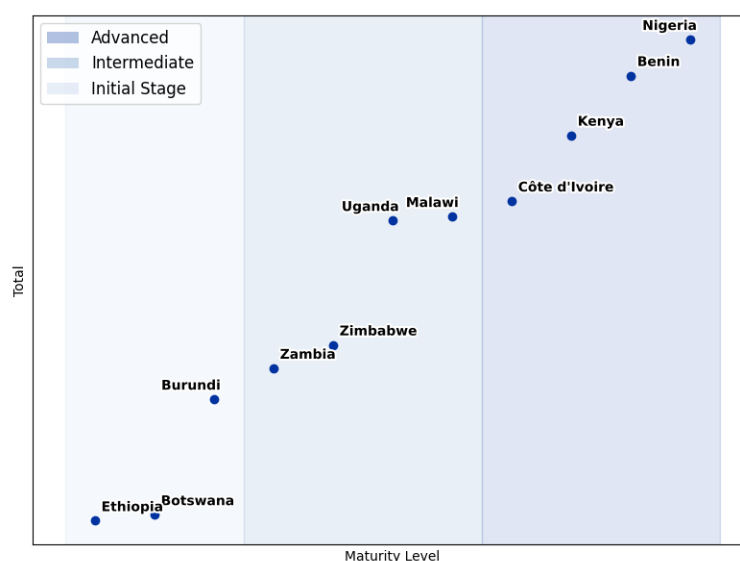

Figure 2: Maturity level plotted with the country's relative score
The more to the right and to the top, the more advanced the country is
(Source: Graph created by the Africa-BB-Maps project team)

This analysis is not intended as a performance evaluation. It is instead a reference document that supports three main functions:

- First, it provides the project team and other stakeholders with a structured snapshot of the situation across countries, identifying what capabilities exist and where key limitations persist.
- Second, it introduces a common vocabulary for understanding maturity in broadband mapping systems, so that discussions around technical assistance and investment planning can proceed on shared terms.
- Third, it enables peer comparison—not to foster competition, but to facilitate learning, adaptation, and the diffusion of practical solutions from more advanced systems to those at earlier stages of development.

In summary, the following table presents the maturity clusters identified thanks to the survey:

Nigeria	Advanced stage
Benin	Advanced stage
Kenya	Advanced stage
Côte d'Ivoire	Advanced stage
Malawi	Medium stage
Uganda	Medium stage
Zimbabwe	Medium stage
Zambia	Medium stage
Burundi	Initial stage
Botswana	Initial stage
Ethiopia	Initial stage

Table 1: Maturity levels of the 11 participant countries

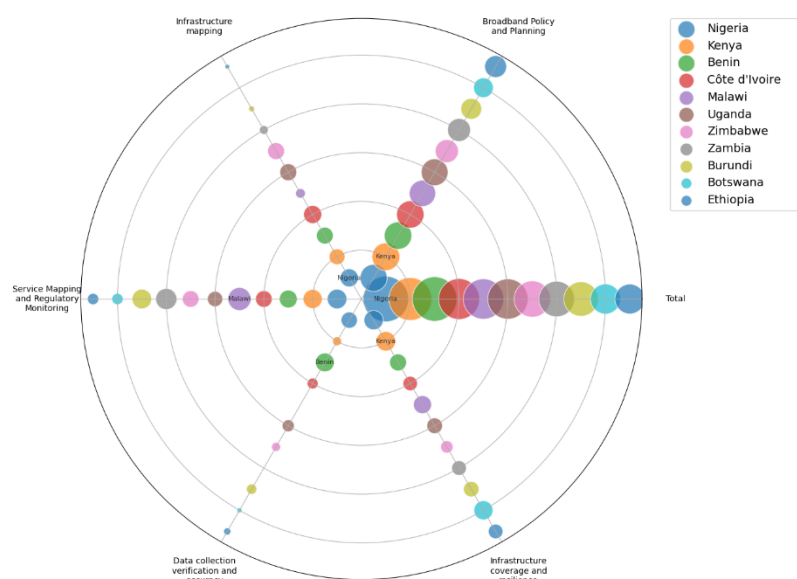Spider Graph of Maturity Matrix Survey Sections and Maturity Level

Figure 3: Spider graph of Maturity Matrix results, by country, by survey section
The bigger the circle sizes, the more advanced the country's performance in the related category. The name of
the most advanced country of each category is written in the corresponding circle
(Source: Graph created by the Africa-BB-Maps project team)

This spider graph displays countries' maturity level in each of the survey's categories. The sizes of the circles are proportional to the maturity level of each country. For each section, the name of the most mature country is written in the corresponding circle (for example, the reader can see that Kenya is the most mature country in "Infrastructure coverage and resilience"). A legend allows to identify each country by its colour. It allows to identify the strengths and weaknesses of each of the respondent countries.

Here are a few examples to see how this graph can be read:

- For example, Benin's strength in "Data collection, verification and accuracy" is shown by the relatively bigger size of Benin's green circle in the bottom left line, compared to other countries;
- Kenya's advanced maturity in many of the areas evaluated through the survey is visible, as the blue circles are often the biggest of each line.
- Additionally, Burundi's strongest point is on "Broadband Policy and Planning", but can improve "Infrastructure Mapping" and "Infrastructure Coverage and Resilience", since the circles of this country in both these areas is relatively small.

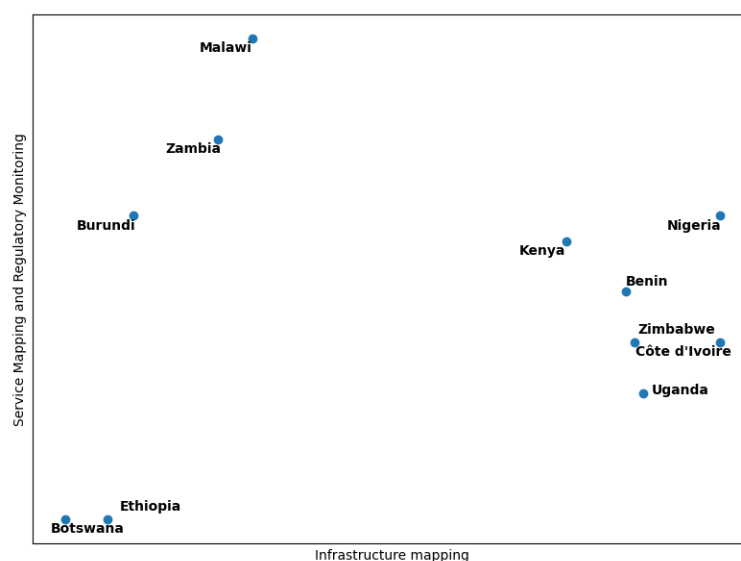## Infrastructure Mapping & Service Mapping and Regulatory Monitoring

Figure 4: Countries' scores in "Infrastructure Mapping" and "Service Mapping & Regulatory Monitoring"
The more to the right and to the top, the higher the country's score is in the related axis
(Source: Graph created by the Africa-BB-Maps project team)

This 2-dimensional plot allows to evaluate the answers of the countries to the questionnaire, through the lens of Infrastructure and Service mapping. It shows three clusters:

- The most advanced countries in "Infrastructure mapping" include Kenya, Nigeria, Benin, Zimbabwe, Côte d'Ivoire and Uganda. They are however less advanced when it comes to Service Mapping and Regulatory Monitoring.
- Countries most advanced in "Service mapping and regulatory monitoring" are Malawi, Zambia and Burundi. They are however less advanced when it comes to Infrastructure mapping.
- Botswana and Ethiopia are at an initial stage in both areas.

Broadband Policy and Planning & Service Mapping and Regulatory Monitoring
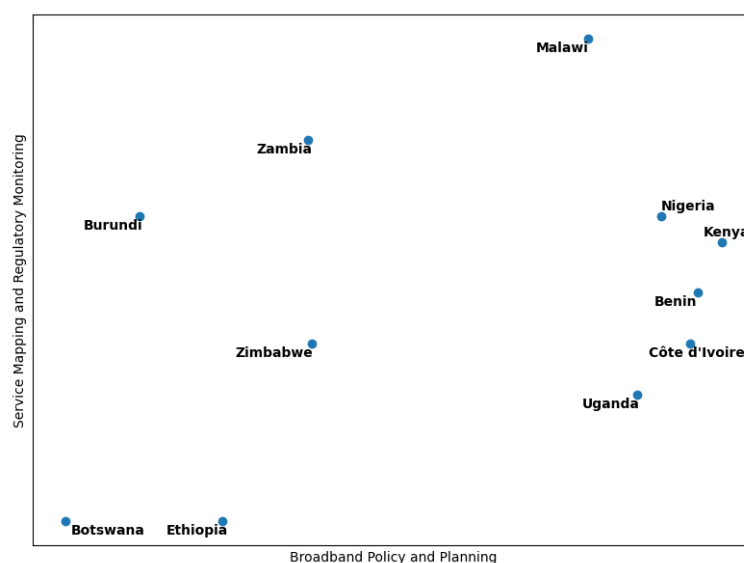

Figure 5: Countries' scores in "Broadband Policy and Planning" and
"Service Mapping and Regulatory Monitoring"
The more to the right and to the top, the higher the country's score is in the related axis
(Source: Graph created by the Africa-BB-Maps project team)

This 2-dimensional plot allows to evaluate the answers of the countries to the questionnaire, through the lens of Policy/Planning, and Service mapping. One can identify three clusters with overlapping members:

- The most advanced countries in "Broadband Policy and Planning" include Kenya, Nigeria, Benin, Côte d'Ivoire, Uganda and Malawi. They are however less advanced when it comes to Service Mapping and Regulatory Monitoring (except for Nigeria and Malawi).

- Countries most advanced in "Service mapping and regulatory monitoring" are Malawi, Zambia, Burundi and Nigeria. They are however less advanced when it comes to Infrastructure mapping (except for Nigeria and Malawi).

- Botswana and Ethiopia are at an initial stage in both areas. Zimbabwe is in a relatively more advanced maturity state than these two countries, but still does not belong to cluster 1 or 2.

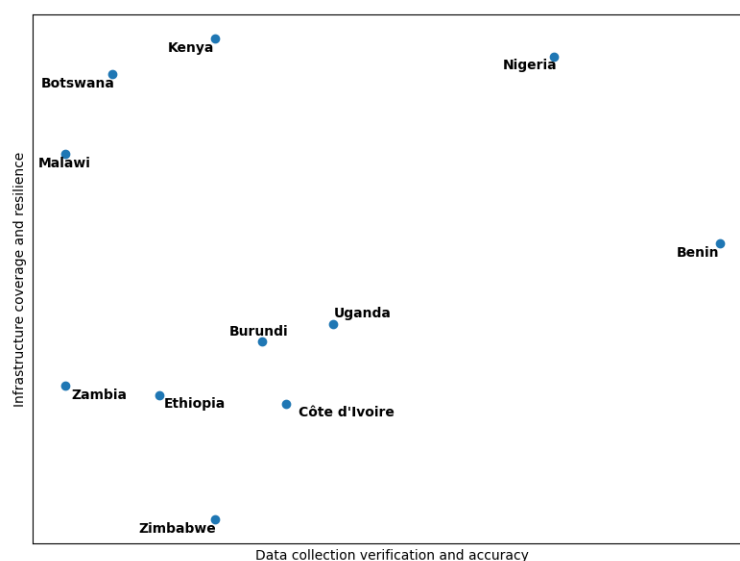Data Collection Verification and Accuracy & Infrastructure Coverage and Resilience

Figure 6: Countries' scores in "Data collection verification and accuracy"&
"Infrastructure Coverage & resilience"
The more to the right and to the top, the higher the country's score is in the related axis
(Source: Graph created by the Africa-BB-Maps project team)

This 2-dimensional plot allows to evaluate the answers of the countries to the questionnaire, through the lens of Data collection, verification and accuracy, and Infrastructure Coverage and resilience. One can again identify three clusters:

- The most numerous cluster groups together countries with relatively low maturity levels in both sections: Zambia, Ethiopia, Zimbabwe, Burundi, Côte d'Ivoire and Uganda.
- Countries most advanced in "Data collection verification and accuracy" are Benin and Nigeria. They are also quite advanced when it comes to Infrastructure coverage and resilience (especially Nigeria).
- Malawi, Botswana and Kenya show advanced maturity in "Infrastructure coverage and resilience", while having earlier stages of development of "Data collection verification and Accuracy". Nigeria also has a relatively mature infrastructure coverage and resilience ecosystem.

Questions asked in the survey

Following are the questions asked in the survey:

Section / Question	Answer
Section 1: Broadband Policy and Strategic Planning	
Q1: Does your country have government initiatives or public policies related to broadband mapping?	• Yes, with a structured plan and budget; • Yes, but without a structured implementation plan; • No formal broadband mapping strategy exists
Q2: Which types of broadband technologies are most widely deployed in your country? (Multiple selections)	• Fibre optic; • Coaxial Cable; • Wireless networks; • Copper pair; • Satellite
Q3: What is the main objective of your broadband expansion strategy?	• Extension of fibre optic broadband; • Expansion of satellite broadband; • Development of mobile broadband (3G/4G/5G); • Other, please specify
Q4: Does your country have specific broadband penetration targets for the next five years?	• Yes, for both urban and rural areas; • Yes, but only for urban areas; • No formal broadband penetration targets; • Other, please specify
Q5: Does your country have a broadband mapping system?	• Yes, it is publicly accessible; • Yes, but it is not publicly accessible; • We collect and develop internal maps, but they do not constitute a true system; • We collect data only, without mapping; • No, and we do not collect any data

Q6: Are there policies or incentives to encourage the expansion of mobile and satellite broadband in rural areas?	• Yes, with active government support; • Some incentives exist, but implementation is weak; • No policies or incentives
Q7: Does your country have a broadband roadmap specifically for underserved communities?	• Yes, with active government support; • Some initiatives exist, but implementation is weak; • No initiatives
Q8: Does your agency have a dedicated division responsible for broadband infrastructure and development?	• Yes; (If yes, does it include GIS experts? Yes / No); • No
Q9: How many personnel are part of the legal and policy department?	• More than 15; • 5 to 15; • Less than 5
Q10: How many employees are part of the network and infrastructure division?	• More than 5; • Between 3 and 5; • Less than 3
Q11: Are there national broadband targets for the next 5 years?	• Yes; • No
Q12: Is broadband mapping integrated into national infrastructure projects?	• Yes; • No
Section 2: Broadband Infrastructure Mapping Systems	
Q13: Does your country have a national broadband infrastructure mapping system?	• Yes, with regularly updated data and public access; • Yes, but it is not regularly updated or fully accessible; • No formal broadband infrastructure mapping system exists

Q14: If yes, who manages the system?	• National Regulatory Authority (NRA); • Ministry responsible for ICT; • Other, please specify
Q15: Which infrastructure or coverage data are included in broadband mapping efforts? (Multiple selections)	• Backbone networks and fibre backhaul; • Mobile broadband towers (3G, 4G, 5G); • Satellite broadband coverage areas; Fixed broadband access networks (DSL, FTTH, Cable); • Power and energy infrastructure related to broadband; • None of the above – no infrastructure data is mapped
Q16: How are broadband infrastructure mapping data collected? (Multiple selections)	• Data provided by ISPs and telecom operators; Field surveys conducted by the government; • Validation by independent third parties; • Crowdsourced user reports and participatory data; • No structured data collection on broadband infrastructure
Q17: Is broadband infrastructure mapping integrated with other national infrastructure planning systems?	• Yes, integrated with transport, energy, urban planning; • Some level of integration exists, but not fully structured; • Broadband infrastructure mapping is isolated
Section 3: Broadband Service Mapping and Regulatory Monitoring	
Q18: Does your agency collect broadband coverage data?	• Yes, regularly and systematically; • Occasionally, but not systematically; • No broadband coverage data is collected
Q19: How is broadband coverage data collected? (Multiple selections)	• Self-reported by Internet Service Providers (ISPs); Government-led surveys;

	• Crowdsourced user data (speed tests, complaints, etc.); • Field audits and independent verification
Q20: Are ISPs legally required to submit broadband coverage and Quality of Service (QoS) data?	• Yes, with strict enforcement and penalties for non-compliance; • Yes, but enforcement is weak; • No legal obligation
Q21: Does your country publish broadband coverage data for public consultation?	• Yes, fully open and accessible; • Limited access for stakeholders only; • No public access to broadband data
Q22: Is there a national or regional framework to coordinate cross-border data collection and broadband mapping standards?	• Yes, a robust framework is in place; • Partial cooperation, but no structured framework; • No framework exists
Q23: Are there formal sanctions or incentives to ensure compliance with broadband data submission?	• Yes, with clear penalties and/or incentives; • Some measures exist, but they are rarely enforced; • No enforcement mechanism
Section 4: Data Collection, Verification, and Accuracy	
Q24: What methods are used to collect broadband coverage data? (Multiple selections)	• ISP reports; • Crowdsourced data; • Automated real-time data validation tools; • Independent field surveys; • Government-led audits
Q25: Does your broadband mapping system follow standardized GIS protocols (e.g., ITU recommendations)?	• Yes, fully standardized; • Partially standardized; • No standardization

_____

Q26: How frequently are broadband coverage maps or datasets updated and verified?	• Continuously / in real-time; • Quarterly or more frequently; • Annually; • Ad hoc updates
Q27: Does your broadband mapping system systematically integrate user-reported issues and network complaints?	• Yes, with automated verification and real-time updates; • Yes, but data is verified manually and updated infrequently; • No, user feedback is not systematically used
Q28: Does your broadband mapping process include validation by an independent third party (e.g., audits, field tests)?	• Yes, with regular independent audits verifying ISP data; • Yes, but audits are occasional and not standardized; • No third-party validation
Section 5: Infrastructure, Coverage, Resilience, and Expansion	
Q29: How does your country define "rural areas"?	• Population density between 0 and 100 inhabitants/km²; • Population density between 101 and 200 inhabitants/km²; • Settlements with fewer than 2,500 inhabitants; Areas outside urban municipalities with limited infrastructure; • Other, please specify
Q30: What percentage of rural areas in your country have access to basic broadband (≥2 Mbps)?	• Above 60%, with national resilience and crisis response plans; • Between 30% and 60%, with partial resilience planning; <30%; • Below 30%, with no resilience strategy
Q31: What percentage of rural areas have access to broadband speeds	• Above 60%, with national resilience and crisis response plans;

meeting the ITU's minimum recommended threshold (≥10 Mbps)?	• Between 30% and 60%, with partial resilience planning; <30%; • Below 30%, with no resilience strategy
Q32: Does your country use the Universal Service Fund (USF) to develop broadband in underserved areas?	• Yes, with clear eligibility criteria; • Yes, but funding is limited; • No, the USF is not used for broadband
Q33: Are there specific policies to encourage investment in rural broadband infrastructure?	• Yes, with clear incentives; • Some efforts exist, but they are not well-structured; • No dedicated policy for rural broadband investment
Q34: Are there specific projects to improve network resilience (e.g., backup power, redundant links)?	• Yes, with published Service Level Agreements (SLAs); • Under development; • No such projects exist
Q35: To what extent are local municipalities or other community groups involved in broadband deployment planning and execution?	• Highly involved; • Some coordination, but limited; • Minimal involvement
Q36: Does your country have a roadmap or pilot programs for next-gen tech (e.g., 5G, advanced satellite) in urban and/or rural areas?	• Yes, with a fully developed pilot program; • Yes, but limited in scope; • No pilot program exists

Table 2: Questions asked in the questionnaire/survey, and associated answers

Category attributed to each question

The following table illustrates the Category attributed to each question (A, B or C).

Section / Question	Category	Focus
Section 1		
Q1	C	Policy (intangible, software)

Q2	B	Hardware/Software (mixed, tangible technologies)
Q3	C	Policy (intangible, software)
Q4	C	Policy (intangible, software)
Q5	A	Engineering (tangible, hardware)
Q6	C	Policy (intangible, software)
Q7	C	Policy (intangible, software)
Q8	A	Engineering (tangible, hardware)
Q9	B	Software (intangible, policy team)
Q10	A	Engineering (tangible, hardware)
Q11	C	Policy (intangible, software)
Q12	B	Software (intangible, integration)
Section 2		
Q13	A	Engineering (tangible, hardware)
Q14	A	Engineering (tangible, hardware)
Q15	B	Hardware/Software (mixed, tangible data)
Q16	B	Software (intangible, data collection)
Q17	B	Software (intangible, integration)
Section 3		
Q18	B	Software (intangible, data collection)
Q19	B	Software (intangible, data collection)
Q20	B	Software (intangible, regulation)
Q21	A	Engineering (tangible, public access)
Q22	C	Policy (intangible, software)
Q23	B	Software (intangible, regulation)

Section 4		
Q24	B	Software (intangible, data collection)
Q25	A	Engineering (tangible, hardware)
Q26	B	Software (intangible, updates)
Q27	A	Engineering (tangible, hardware)
Q28	A	Engineering (tangible, hardware)
Section 5		
Q29	C	Policy (intangible, definition)
Q30	B	Hardware (tangible, coverage)
Q31	B	Hardware (tangible, coverage)
Q32	C	Policy (intangible, software)
Q33	C	Policy (intangible, software)
Q34	B	Hardware (tangible, resilience)
Q35	C	Policy (intangible, software)
Q36	C	Policy (intangible, software)

Table 3: Category attributed to each question (A, B or C)

Category A is defined as of high importance, encompassing tangible, engineering and policy-focused questions that involve physical infrastructure and measurable outcomes, such as the presence of a broadband mapping system or a dedicated infrastructure division.

Category B is defined as of medium importance, including questions that blend tangible and intangible elements, such as the types of technologies deployed or methods of data collection.

Category C is defined as of low importance, focusing on intangible, policy- and strategy-oriented questions like the existence of penetration targets or rural broadband roadmaps plans.

This tiered structure ensures that the assessment prioritizes what delivers the most concrete results, connecting the categories to the practicality of broadband development.