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KENYA COUNTIES **DATA MATURITY** SURVEY REPORT

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LIST OF ABBREVIATIONS/ ACRONYMS

CIDP	County Integrated Development Plan
KNBS	Kenya National Bureau of Statistics
ICT	Information and Communication Technology
GHRIS	Government Human Resource Information System
NEMIS	National Education Management Information System
IFMIS	Integrated Financial Management. Information System
KHIS	Kenya Health Information System
ECDE	Early Childhood and Development Education
TVET	Technical and Vocational Education and Training
OCOB	Office of the Controller of Budget
CARA	Commission for Revenue Allocation
CAJ	Commission on Administrative Justice
CoG	Council of Governors
DHIS	District Health Information System
HMIS	Health Management Information Systems

EXECUTIVE SUMMARY

This survey was conducted to understand the level of data maturity in selected county governments and come up with a tool for county governments to assess their own levels of data maturity. Department heads from the governance, health, agriculture and education sectors of the eight counties included in this survey responded to a digital questionnaire either at in person interviews or online. Questions on data quality and availability were included to paint a picture of the current situation and the causality section was designed to investigate why the departments are at that level.

The results show that data maturity is highest in the health and governance sectors where systems are set in place by the national government to regularly collect and report detailed data to the public for use and transparency. Each department has its own system for data management which is geared towards populating quarterly and annual reports of progress towards the goals outlined in each county's development plan for the term of their elected officials. Most of the data is collected in physical forms and templates and collated at the sub county and county levels in digital form.

We recommend that counties work towards formalising data management manuals for all departments to ensure that counties are collecting, reporting and analysing data in the same format. These frameworks should look to digitise these processes as much as possible to improve access and accountability.

BACKGROUND

About Data Maturity

Data maturity is a measure of how effectively an organisation collects, manages and uses data for its operations and beyond. A data maturity model allows an institution to assess their data practices and identify areas for improvement to work towards the next level of the model. Defining the parameters of this journey can be a useful way of thinking about the different aspects of how value is created through data. As a good example, giving citizens open access to data on the operations and progress of their county governments allows them to be actively involved in planning and verification of programs and services offered by their government. This is a good indicator of mature data collection and use within government.

Objectives

The main objective of the maturity assessment is to explain the key enablers whose presence or absence and the lack of maturity thereof explains a deficiency in the overall data quality.

This assignment develops a practical and innovative data toolkit to enable counties to identify, collect, manage, analyse, and utilise data that objectively helps to understand the county, the state of its data maturity as well as govern it and plan better. The major goals of the exercise can be broken down as follows:

1. To measure the level of data maturity in eight Kenyan counties
2. To develop a standardised data maturity assessment toolkit that all county governments can use to measure their own level of data maturity
3. To provide county governments with data that can be leveraged in partnerships for resources to improve data infrastructure
4. To understand the challenges and limitations that prevent county governments from collecting, using and sharing data in their operations
5. To understand the ways in which county governments can be supported to work towards higher levels of data maturity

The table below outlines some characteristics of the counties in this study, ranging from desert regions with nomadic populations to metropolitan areas with established county government structures.

PARTICIPATING COUNTIES[1] STATISTICS

NAIROBI

POPULATION

		Urban	Rural Population
		Total area (sq. km)	Persons per sq. km
		704	6247
Male:	2,192,452	2,192,452	-
Female:	2,204,376	2,204,376	-
Intersex:	245		-
Total:	4,396,828	4,396,828	-

Average Contribution to GDP (2013-2017)

21.70%

Key Economic Activity

1. Services
2. Manufacturing

Gross County Product, 2017 (in million Kshs.))

1,492,323

County Share of Gross Value Added and Gross County Product (GCP) by Economic Activity, 2017

19.80%

INEQUALITY TRENDS

Annual mean per capita expenditure 2016 (Kshs)	Median real per capita expenditure 2016 (Kshs)	GINI coefficient 2015/16	Absolute Poverty 2015/2016 (%)
103,774	80,472	0.34	16.80%

SAMBURU

POPULATION

		Urban	Rural Population
		Total area (sq. km)	Persons per sq. km
		21,090	15
Male:	156,774	23,716	133,058
Female:	153,546	23,416	130,130
Intersex:	7	-	-
Total:	310,327	47,132	263,188

Average Contribution to GDP (2013-2017)

0.30%

Key Economic Activity

1. Agriculture
2. Services
3. Other industries

Gross County Product, 2017 (in million Kshs.))

26,503

County Share of Gross Value Added and Gross County Product (GCP) by Economic Activity, 2017

0.40%

INEQUALITY TRENDS

Annual mean per capita expenditure 2016 (Kshs)	Median real per capita expenditure 2016 (Kshs)	GINI coefficient 2015/16	Absolute Poverty 2015/2016 (%)
29,667	15,882	0.463	79.40%

WEST POKOT

POPULATION

		Urban	Rural Population
		Total area (sq. km)	Persons per sq. km
		9,123	68
Male:	307,013	15,544	291,469
Female:	314,213	16,297	297,916
Intersex:	15		-
Total:	621,241	31,841	589,385

Average Contribution to GDP (2013-2017)

0.70%

Key Economic Activity

1. Agriculture
2. Services
3. Other industries

Gross County Product, 2017 (in million Kshs.))

46,785

County Share of Gross Value Added and Gross County Product (GCP) by Economic Activity, 2017

0.60%

INEQUALITY TRENDS

Annual mean per capita expenditure 2016 (Kshs)	Median real per capita expenditure 2016 (Kshs)	GINI coefficient 2015/16	Absolute Poverty 2015/2016 (%)
24,897	19,544	0.344	57.40%

TURKANA

POPULATION

		Urban	Rural Population
		Total area (sq. km)	Persons per sq. km
		68,233	14
Male:	478,087	71,597	406,490
Female:	448,868	69,193	379,675
Intersex:	21	-	-
Total:	926,976	140,790	786,165

Average Contribution to GDP (2013-2017)

1.10%

Key Economic Activity

1. Agriculture
2. Services
3. Other industries

Gross County Product, 2017 (in million Kshs.))

78,301

County Share of Gross Value Added and Gross County Product (GCP) by Economic Activity, 2017

1.00%

INEQUALITY TRENDS

Annual mean per capita expenditure 2016 (Kshs)	Median real per capita expenditure 2016 (Kshs)	GINI coefficient 2015/16	Absolute Poverty 2015/2016 (%)
33,921	15,488	0.559	79.40%

NANDI

POPULATION

		Urban	Rural Population
		Total area (sq. km)	Persons per sq. km
		2,849	311
Male:	441,259	29,544	411,715
Female:	444,430	29,933	414,497
Intersex:	22		-
Total:	885,711	59,477	826,212

Average Contribution to GDP (2013-2017)

1.60%

Key Economic Activity

1. Agriculture
2. Services
3. Manufacturing
4. Other industries

Gross County Product, 2017 (in million Kshs.))

119,691

County Share of Gross Value Added and Gross County Product (GCP) by Economic Activity, 2017

1.60%

INEQUALITY TRENDS

Annual mean per capita expenditure 2016 (Kshs)	Median real per capita expenditure 2016 (Kshs)	GINI coefficient 2015/16	Absolute Poverty 2015/2016 (%)
35,499	28,431	0.316	36.00%

NAKURU

POPULATION

		Urban	Rural Population
		Total area (sq. km)	Persons per sq. km
		7,505	288
Male:	1,077,272	517,633	559,639
Female:	1,084,835	529,377	555,458
Intersex:	95	-	-
Total:	2,162,202	1,047,010	1,115,097

Average Contribution to GDP (2013-2017)

6.10%

Key Economic Activity

1. Agriculture
2. Services
3. Other industries
4. Manufacturing

Gross County Product, 2017 (in million Kshs.))

517,462

County Share of Gross Value Added and Gross County Product (GCP) by Economic Activity, 2017

6.90%

INEQUALITY TRENDS

Annual mean per capita expenditure 2016 (Kshs)	Median real per capita expenditure 2016 (Kshs)	GINI coefficient 2015/16	Absolute Poverty 2015/2016 (%)
60 576	43 265	0.381	39.10%

MAKUENI

POPULATION

Total area (sq. km): **8,177**

Persons per sq. km: **121**

		Urban	Rural Population
Male:	489,691	39,209	450,482
Female:	497,942	37,867	460,075
Intersex:	20		-
Total:	987,653	77,076	910,557

Average Contribution to GDP (2013-2017)

1.40%

Key Economic Activity

1. Services
2. Agriculture
3. Other industries

Gross County Product, 2017 (in million Kshs.))

100,924

County Share of Gross Value Added and Gross County Product (GCP) by Economic Activity, 2017

1.30%

INEQUALITY TRENDS

Annual mean per capita expenditure 2016 (Kshs)	Median real per capita expenditure 2016 (Kshs)	GINI coefficient 2015/16	Absolute Poverty 2015/2016 (%)
42,752	32,987	0.341	34.80%

MANDERA

POPULATION

Total area (sq. km): **25,942**

Persons per sq. km: **33**

		Urban	Rural Population
Male:	434,976	135,548	299,428
Female:	432,444	134,909	297,535
Intersex:	37	-	-
Total:	867,457	270,457	596,963

Average Contribution to GDP (2013-2017)

0.50%

Key Economic Activity

1. Agriculture
2. Services
3. Other industries

Gross County Product, 2017 (in million Kshs.))

35,101

County Share of Gross Value Added and Gross County Product (GCP) by Economic Activity, 2017

0.50%

INEQUALITY TRENDS

Annual mean per capita expenditure 2016 (Kshs)	Median real per capita expenditure 2016 (Kshs)	GINI coefficient 2015/16	Absolute Poverty 2015/2016 (%)
21,443	15,043	0.369	77.60%

APPROACH TO INDICATORS

The County Integrated Development Plans (CIDPs) prepared by all counties to outline development priorities for a five year period (2018-2022) use data projected from the 2009 census and hence annual strategies and budgetary allocation is based on forecasted data. The plan has indicators for each of the sectors that county governments are primarily responsible for. The baseline and target values for these indicators are in PDF documents on the respective county websites along with downloadable progress reports at intervals ranging from yearly to every 2 to 3 years, according to the mode of operations of the individual county government.

The Kenya National Bureau of Statistics (KNBS) is the official government agency tasked with collecting, compiling, analysing and disseminating statistical data. The KNBS website has downloadable county statistical abstracts in PDF format which has data for indicators in the CIDP, however most of these documents are not up to date. At the time of writing this report, only Makueni and Laikipia counties have updated their statistical abstracts after 2015 on the KNBS website[2].

County websites do not provide much programmatic data and where this data is publicly available, it can be incomplete, aggregated and without information on the methodology of data collection. Below is a sample of counties' information provided on the respective county government websites (Kilifi, Mandera, Nakuru, Nandi, Samburu, Turkana, West Pokot, Isiolo, Nairobi, Makueni) at the time of writing this report:

Table 2: Current data landscape

County	Sector	Data available
Mandera **(fact sheet for 2021)** http://www.mandera.go.ke/	Demographics	• Population • Poverty level
	Health	• Immunization coverage • Antenatal attendance • Deliveries conducted by skilled attendants • Number of functional health care facilities • Family planning uptake • Maternal mortality • Number of healthcare workers in each cadre
	Water and sanitation	• The percentage of the County's population being served through water trucking • The population of rural population with access to safe and reliable water services • The population of urban population with access to safe and reliable water services • The total population of the County with reasonable access to safe and reliable water services • Water Security (in Cubic Metres/Capita/Year)
	Education	• Enrolment in ECD • Classes, number of trained ECD teachers • Number of ECDE Teachers. • Number of public ECDE centers • Number of ECDE learners enrolled (Boys andGirls) • Number of ECDE teachers • Amount (Kshs) disbursed through bursary fund

Nakuru *http://www.nakuru.go.ke/*	Governance, Health, Education, Trade, Infrastructure, ICT	PDF reports with targets, achievements, budgetary allocation, and expenditure for various indicators for each of the listed sectors up to 2020
Nandi *http://nandi.go.ke/*	Various sectors	Regular newsletters focusing on work in different sectors
	Health	• Number of health centres • Doctor:population ratio
	County fiscal strategy paper	• Poverty rate • Skilled deliveries • Maternal mortality • Infant mortality • Budget allocations
	Education	• Number of primary and secondary schools • Number of students in primary and secondary schools

Samburu
http://www.samburu.go.ke/
	Health (2019-2020 report)	• Number of healthcare facilities at each level
		• Number of ambulances
		• Number of healthcare workers in each cadre
		• Budgetary allocation
		• Multiple indicators within:
		  • Communicable conditions
		  • Non-communicable conditions
		  • Violence and injuries
		  • Essential health care
		  • Access
		  • Quality and safety of care
		  • Service delivery

Turkana *https://www.turkana.go.ke/*	CIPD key performance indicators report 2018/19	Data on targets for various indicators and what has been achieved up to 2019 across all sectors
West Pokot *http://www.westpokot.go.ke/*	Education	Detailed report on vocational training centres in the county (2021)
Nairobi *http://www.nairobi.go.ke/*	No data found for the selected indicators	
Makueni *https://www.makueni.go.ke/*	Open data portal	Detailed dashboards and pdf files with general, budget and project data

Most of the data on county government websites is in financial and progress reports that are available in PDF format. The focus of these reports is to inform stakeholders of the work that has been done and hence cumulative sums are often not included. Most of the data is not presented in a format that is easy to download and analyse.

A METAPHOR FOR THE DATA MATURITY MODEL

The aim was to use a scoring system that is easy for all actors to understand and illustrates the stages of data maturity using simple and relatable imagery. One process that may be familiar is the growth of a tree, with the four major stages highlighted below.

1. Seedling	2. Growing	3. Flowering	4. Fruitful
Data is collected, analysed and reported on an ad hoc basis. Data is not considered when making decisions. Data quality is not a priority.	Data is analysed and reported on a regular schedule. Data is shared selectively, to others within the government. Analysis is mostly for reporting purposes.	Data is used in the decision-making process, but mostly in areas of importance or concern. Data from multiple sources is included in analyses.	Data is embedded into all processes and central to the decision-making process. Data is verified and shared freely. New policies and programs are conceived from analyses and predictions.

Figure 1: Data maturity model. The stages of growth of a fruit tree were used as a metaphor for the different stages of the model.

The characteristics of each level of data maturity are listed below:

01 Seedling

This stage is the initial step that counties take towards building their data infrastructure. Data is collected as part of operations but without a specific use or objective, it is not processed for use or consumption.

KEY FEATURES:

- Data is collected infrequently, and not on a regular schedule
- Data is stored in a format that cannot be easily accessed or used by most stakeholders
- Physical data collection
- Data comes from a single source or only within the county govt

02 Growing

Data infrastructure is improving at this stage to accommodate regular collection and reporting. The use of data is integrated into departmental processes and regulations. The system has expanded to include data from other sources within the local and national government.

KEY FEATURES:

- Data is reported quarterly/yearly
- Data is stored in a format that can be accessed within government, but with restrictions
- Data is collected infrequently, but on a regular schedule
- Data comes from multiple internal sources, with no formal mechanism for collaboration
- Physical/automated data collection
- Data collection is required for administrative reporting

03 Flowering

Data-driven decision making is a priority at this stage of maturity. The use of technology is integrated into data management practices. The scope of data collection is widened to include partnerships outside the government. The data is reliable and available to all interested parties.

KEY FEATURES:

- Data is stored in a format that can be used by all stakeholders with some restrictions
- Data is reported within a month of collection
- Data is collected frequently, and on a regular schedule
- Automated data collection
- Data is used for decision making including budget allocation
- Data is validated and audited by independent parties
- The county management prioritises data quality and availability in their operations
- Data collection is legally mandated

04 Fruitful

At the final stage of maturity, data is used for innovation and strategy. High quality data is freely available and up to date due to an intentional boost in resourcing and supportive legislation. Contextual data such as location and demographics is included for more robust analysis.

KEY FEATURES:

- Audit reports are also available to the public
- Collaborators can contribute to databases and use available data for new projects
- Data is stored in a format that can be used by all stakeholders without restrictions
- Database is updated in real time
- Data collection is legally mandated, with penalties for not reporting data
- Stakeholders have clear channels for feedback based on shared data
- The county has a budget with an extensive funding stream for data functions
- The county elected representatives and management prioritise data quality and availability in their operations
- Marginalised groups are considered in data-driven decision making

METHODOLOGY

The pilot study involved interviewing officials from different sectors in the governments of eight participating counties and noting any additional information proffered by the respondents. Data was collected through a prototype of the tool (online questionnaire) that will be transformed into a toolkit as the end product of the exercise. The initial goal was to travel to each county and conduct in-person interviews, with researchers filling in the form to avoid getting inaccurate responses due to different interpretations of the questions. It was crucial to understand how the questions would be interpreted and how the questionnaire could be adapted for improved clarity and efficiency.

THE TOOL

The questionnaire covers four of the many sectors within county governments, namely governance, health, agriculture and education. These four sectors were selected because they provide essential services that were presumed to be a priority for most counties.

The respondents for each sector answered questions from two main sections:

1. Data Quality and Availability

The questions for this section are focused on how data is collected, stored, verified, and shared in each of the four sectors.

A critical first step in understanding the data ecosystem is to form an idea of the current status and quality of the data available. This section of the assessment is focused on developing an objective or at least a transparent view of the quality and availability of data, with questions centred around various parameters of data availability (at what levels, in what formats etc.) and robustness (collection protocols, validation mechanisms, inter-linkages etc.) of critical indicators and their data points across the data value chain.

Data quality and availability is explored along these metrics:

Mode of Collection: This has to do with how data is collected- is it digitised from the field? What tools are used? Among others.

Frequency of Collection: The periodicity of collection and release should consider user requirements and timeliness as much as possible.

Granularity and Disaggregation: The availability of disaggregated data – especially along critical variables of age, gender and location – are extremely valuable for public policy discourse, analysis, and planning.

Validation: Validation provides an independent review of the data to increase the confidence of users and policymakers.

User Satisfaction: Statistics generated must meet the needs of users; Priority needs should be identified and there must be ways to identify how to improve use cases which are addressed by data.

Accuracy: Statistics must accurately and reliably portray realities on the ground.

A set of 10-12 indicators that were potentially universal to most counties within this study were selected for each sector (Health, Education, Agriculture and Governance) and 17 questions asked on the quality and availability of their data for each of these indicators. The 17 questions and indicators for each sector can be found in the appendix.

2. Causality

This section focuses on the legislation and systems in place for data management across the entire sector. While the data quality and availability assessment will provide an indication of the robustness of data, it does not explain potential reasons for why this is the case and what should be done to move towards a higher level of maturity. The objective is to ascertain intentionality, ensure sustainability and scalability in strengthening the data ecosystem at the county government level for the particular theme. Questions on mandates, resourcing, collaboration, and connectivity feature in this section. These questions are also available in the appendix.

Indicators

The indicators included in the questionnaire were developed from CIDPs of participating counties. At the time of writing this report, there is no formal universal template or format for CIDPs and other reporting documents. This makes it difficult to standardise the indicators as individual counties have their own priorities and hence their governments fund and report on different metrics.

The first version of the questionnaire included too large a number of indicators; it was a first attempt to broadly capture the priorities of all counties in the study. However, it was found to be too lengthy, thus a second version with a set of 10-12 key priority indicators for each sector was developed for the rest of the exercise. This was agreed upon after consultations with the counties so that this first version of the tool provides a baseline for participating counties as we look to grow the scope of data maturity in subsequent studies. Indeed, next steps will include revision of these indicators to ensure that each county can be included in the entire scope of the survey.

Also, as the survey progressed some indicators were identified as irrelevant for this study or partial to the priorities of counties in certain regions.

SCHEDULE

The timeline of developing and conducting the survey was dictated by the schedule of the wider program. Nairobi was the first county government that took the survey, to understand what to anticipate for future interviews where more intensive logistical planning of time and resources was needed. Interviews in counties that are geographically close to each other were conducted one after the other for more efficient use of time and resources. Unfortunately, logistical and/or network issues were a barrier for in-person or virtual interviews in some counties and they received a link to complete the online tool. Some health departments are not included in the survey as their officials were not available to participate in the exercise.

Most of the respondents in the survey hold senior managerial positions or work in monitoring and evaluation within their department.

Table 3: Schedule of interviews for the survey

	Sector	Date	Respondent
Nairobi	Governance	09/09/2021	Director, M&E
	Agriculture	21/09/2021	AG Director Crops Development
	Education	10/09/2021	Assistant Director, ECDE Deputy Director, TVET
Samburu	Governance	15/09/2021	Deputy Director, Monitoring and Evaluation
	Health	16/09/2021	Health Records and Information Manager
	Education	16/09/2021	Deputy Director for Education
	Agriculture	15/09/2021	Deputy Director Agriculture
West Pokot	Governance	27/09/2021	Head of Monitoring and Evaluation
	Agriculture	27/09/2021	Assistant Director for Agriculture and Irrigation and Focal Person, Monitoring and Evaluation
	Education	27/09/2021	Assistant Director ECDE
Turkana	Governance	22/09/2021	Director, Monitoring and Evaluation
	Health	22/09/2021	Director Health Products and Technology
	Education	21/09/2021	CO Education
	Agriculture	22/09/2021	CO Agriculture

Nandi	Governance	23/09/2021	Economist/M&E and Planning Officer
	Health	23/09/2021	Planning Officer/Economist
	Education	23/09/2021	Director ECDE and Early Childhood Education
	Agriculture	23/09/2021	Economist
Nakuru	Governance	29/09/2021	Acting Director, Economic Planning
	Health	30/09/2021	CHRO
	Education	29/09/2021	Director Vocational Training
	Agriculture	30/09/2021	Chief Agricultural Officer, M&E
Mandera (virtual)	Governance	23/10/2021	County Chief Officer
	Education	22/10/2021	County Chief Officer Education
Makueni (virtual)	Governance, Health, Education, Agriculture	28/10/2021	Principal Economist

SCORING

Various methods of scoring were deliberated and the final selection was based on the ease of interpretation of the scores for all stakeholders. A number with discrete values for each answer would yield an overall average score across sectors and sections of the survey (the number was used to categorise and also to rank). This score could be interpreted as percentage values. While the results of this method would be more quantitative and it would be easier to make comparisons, it was difficult to tie the score back to the stages of the model at the level of understanding of all stakeholders in the process.

An ordinal scale of 1 to 4 was decided upon, with 1 being the lowest score representing the "Seedling" stage and 4 the highest score representing the "Fruitful" stage since it was easier to standardise according to the properties of each stage of data maturity. Every answer to each of the questions was designated a score on a scale of 1 to 4 to match the four stages of data maturity described above according to the model. The example in Table 4 below shows the score assigned to each answer for data quality and availability question 14: "What format is the data available in?"

Table 4: Survey Scores

Answer	Score	Stage in Model	Property
Editable soft files, online.	4	Fruitful	Data is stored in a format that can be used by all stakeholders without restrictions
Non editable (e.g. PDF) soft files, online.	3	Flowering	Data is stored in a format that can be used by all stakeholders with some restrictions
Editable soft files, CD/ DVD/Flashdisk.	2	Growing	Data is stored in a format that can be accessed within government, but with restrictions
Non-editable soft files, CD/DVD.	2	Growing	
Paper	1	Seedling	Data is stored in a format that cannot be easily accessed or used by most stakeholders

The number of responses with each score were tallied for each sector within the participating counties which gives an overall view on their progress in different data practises. The scores were also tallied across departments

CHALLENGES AND LIMITATIONS OF THE STUDY

1. The first interview revealed that our questionnaire was too lengthy for an exercise with no tangible incentives and some indicators were redundant or unclear. We developed a second version of the tool from this feedback which we used for the remaining department in that county, and for subsequent interviews in the other counties.
2. The survey respondents were not incentivised to participate as we felt it may affect the quality and candour of responses. We reviewed the tool and came up with a shorter version that captured as much information as possible and took less time to complete.
3. Each county has different priorities when it comes to sectoral indicators and hence it was difficult to compare responses from different counties.
4. Some of the interviews had to be conducted virtually or filled in by the officials due to connectivity issues and/or logistical and scheduling challenges.

JUSTIFICATION FOR THE DATA MATURITY ASSESSMENT

Information and communication technologies (ICT) offer great opportunities for counties to enhance the effectiveness and efficiency of their internal and external operations. Internally, ICT enables counties to adapt to changes in governance policies and processes. Externally, it provides rich capabilities that facilitate service convergence and citizen participation. However, providing seamless services and reliable information requires more than just scalable and secure technology capabilities. Also required are information strategies that emphasise management, quality, and governance of data, and organisational practises that enfold a strong compliance program, ongoing training, and data sharing practises. Thus, achieving effectiveness and efficiency is not just a matter of capitalising on ICT capabilities but achieving higher levels of maturity in the management of technology, information, and organisational processes.

The growing importance of data management in counties cannot be overstated. As with any organisation, data is a critical asset to counties. Government organisations collect and maintain different types of data related to citizens. Data ascribes meaning to the information that county governments wish to share. Data drives the information discovery needs of citizens and counties as agencies of the national government. It enables information exchange among public agencies and external partners. Government agencies integrate and reconcile data from different sources according to the functions and services they provide. Thus, data management is central to achieving operational effectiveness, reducing costs, and improving efficiencies of government services.

Management of data across the various functions within county governments is vital for a variety of reasons. First, data that is undefined and fragmented adds complexity, costs, errors, and inefficiency. Second, data management strategies reduce costs associated with decision making. To facilitate effective decision making, data should be built, stored, nurtured, shared, and managed in a sustainable manner. Third, data management ensures clear agreements around how data is transferred and shared among business partners. It helps to improve supplier relations and reduce customer service errors. Fourth, operational functions such as application development, data integration, and reporting are dependent on the strength of the underlying data models. Last but not least, enterprise-wide data management programs facilitate statutory data security compliance and regulatory reporting.

Just as any other organisation, county governments need to seek agile, transparent, effective, and accountable data management practises. This exercise will help county government officials discern the importance of maturity in data management to facilitate high quality, meaningful, and understandable data. The ability to share data (across departmental, organisational, geographic, and institutional boundaries) and integrate business processes face serious challenges when data management practises are not mature. While there is no single approach to address the complexity of data management, sound data practises are pivotal to achieve organisational efficiency and effectiveness and to facilitate rapid decision-making. For example, when faced with complex legislative challenges, improved decision quality would be reached when decision makers have access to critical inputs from all relevant government agencies. A holistic approach in the provisioning of data related services is thus required to ensure the ability to deliver insights and execute decisions in a timely manner.

ANOTHER TOOLKIT?

A data maturity assessment toolkit[3] must cover a fuller spectrum of knowledge needed to accurately assess and develop a (country's or in our context a county's) data system, including the following:

1. Assessing data maturity
2. Identifying data sources and build a data structuring framework
3. Managing data and assess the enabling factors
4. Understanding the role of ICT in data management
5. Incorporating innovative data types into a data ecosystem

According to the World Bank, enormous amounts of data are published on government websites but the majority of this data is only intended to be read as standalone documents and not reused for other purposes. Reusable data should be reusable and users should have the ability to reuse without legal implications (World Bank, 2019). Big data has become a major part of corporate and non profit organisations in this digital age. Data has become a strategic and valuable asset by allowing organisations to uncover unforeseen patterns and develop sharper insights about their customers and partners as well as the markets and environments in which they operate.

Information enables governance to be less uncertain, complex and ambiguous. The ability to derive intelligence from data is what will make counties more efficient in data governance, reporting and maturity. In most cases, problems are as much cultural as technical. Sliced information, reluctance to share, lack of analytical skills and difficulties in finding and ingesting data in a manner that users and/or citizens can apply are among the factors that are holding counties from being truly data centric.

In the spirit of the Data Revolution for sustainable development, the success in collection, analysis and dissemination of data within counties would encourage SMART (Specific, Measurable, Attainable, Realistic, Timely) decision making based on evidence and accountability - by governments and other stakeholders. This would make it easy for multiple stakeholders in actioning, monitoring and implementing strategies for development (Open Institute, 2017).

As a result of devolution, Kenyan counties have chosen to focus on different priorities that hold the most weight and interest to their counties as opposed to national level priorities. This has caused a lack of standardisation and hence no consistent reporting criteria or feedback mechanism for the different departments/sectors in counties. We will however manage to compare their work through channels and tools for assessment.

This approach was therefore informed by limitations that the mainstream tools that currently exist focus mainly on the private sector or aggregated sectoral data and some examples can be found in the following links;

1. Data governance maturity assessment tool: A design science approach
2. Data capability maturity
3. Big data maturity model assessment


Executive Scoreboard
Total Revenue
Revenue & Backlog
Cash Flow
Bookins & Billings

FINDINGS

SUMMARY OF THE DATA

Figure 2: Cumulative summary of all responses across all counties.
A large proportion of responses fall in the later stages of the model. However, a push is necessary to add more responses to the growing and later stages and out of the seedling stage of data maturity.

While the data quality and availability assessment will provide an indication of the robustness of data, it does not explain potential reasons for why this is the case and what should be done. The objective is to ascertain intentionality, ensure sustainability and scalability in strengthening the data ecosystem at the county government level for the particular theme.

According to the respondents, a trend can be seen that data quality generally mimics the institutional enablers that ensure that it continues to be produced and used. In other words, it can be seen that respondents felt there was least growth (or 'growing' stage) for both quality and causality enablers. And even though there are a large number of respondents who cumulatively believe that quality data is both available and causality enablers present, that is, 'flowering' and 'fruitful'; it is also seen that much still remains to be done as respondents also felt that data quality and causality enablers are at a 'seedling' stage.

QUALITY & AVAILABILITY

The departments mostly scored within stages 3 (Flowering) and 4 (Fruitful) on data quality and availability, with a considerable amount of scores at the initial seedling stage.

The scores in the data quality and availability section were analysed in four categories, namely data collection, reporting, availability, and quality. The results are summarised by category below and in more detail in the sectoral reports.

Figure 3: Overall Summary of responses on Data Quality and Availability.
The majority of responses fall within the flowering and fruitful stages, however the number of responses in the seedling stage is still high. This is especially true under data quality and availability where there are few and no responses in the growing stage, respectively.

Data Collection:

It is apparent that counties are collecting and reporting data on a regular basis for the sectors under study. However, the largest percentage of data collection is done manually, from primary data sources, by field officials and others charged with providing public services (for example health workers or agriculture extension officers) via various government institutions or at ward level and compiled into digital reports at the sub county and then county headquarters. We posit that some sectors such as governance and health where there have been strong national implementation structures and centralised national-level databases for data management have relatively standardised methods for consistent data collection and reporting. This includes the Government Human Resource Information System (GHRIS)[4], National Education Management Information System (NEMIS)[5], Integrated Financial Management Information System (IFMIS)[6] and the Kenya Health Information System (KHIS)[7]. The result is that some departments register strongly on 'flowering' and 'fruitful' stages due to institutionalisation of processes, people and even resources for continued sustenance and improvement of data management practices and use.

Incidentally, during public meetings and public participation, data is collected using physical attendance registers with information captured including the demographics of the citizens that were present and these are stored in physical files and then summarised in digital formats for reporting.

Data Reporting:

Our interviews revealed that data is mostly reported in quarterly and annual reports for accountability purposes and most of these are available to the public. Most departments received high scores when it comes to reporting on data as can be seen in Figure 3.

The agriculture and education (focused on Early Childhood and Development Education (ECDE) and Technical and Vocational Education and Training (TVET)) departments within counties are devolved functions according to the 4th schedule of the Constitution of Kenya (2010) and so the responsibility of data management naturally also mostly falls on the shoulders of the county governments. Data is collected on site through manual registers. They have a variety of systems for data storage in place which includes manual systems (that is physical files) to spreadsheets (on PCs and/or Google sheets). This differs depending on the priorities of the departmental managers, data competencies and the county government. Overall, it was found to be more difficult to standardise data collection practises within the agricultural sector because agricultural activities vary in different counties. Respondents revealed that most of the quantitative data is estimated based on formulas since the field staff cannot visit and measure every farm.

Data Availability:

Most of the data has been made available to the public mostly in the form of PDF documents on county government websites and the websites for other national government agencies such as DHIS and KNBS, which is not a document format that citizens can easily extract data from for further analysis. In most cases, members of the public can request this data from local government officials. However, most of the data is available in county progress reports, including the occasional CIPD reports and sectoral reports.

Data Quality:

The Office of the Auditor-General is mandated by article 229 of the constitution to audit and report on any entity using public resources for their operations. This includes county governments that are dependent on the national government for the majority of their resources[8]. However, according to the respondents, processes for third party validation of data are not universal and many departments do not have additional systems in place to complement the auditing process. The focus of data validation for most of the respondents was financial accountability rather than quality assurance.

CAUSALITY

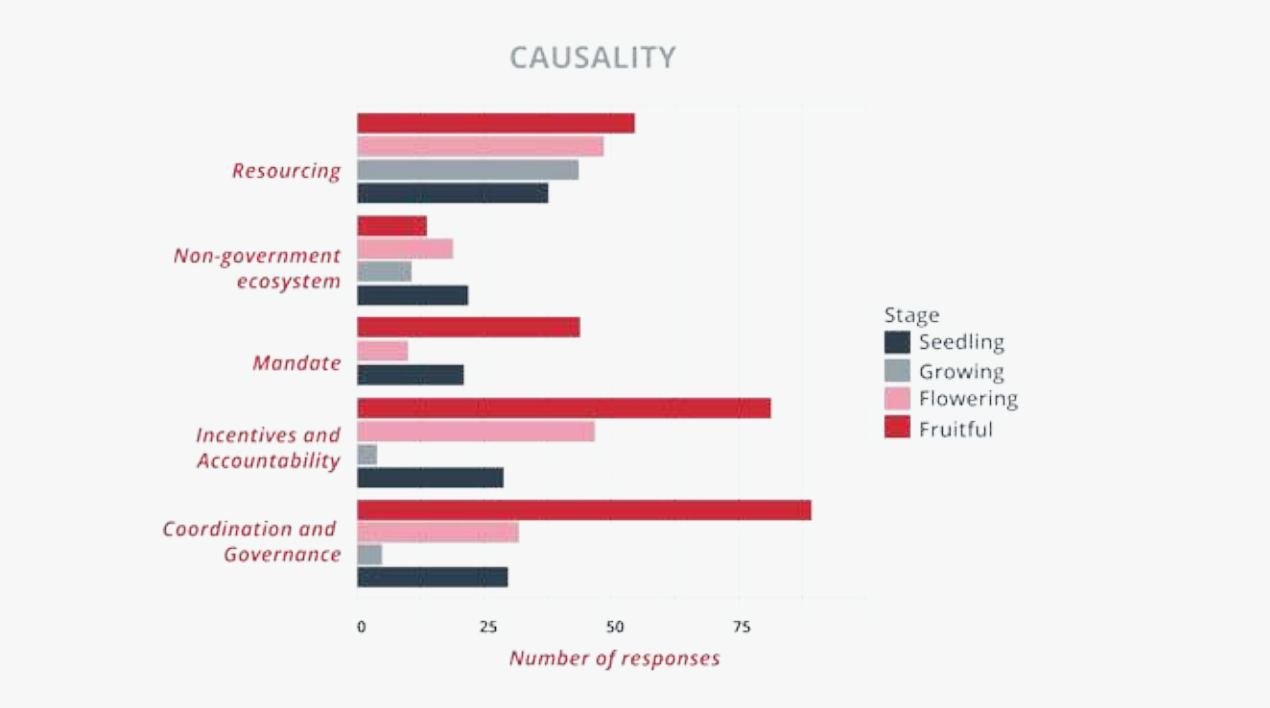


Figure 4: Overall Summary of responses on Causality.
Scores are highest under incentives & accountability, and coordination & governance. There is room for improvement in the areas of non-governmental ecosystem and mandate. The widest range of responses was observed under resourcing, but with an increasing number of responses in the later stages of maturity.

Mandate:

The study found that counties generally score highly on mandate, with most responses falling under the 'fruitful' stage of the model. This may be linked to the legal frameworks that are in place to ensure that counties collect data, including the statistics function that falls under the county planning and development role in the 4th schedule of the constitution of Kenya[9]. The bill of rights also grants citizens the right to access information held by the state, and the state is required to publish and publicise important information in the same chapter[10].

Incentives and Accountability:

The scores for incentives and accountability mostly fall within the last two stages of maturity. This may be due to the demand for accountability to the national treasury to receive funds. It can be attributed to the need by counties (and thereby departments) to comply with most of the reporting demands of the Office of Controller of Budget (OCOB)[11]. Disbursements to county governments are made by the National Treasury upon passage of an Appropriation Act, requisitions involving the Commission for Revenue Allocation (CARA), and upon approval by OCOB[12].

Resourcing:

One common theme that stands out in causality ratings is the lack of resourcing - both staff and material resources - specific to data in county governments. The governance and health departments receive systemic data management support from the national government and this is reflected in their scores. However, much more can be done to streamline processes and investments in better data infrastructures to collect data in a harmonised format from all counties.

Coordination and Governance:

In the agriculture and education departments, each county in this study has developed their own data management system to meet the reporting requirements. The governance and health sectors collaborate with the national government for data management via the IFMIS system and DHIS, with standard protocols and formats for reporting clearly outlined. From the responses, systems for data privacy and security in line with the data protection act[13] are not part of standard practice for most of the sectors under this study. However, these are considerations that are due to be addressed by the officials.

Non-government ecosystem:

County governments have opportunities for collaboration with entities outside of local and national government, but these collaborations are often short-lived and do not cover all stages of the data management process. Some respondents also alluded to difficulties in collaborating with actors outside of government due to political interference.

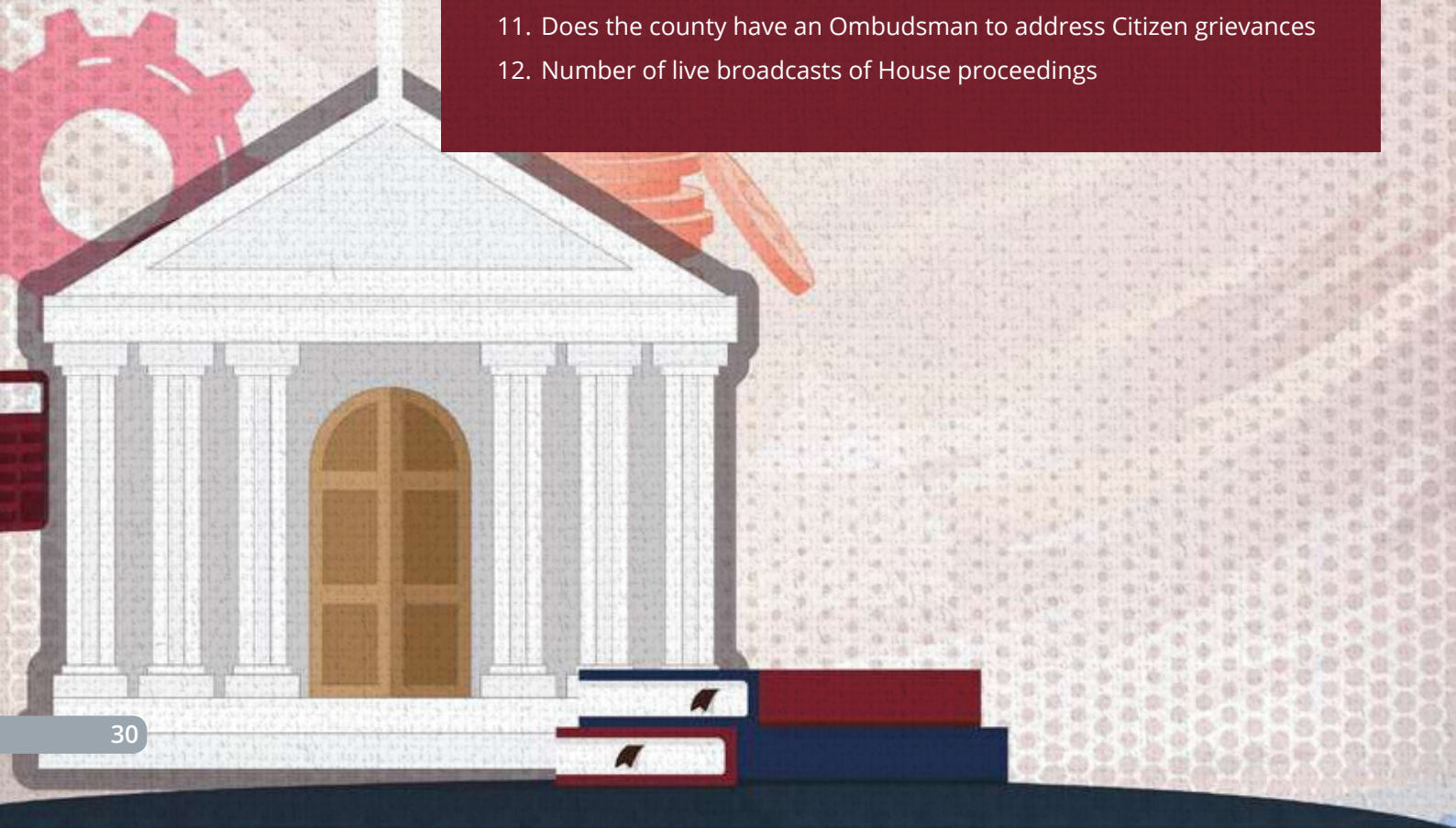
FINDINGS BY SECTOR

GOVERNANCE

Often found under the Department of Finance and Economic Planning and/or under the Office of the Governor, a key function of the governance in county governments is facilitating of public participation[14]. The Finance and Economic Planning Department also takes the lead on public finance, planning and monitoring and evaluation within the county government.

The following indicators were included in assessing for data quality and availability for this sector, namely availability of:

1. County budget - development and recurrent
2. County annual reports
3. Amount of 'own' revenue as a percentage of total budget
4. Collection efficiency
5. Total county employees per 1000 population, disaggregated by level of education (primary, secondary, university)
6. No. of Services under E-Governance
7. No. of town hall meetings held
8. No of civic education events held in the County
9. Annual number of public local government meetings and total attendance
10. No. of policies and laws passed per year
11. Does the county have an Ombudsman to address Citizen grievances
12. Number of live broadcasts of House proceedings



Results

The majority of scores when it comes to data quality and availability as well as causality under governance fall within the flowering and fruitful stages (Figure 5). Data is collected and reported regularly for most of the indicators under governance as part of county transparency and accountability processes as well as due to statutory reporting needs for independent constitutional offices such as OCOB, CARA, the Commission of Administrative Justice (CAJ), Council of Governors (CoG) as well as at the request of the national government.

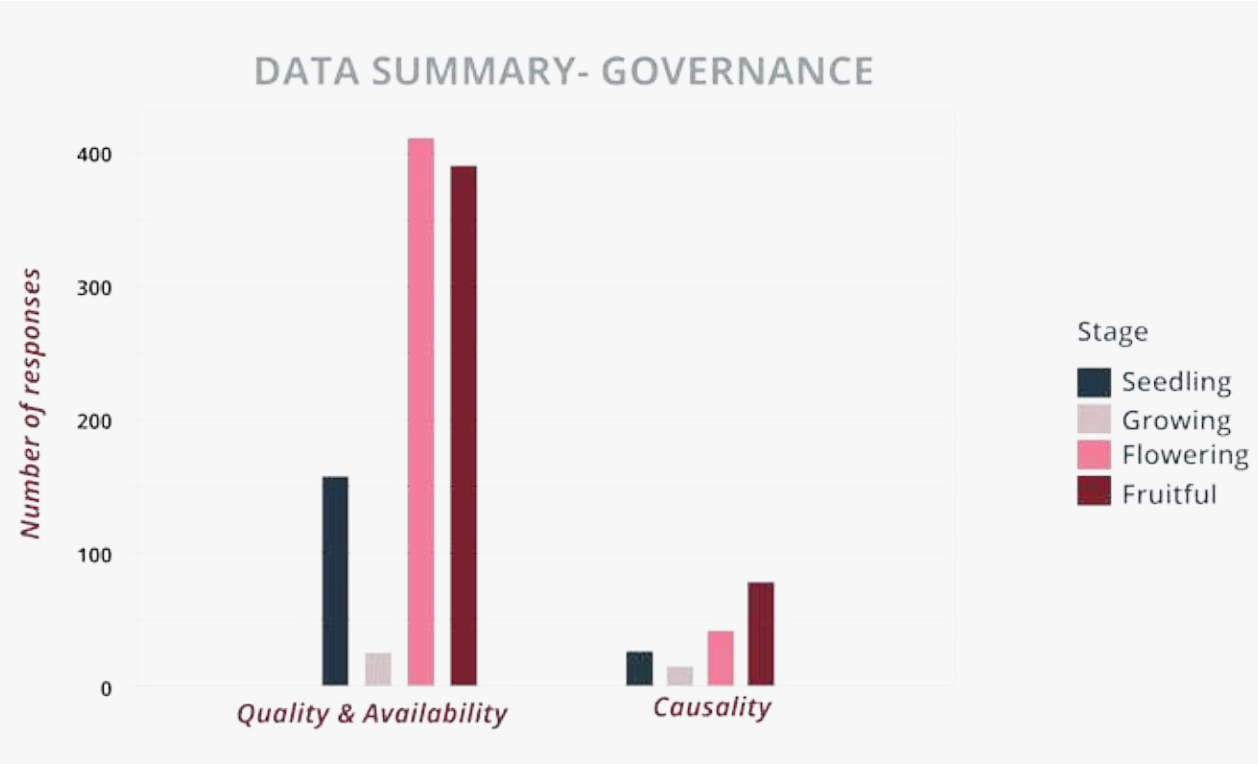


Figure 5: Summary of Governance Sector Results.
The responses in the governance sector present an overall high level of maturity, with room for growth where both quality & availability and causality are concerned.

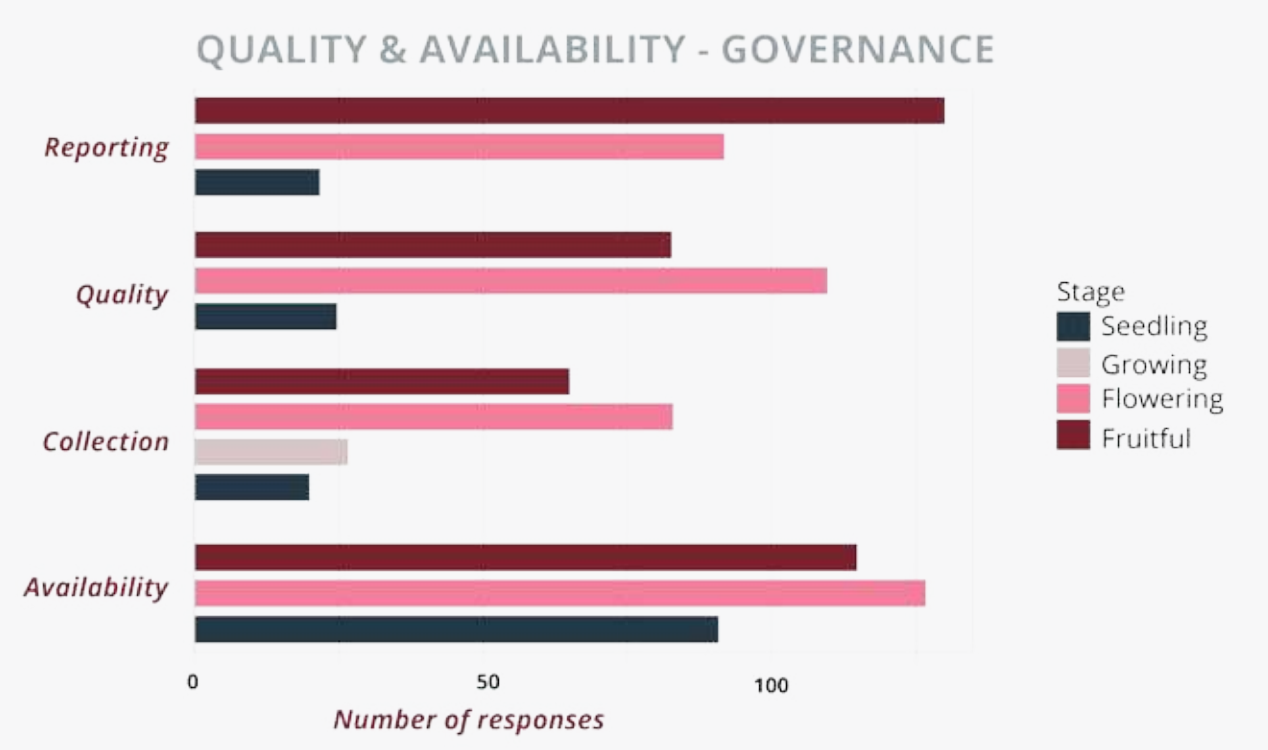


Figure 6: Data Quality and Availability Scores - Governance.
The scores are high across the board, with most responses falling in the latter stages of the model. However, there are more responses in the flowering stage than the final stage of maturity, and therefore room for further improvement.

Data Collection:

The interviews and data show that budgeting and finance data is key for the governance sector, mostly for planning and accountability. All finance and procurement data must be logged in real time to IFMIS, which is also the e-procurement system used by both the national and country governments. Data is uploaded to the national database (IFMIS) in real time and hence they have efficient systems in place to manage collection and sharing of finance data. Details of procurement processes, payments and revenues are regularly logged on the digital platform. Additionally, most of the counties also possess Revenue Management Systems which are key in issuing business permits, tracking various payments made to the county by businesses. This includes mapping out where these actual businesses are and their contact details.

Traditional line-item budgets (including Kenya's budget until 2013/14) previously focused on providing details on all the government was spending money on leading to voluminous data on specific inputs[15]. Post this period, there was a shift to program-based budgets (PBB) which organise the budget around objectives rather than inputs[16]. Data on/for public participation is key to drive this sector; PBB as driven through counties makes a distinction in earmarked development budgets to both flagship projects as well as an amount allocation to the ward level that must be spent on priorities identified by citizens through public participation. Data from public participation is essential for accountability processes and these exercises are well documented on paper at the time of the event.

The counties participating in this assessment have also instituted feedback mechanisms (similar to CAJ) and systems (for complaints, compliments) including suggestion boxes, online forms, access to local government officials at sub county headquarters, and town hall meetings. However, for most of the counties in this assessment, we found that the avenues for feedback are not anonymous as the views are collected at public events, offices or call centres and SMS systems which log personal contacts of reporters.

Data Reporting:

As stated, most data under governance is reported to statutory bodies, primarily OCOB (financial performance), CARA and CoG through quarterly and annual/quarterly reports are available to the public in PDF format in the websites of these bodies. Reporting to bodies such as CAJ, the National Gender and Equality Commission (NGEC) (see examples[17][18]) is noted to be still lagging behind.

Data Availability:

The data on public participation is mostly held in physical files using registers which are filled in manually in these meetings. The county assembly has its own data repository in the form of hansard reports and which are managed internally in each county. Most assemblies in the assessment counties do not publish hansard but there are committee reports available on county assembly websites that provide a lot of detail in PDF format. In summary, whereas Figure 6 above shows that most counties are receiving higher scores for data availability; there is a considerable portion of responses in the seedling stage.

Data Quality:

Finance data is regularly audited by the national government. The results of these audits are published by the office of the auditor general[19] and accessible to members of the public. As a result, we find that this data is of very high quality.

CAUSALITY

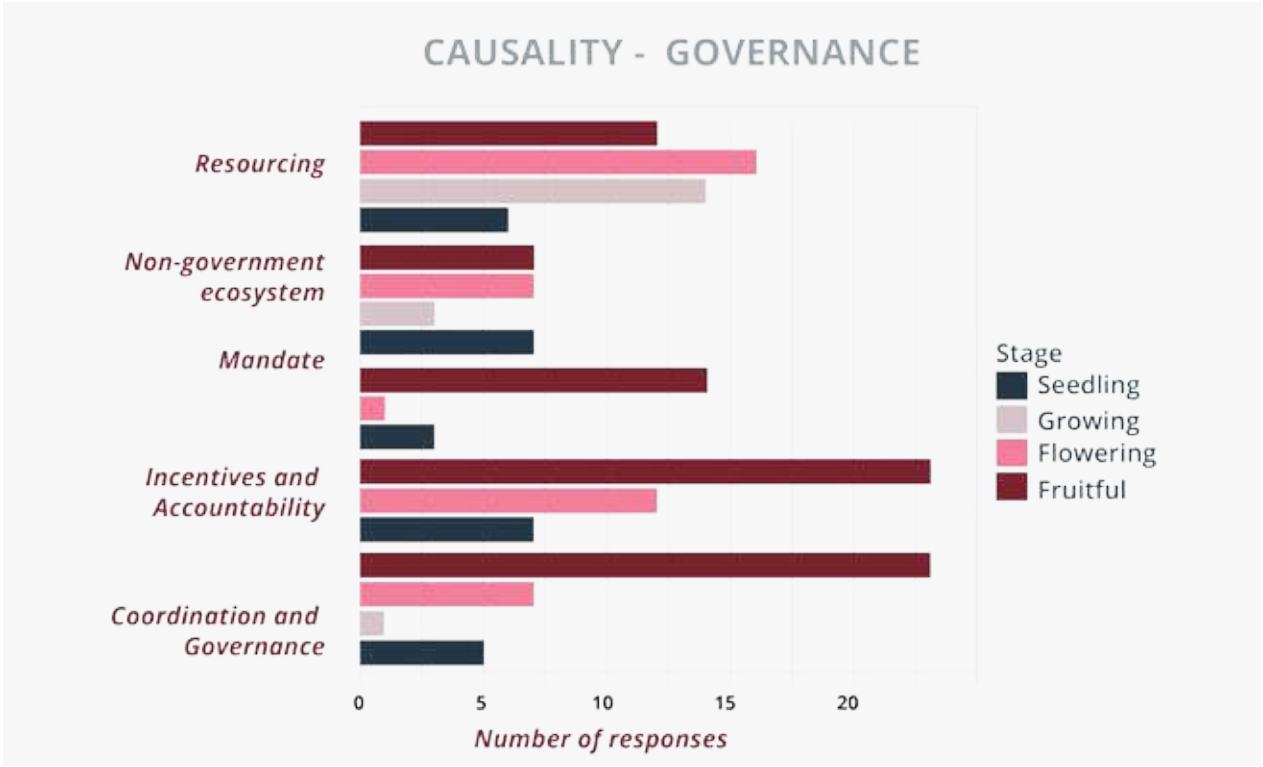


Figure 7: Causality scores - Governance.
This section has a high proportion of responses in the fruitful stage. There is a significant number of responses in the seedling stage, especially in the non-government ecosystem category.

Mandate:

Financial incentives and penalties are used to drive collection and reporting of this sectoral, but mostly budget related data. According to the Controller of Budget Act of 2016, the Controller of Budget shall, in accordance with Article 228 (6) of the Constitution, submit to Parliament quarterly budget implementation reports for the national and county governments within 30 days after the end of each quarter. The law further states that a public officer, State Organ or State office shall cooperate with the Controller of Budget to enable the Controller of Budget to carry out his or her functions. Those who refuse or fail to cooperate with the Controller of Budget as required by this section commits an offence and is liable, on conviction, to a term of imprisonment not exceeding two years or to a fine not exceeding one million shillings, or to both. At the time of writing, Members of Parliament have been pushing for harsher penalties for late fiscal reporting (a jail term of 5 years and/or fine of up to 10 million shillings)[20].

County governments rely on legislation and infrastructure from the national government to support their data collection and right to information mandates[21]. It should be noted however that the National Treasury has been faulted by Senators[22] and the Council of Governors[23] over perpetual late disbursement of cash to counties, a trend which the leaders say is slowing down the implementation of devolution.

All data on procurement, budget and revenue is recorded on the IFMIS platform in real time. Data collection outside of financial transactions and processes is mostly manual but transferred to digital platforms for reporting to the national government and in annual progress reports.

Incentives and Accountability:

Data is a top priority for departmental managers under governance. This sector is heavily involved in processes related to revenues and budgets which points to a need for higher accountability via regular reporting of data. This department invests in data management with regular and structured budget allocations in place.

Resourcing:

Governance departments employ dedicated staff for data management, including monitoring and evaluation and planning officials. These employees mainly deal with ensuring that data is collected from all departments and reported according to the schedule laid down either locally or nationally.

Coordination and Governance:

Most secondary data sources in this sector come from the national government via KNBS and other MDA's such as the Communications Authority of Kenya (CAK).

Internet and smartphone penetration:

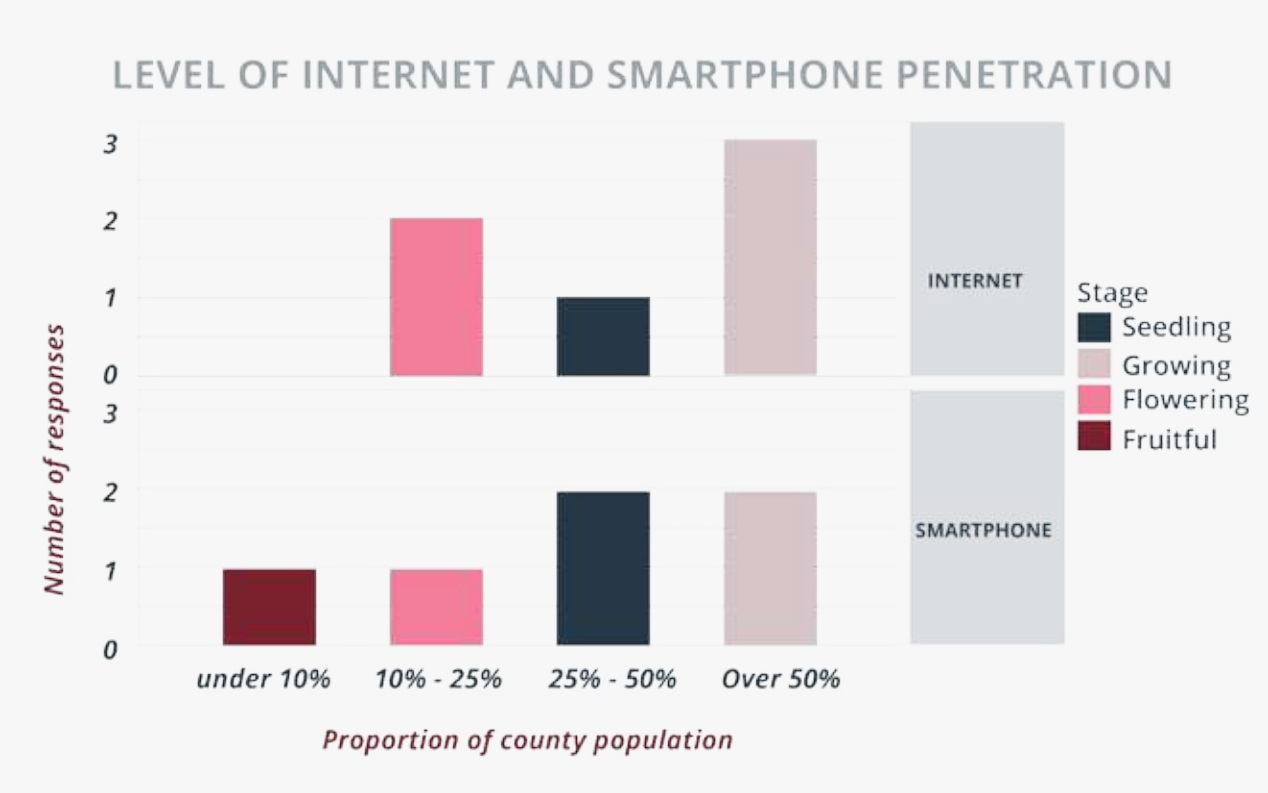


Figure 8: How do you gauge the level of internet/smartphone penetration across the county?

Respondents in this study estimated that internet penetration is higher than smartphone penetration, in general.

Infrastructure improvements underpinned by availability of cheap smartphones and digitization of crucial government services such as e-Citizen services[24] , National Transport & Safety Authority's Transport Information Management System (TIMS[25]), Kenya Revenue Authority's iTax[26], Huduma centres, among others, have increased the appetite/demand for internet access due to availing of these services online in recent years. According to the Communications Authority of Kenya (Sector Statistics Report for Quarter 1 of Financial year 2021/22), by 30th September 2021, the number of mobile phone devices accessing mobile networks stood at 59.0 million, out of which 33.0 million were feature phones and 26.0 million smartphones (the penetration levels of feature phones and smartphones stood at 67.9% and 53.4% respectively)[27]. Still, according to the Kenya Economic Update by the World Bank (2019), whereas 44% of the urban population have access to the internet and only 17% of people in rural areas have access[28].

In the counties of interest, it was found that people mostly relied on access to the internet through cyber cafes and at sub-county offices (as opposed to through their smartphones) when it comes to government e-services. Most people in the rural counties prefer basic handsets with batteries that last longer compared to smartphones with shorter battery lives; and since most simple phones do not connect to the Internet, the result is fewer people with Internet access[29]. Additionally, gender power dynamics are another obstacle to Internet access in rural areas -with many rural women not participating at the household level[30]. And remote areas in some counties still do not have the appropriate infrastructure for all residents to have access to internet services - which might hamper any e-government initiatives that are planned.

HEALTH SECTOR

In line with the 4th Schedule of the Constitution of Kenya 2010, the health sector at the county government level is responsible for county health services, such as, facilities and pharmacies, promotion of primary health care, food safety and waste disposal, and other health and safety related responsibilities[31].

The following indicators were included in the quality and availability assessment for the health sector:

1. Doctor:population ratio
2. Health facility numbers in the County
3. Proportion of deliveries conducted by skilled birth attendants
4. Proportion of children under the age of 1 fully immunized
5. Proportion of general population testing positive for malaria
6. % of villages declared Open Defecation Free
7. Number of environment & public health workers
8. No of TB cases identified and put on treatment
9. Proportion of pregnant women attending 4th ANC visit
10. Proportion of women of reproductive age accessing family planning services
11. HIV prevalence rate
12. Percentage of children under 5 that are underweight

Results

Most of the indicators on the questionnaire are included in the District Health Information System (DHIS) or Health Management Information Systems (HMIS) which are databases that the national government uses to collate health data from different health facilities across the country.

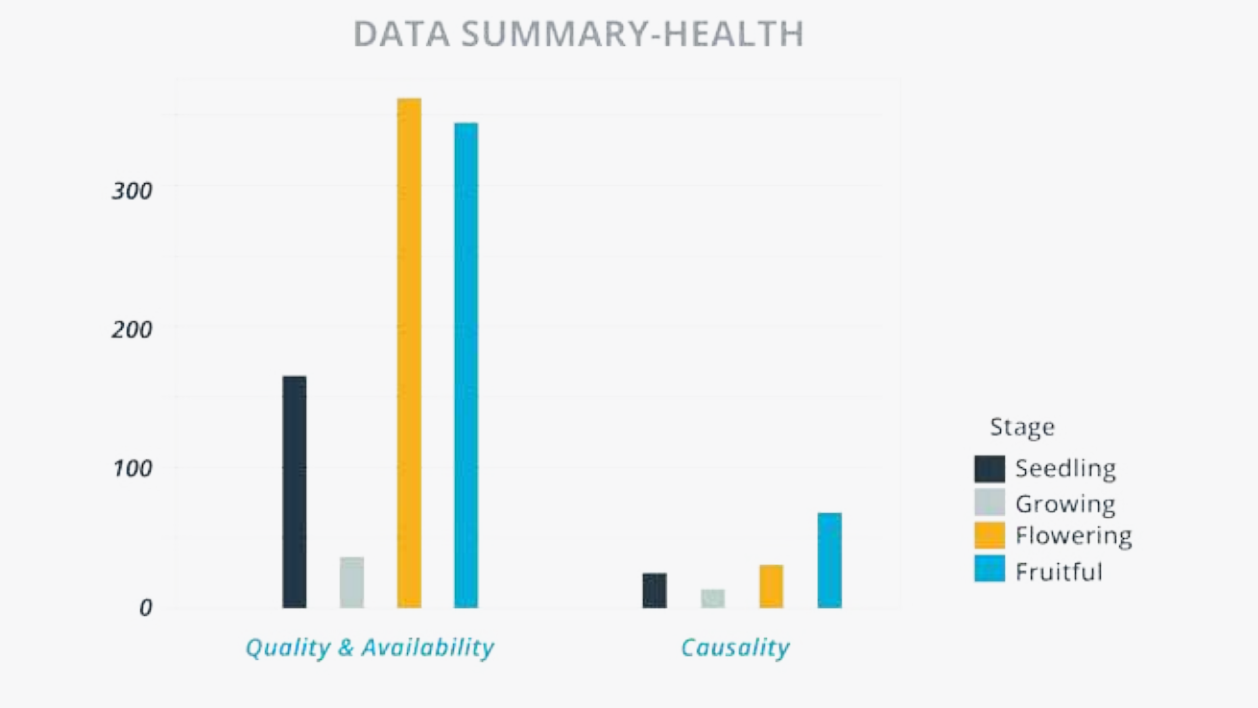


Figure 9: Summary of Health Sector Results.
Most of the responses from the health sector fall within the final two stages of the model.

Data practises in health are boosted by the efforts of the national ministry and partners when it comes to health; to collect data across the country and make it available to authorised users on an accessible platform (KHIS). There is an existing universal system for monthly data collection and reporting with regular validation and auditing. These structures and investments reflect on the scores across the board for the health sector to mostly fall within the flowering and fruitful stages of the model for both quality/availability as well as causality. Moreover, please note that three counties (Nairobi, West Pokot and Mandera) results are not reflected in these results as it was not possible to collect data in these counties by the time of reporting.

QUALITY & AVAILABILITY

Figure 10: Data Quality and Availability Scores - Health.
The health sector scores highly in data collection and reporting. However, there is room for improvement in scores across the board with a large number of responses in the seedling and flowering stages.

Data Collection:

Data is collected in (near) real time as part of health facility records at the individual facility level. Most of this data is collected in physical forms and transcribed into the information systems by health workers. Whereas this is occuring in public health facilities, county governments health departments also engage with private and faith-based institutions to request for similar data. Most of this might not be captured in HMIS but it is nevertheless used by the county governments when it comes to planning.

Data Reporting:

The database is updated up to the sub county level on a monthly basis with data from health facilities in all counties. All staff including location and specialisation and health facility data is stored on the HMIS database. The data also forms part of annual reports as these indicators are part of the CIDP agenda for most counties. These reports are available on most county websites in PDF format.

Data Availability:

This data is presented on the KHIS portal which can be accessed by authorised personnel as needed and based on their roles.

Data Quality:

Data each of the key indicators under study is recorded with location data down to the health facility level. Demographic data is included in health records and the data is audited often.

CAUSALITY

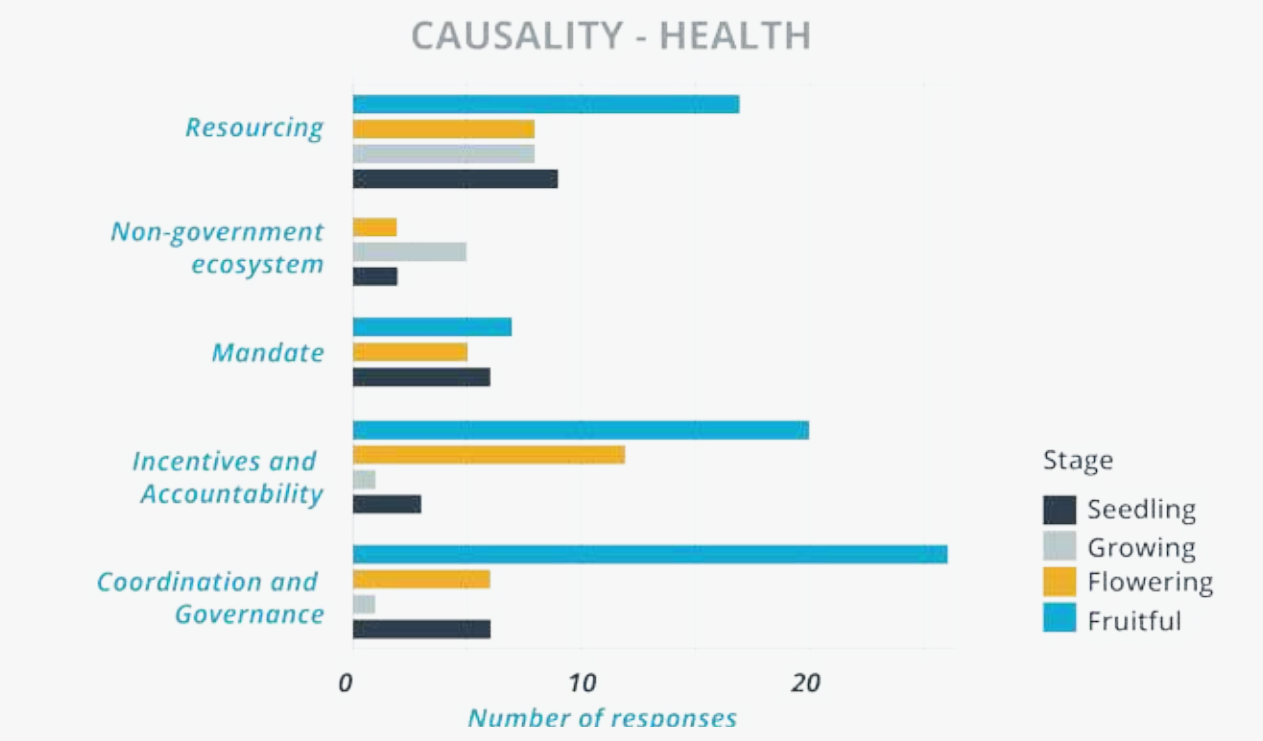


Figure 11: Causality scores - Health.
The health sector scored highly on incentives & accountability, and coordination & governance. Scores in the non-government system category are lower than for any other category under health.

Mandate:

Health facilities are required to report this data to HMIS regularly for compilation and reporting to the national government. However, from the interviews, it was interestingly apparent that most respondents were not aware of any clearly articulated penalties for not reporting the data beyond withholding resources.

Incentives and Accountability:

Besides monitoring of the disease burden, the data is used for monitoring costs and revenues for health departments. Health departments therefore receive regular and structured budgetary allocations for data management and collection based on these needs.

Resourcing:

Most of the data is collected manually at individual health facilities and reported regularly on the HMIS database. It was noted however that the health workers were also primarily responsible for also capturing data in the HMIS; as such may not have training in data-specific roles (including data analysis) as most of the staff carry out this work in tandem with their other responsibilities.

Coordination and Governance:

County health facilities are well connected to the national data network and they have clear guidance on collecting and reporting the data to the public and national government. Health departments work closely with non-governmental organisations, and regularly coordinate using their data in planning and operations.

AGRICULTURE SECTOR

Similar to the Department of Health, and in line with Provisions of the 4th Schedule of the Constitution of Kenya 2010, County Departments of Agriculture, Livestock and Fisheries are responsible for crop and animal husbandry, livestock sale yards, county abattoirs, plant and animal disease control, and fisheries[32].

The following indicators were included in the quality and availability assessment for the agriculture sector:

1. Tonnes of Maize Produced annually
2. Percentage of population receiving food aid
3. Proportion of animals vaccinated
4. No of annual trainings for farmers
5. Number of active farmer associations
6. Hectares of arable land under crop production
7. Tonnes of fish produced
8. No. of forests conserved, managed and protected
9. Ha of crops under irrigation
10. Number of beneficiaries accessing farm inputs (tools, seeds, fertilizers, pesticides)

Results

Data for the indicators under the agricultural sector in this study is mostly collected manually by field officers and extension officers and thereafter calculated according to preset formulas (drawing from sampled data). Some directorates such as those dealing with food aid and forestry may fall under other departments (or sectors) and not Agriculture and so this study may have excluded some key indicators.

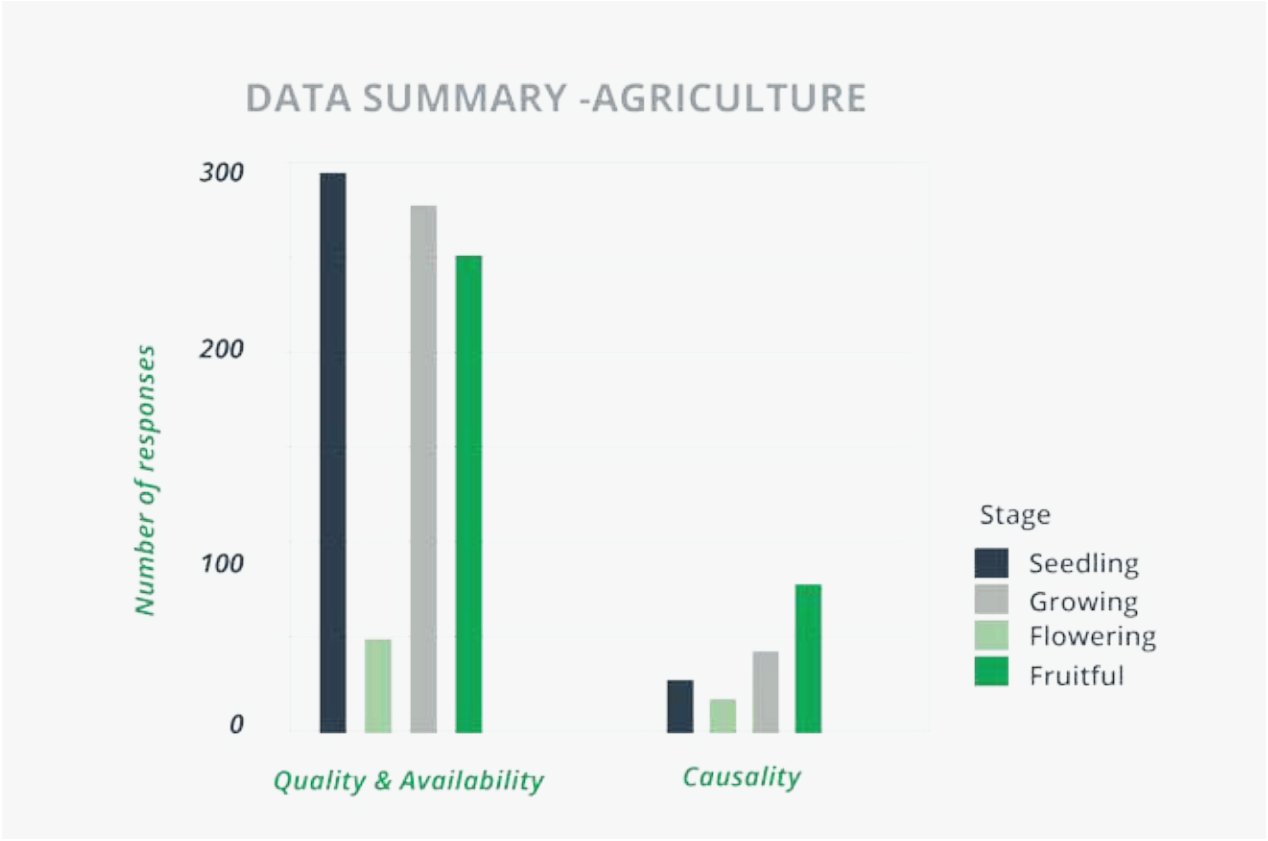


Figure 12: Summary of Agriculture Sector Results.
A large proportion of results fall within the final two stages of the model in both sections. Many responses under data quality & availability fall under the first stage of the model.

In Agriculture, there is no single top-down Management Information System for data management from the national government so the systems vary according to the needs at hand. Some examples of such systems include: 1) The Digital Good Balance Sheet[33], 2) Kilimo Open Data Platform[34] among others such as the Livestock Identification and Traceability[35] (LITS) which are being piloted by the Ministry of Agriculture, Livestock, Fisheries and Cooperatives[36]. Admittedly, some activities in this sector are undertaken more by private sector actors than the county government and often this data may not be collected. Examples might be Agrovets who also provide advisory services when they come to buy farm inputs. These and other factors lead to a higher proportion of scores in the seedling stage for this sector. However, the number of responses in the flowering and fruitful stages of the model remains high.

For the participating counties, data on fisheries is not available; on one hand fishing is highly privatised and the study could not find formal coordination mechanisms for data sharing in this sub-sector.

QUALITY & AVAILABILITY

Figure 13: Data Quality and Availability Scores - Agriculture.
A large number of scores in this section are in the seedling stage of the model. However, a good proportion of responses still fall under the flowering stage which signals growth.

Data Collection:

The study also found that in most counties, for crop farming, data is collected by field officers who visit individual farms on a regular basis, whilst data on in person training and vaccination records are collected on the day of the event and stored in physical registers.

Data Reporting:

The systems in place for reporting agriculture data do not have static reporting requirements due to the nature of agriculture that may encompass different types of crops with different planting cycles; and different types of livestock which produce different products and serve different purposes. Agriculture is a mainstay of the economy in Kenya and data is key. Regular reporting occurs at the county and national levels; unfortunately, a lot of times the reports (annual/quarterly or other) do not include the exact figures.

Data Availability:

The main priorities of the agriculture departments from the counties selected for this study cut across different indicators; they have different agricultural outputs and the indicators selected could not do justice to all the counties uniformly. But it has been indicated that the indicator set was too broad to adequately cover all the counties (and it is possible to extend this tool to capture more indicators). However, as has been indicated, agriculture is not just a mainstay but also a source of livelihoods in Kenya, contributing 26% to GDP directly and another 27% indirectly through linkages with sectors such as manufacturing[37].

Data Quality:

In most of the counties under study, the majority of the figures on crop farming are estimates obtained from inserting this data into a formula. Often this is due to logistical constraints and lack of resources (including competent personnel) to regularly go to the field to collect this data. Also, for all the counties under study, most of the data in the agricultural department is not subject to independent process audits.

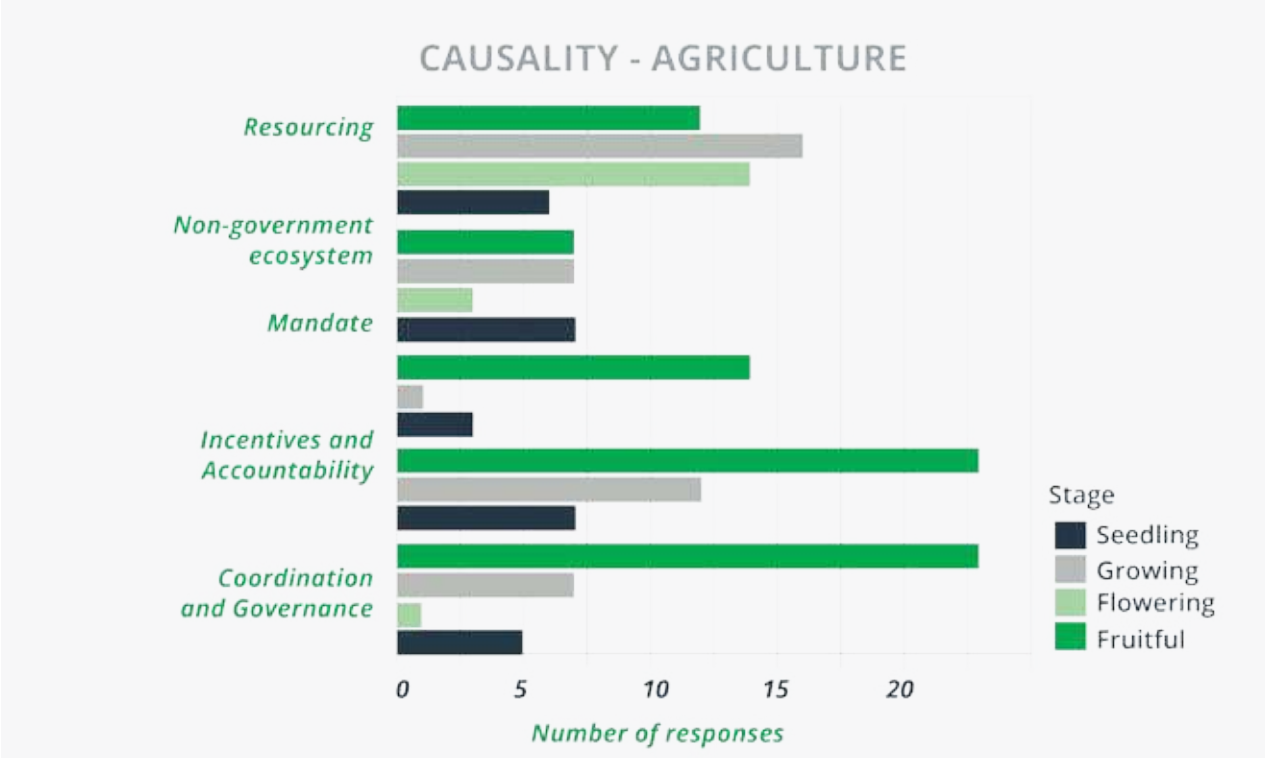


Figure 14: Causality scores - Agriculture.
The agriculture sector scores highly on mandate, incentives & accountability, and coordination & governance. Scores are more evenly distributed across the stages of maturity in the resourcing and non-government ecosystem categories.

Mandate:

The national government, more specifically, the technical working group/committee on Agriculture Statistics (in collaboration with KNBS[38]) requests data from the county level due to its mandate to undertake agricultural census, annual surveys and high frequency surveys. Data also flows up from the county level to the Ministry of Agriculture, Livestock, Fisheries and Cooperatives; but this does not occur in a systematic fashion because there is no harmonised Management Information System that handles the various data related to different agricultural value chains.

Incentives and Accountability:

On one hand, data collected under agriculture is used to monitor costs and revenues. On the other hand, such data is also used to monitor productivity. The field staff that collects data forms a large part of the workforce; collecting the data is a specialised function needing understanding of processes and procedures.

Resourcing:

In most counties, data in agriculture is collected physically at farms or in-person events and meetings. We found that in most counties, data storage is eventually digital - in staff laptops and county computers. However, this data is not centralised. There is also not enough breadth in terms of skilled staff complement to accommodate quality data collection.

Coordination and Governance:

This study found that in most counties, the agriculture departments are open to collaboration with non-governmental agencies for partnerships when it comes to specialised programs and studies.

EDUCATION SECTOR

In Kenya, the government's contextualization of education and training sector contains the following levels in terms of structure[39]:

1. Early Childhood Development and Pre-school Education
2. Primary Education
3. Secondary Education
4. University Education
5. Technical and Vocational Education and Training (TVET)
6. Teacher Education and Training
7. Non-formal Education and Adult Education
8. x Special Education

Similar to the Department of Health, and in line with Provisions of the 4th Schedule of the Constitution of Kenya 2010, the education department at the county level is responsible for Early Childhood and Development Education (ECDE) and Technical and Vocational Education and Training (TVET)[40].

The following indicators were included in the quality and availability assessment for the education sector:

1. ECDE enrolment rate
2. ECDE teacher/Pupil ratio
3. Rate of ECDE student transition to primary school
4. Number of ECDE classrooms constructed and equipped in the last financial year
5. Number of ECDE schools with a feeding programme
6. Amount spent per ECDE student
7. ECDE learners with special needs(%)
8. TVET enrolment rate
9. TVET instructor:trainee ratio
10. TVET course completion rate
11. Number of vocational training centres equipped with modern tools and equipment
12. Proportion of TVET centres with access to internet connectivity

Results

Data management in the education sector is led by the national government through the National Education Management Information System (NEMIS)[41]. NEMIS is a tool that automates the efficient management of basic education in Kenya through collecting data and information from education institutions; processing and reporting the status of designed indicators; and providing the sector a solid ground for effective management to ensure that every learner counts. For example, the government has used the system for Form One admissions and in the provision of the Medical Insurance Cover for secondary school students. However, data collected at the institution level is mostly in physical records that are later uploaded to the database. Logistical hurdles such as connectivity issues and lack of trained staff are some of the barriers to schools accessing the system directly[42].

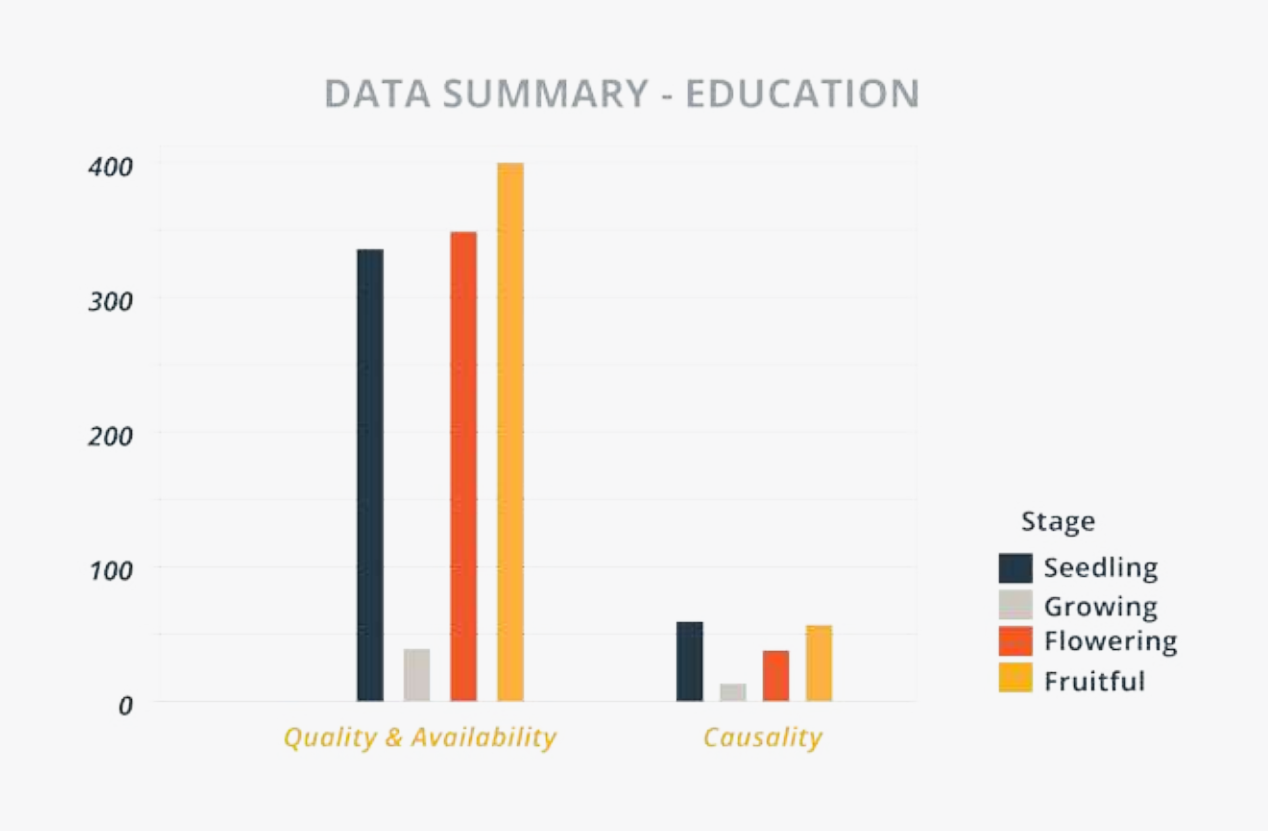


Figure 15: Summary of Education Sector Results.
There is a high proportion of responses in the flowering and fruitful stages of the model, but still a high number of results fall within the initial seedling stage.

In this study, a larger proportion of responses fall in the first stage of the model, specifically in the causality section. However, due to the reliance on the national government for funding, the county education departments must collect and report data on students, instructors and resources regularly to avoid related penalties. Schools are also encouraged to record data in the NEMIS platform for each student for disbursement of per capita resources. This improves the scores for data quality and availability for the department.

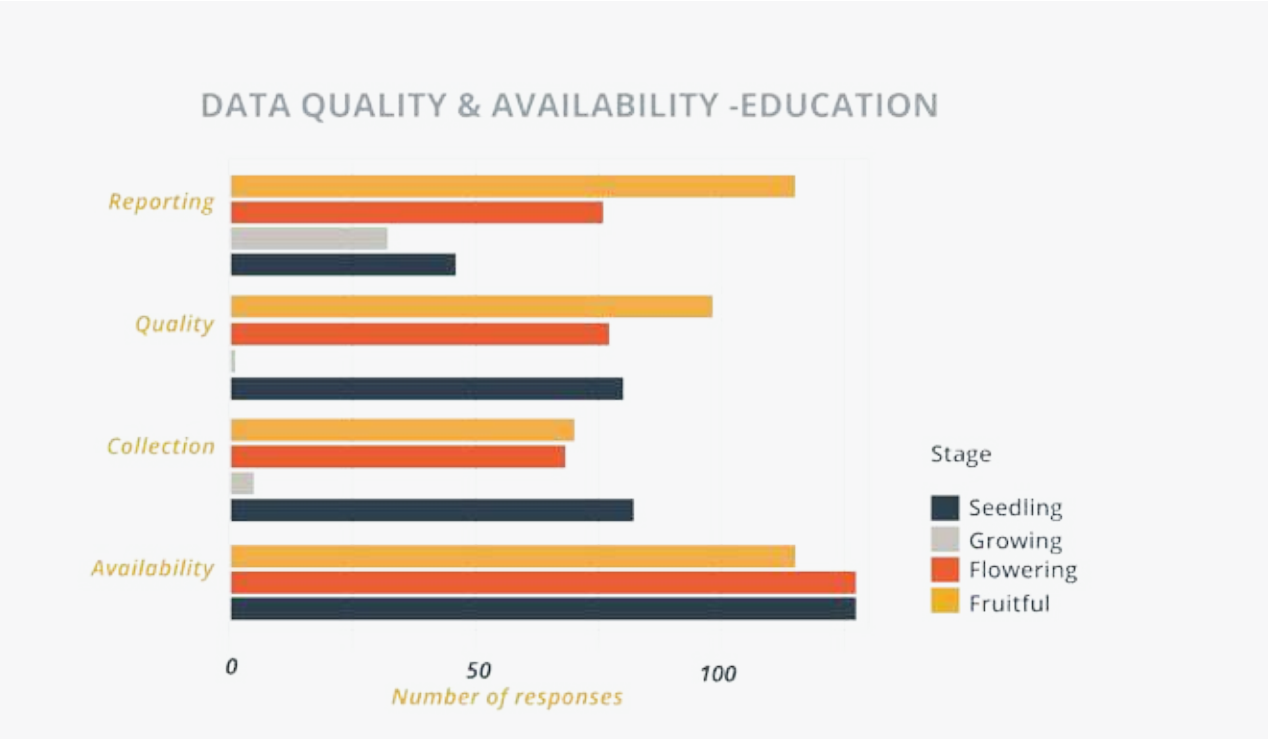


Figure 16: Data Quality and Availability Scores - Education.
The majority of cores are distributed between the initial seedling stage and the last two stages of the model. The scores are higher for data quality and reporting than other categories.

Data Collection:

The government of Kenya is committed to providing education to all its citizens. When it comes to data; however, the number of school-age children who do not have access to education services remains high - especially among children with disabilities - more than those who do not have disabilities.

Education data is collected daily at the school level and reported to the sub county offices on a monthly basis - this data is vital in informing important decision making such as learner capitation grants[43] as well as issues such as learner and teacher absenteeism. Additionally, in most of the counties under study, most children with special needs are enrolled in separate schools/classes.

Data on learners with special needs was not readily available. At the national level, we have the Kenya National Special Needs Education Survey - first unveiled in July 2016; but this has not been regularly conducted by the Ministry of Education.

Data Reporting:

For the devolved functions, data is collected at the individual school level and collated and reported at the sub county level. Whilst this data is stored in digital formats; it resides in departmental laptops/computers and there is no centralised database that houses this information.

Data Availability and Quality:

At the local level, we learnt that feedback mostly occurs through school boards of management where parents, staff and management identify and solve issues. This means that there are opportunities therein to interrogate the quality of the data as it gets used so that it can be improved. Besides such feedback however, we learnt there are not many other avenues for citizens to provide feedback on the quality of the education services and such data is not intentionally sought by departments.

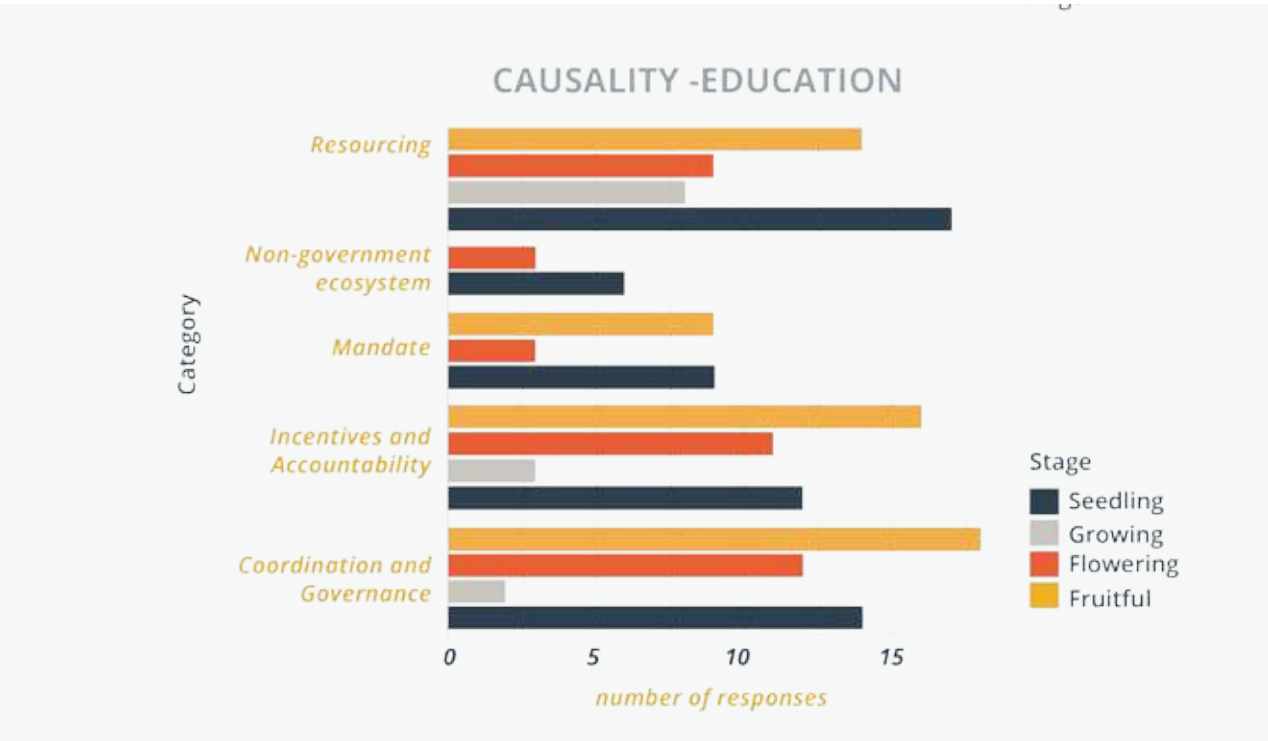


Figure 17: Causality scores - Education.
The majority of the scores in this section fall within the first and last stages of the model.

Mandate:

We learnt that county education departments are required to report this data for budgeting and other planning activities. However, the study revealed there is no standard or centralised county system/database for the devolved education services; individual county departments have created their own systems and templates in place for data reporting (that is, templates or approaches are also not uniform across board).

Incentives and Accountability:

A large proportion of county staff in this department are involved in collecting, collating and reporting data from individual facilities through the sub counties to the county department. The staff are trained on data collection according to local manuals.

Resourcing:

Data collection in the education sector is largely non-digital. Individual schools collect and store data in paper records which are manually compiled using templates by field officers/extension officers. Data storage is largely digital but mostly offline.

Coordination and Governance:

As stated, counties have developed their own templates for manual data collection that are used by field officials at schools, and at sub county level. We found that there are collaboration efforts by non-governmental organisations when it comes to supporting some services; for example, some organisations are involved in feeding and other programs in the education sector. Also, whereas the private sector is heavily involved in education, data from private institutions is not often included in the data collection and analysis.

CROSS-SECTORAL OBSERVATIONS

Right to Information

The constitution of Kenya has an overarching legislation on the right of citizens to access information and this is largely acknowledged and upheld in county governments. In 2016 Kenya passed the Access to Information Act, 2016 in fulfilment of its obligations under the constitution Article 10, Article 33 and 35. The Commission on Administrative Justice (CAJ), the oversight mechanism under the Access to Information law, has also not filed annual reports to the National Assembly as required by law (during the period from 2016). Consequently, there is no report yet to enable an assessment on the state of access to information in Kenya[44]. In addition, Kenya is one of the 78 national signatories to the Open Government Partnership (OGP) and has been since 2011. At the time of writing, the country is implementing the Fourth National Action Plan with clear commitments around beneficial ownership and open contracting[45].

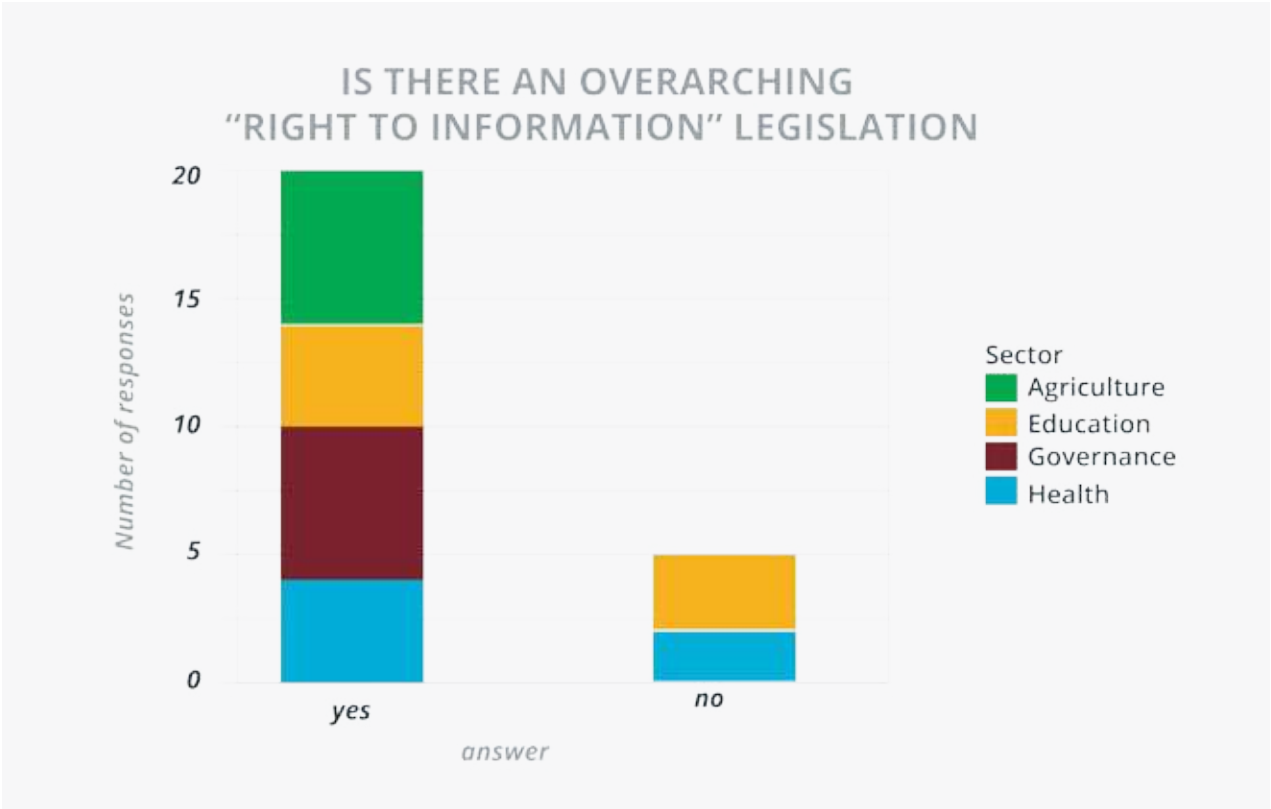


Figure 18: Is there an overarching "Right to Information" legislation?
The right of citizens to access information is cemented within the constitution of Kenya.

Data Collection and Storage

Data is largely collected manually and stored digitally in all departments, often in a decentralised manner offline on local laptops/computers. The exception is data related to finance and procurement data which is uploaded to the IFMIS database in real time as well as the Health data.

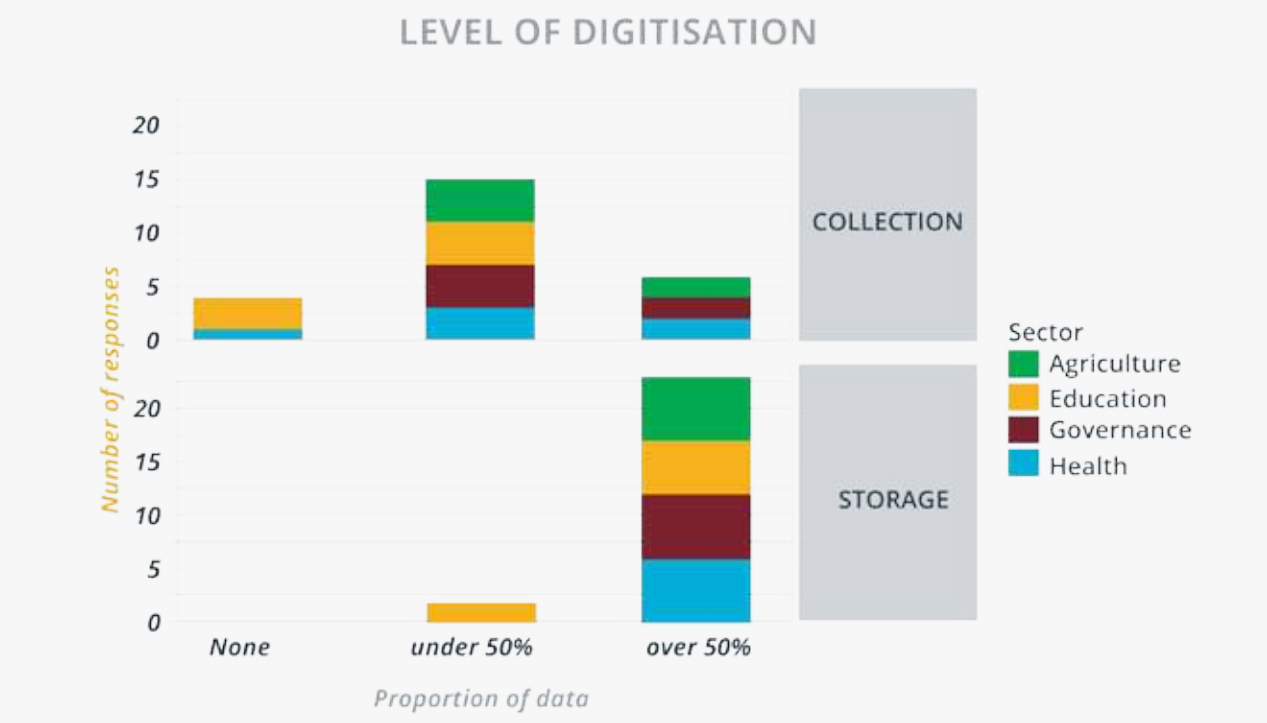


Figure 19: What is the level of digitisation of data collection/storage?
Data is mostly collected in physical formats and transferred to digital formats for storage and reporting.

Feedback

Channels for feedback are not anonymous in most county governments, and data collection often stops at the submission. The feedback is directed to the department in question and followed up later in the process but this is often not recorded. Feedback is also welcomed during public meetings and recorded for further accountability. During the pandemic, counties have evolved to receive feedback through more diverse channels such as social media and website forms.

Prioritisation

Data quality and availability was found to be of higher priority for departmental managers than the political class. This has bolstered claims that there are tendencies to prioritise programs based on politics as opposed to data and evidence where there are competing interests.

On one hand, departmental managers are held accountable by local and national government on their progress and use of funds, hence they recognise the importance of collecting and reporting accurate data regularly. On the other hand, there seems to be a need for further sensitization and capacity building on how data can be shared and used by elected officials so that the case for data management can be made and data management and governance are prioritised during county budgeting processes. This is depicted in the figure below

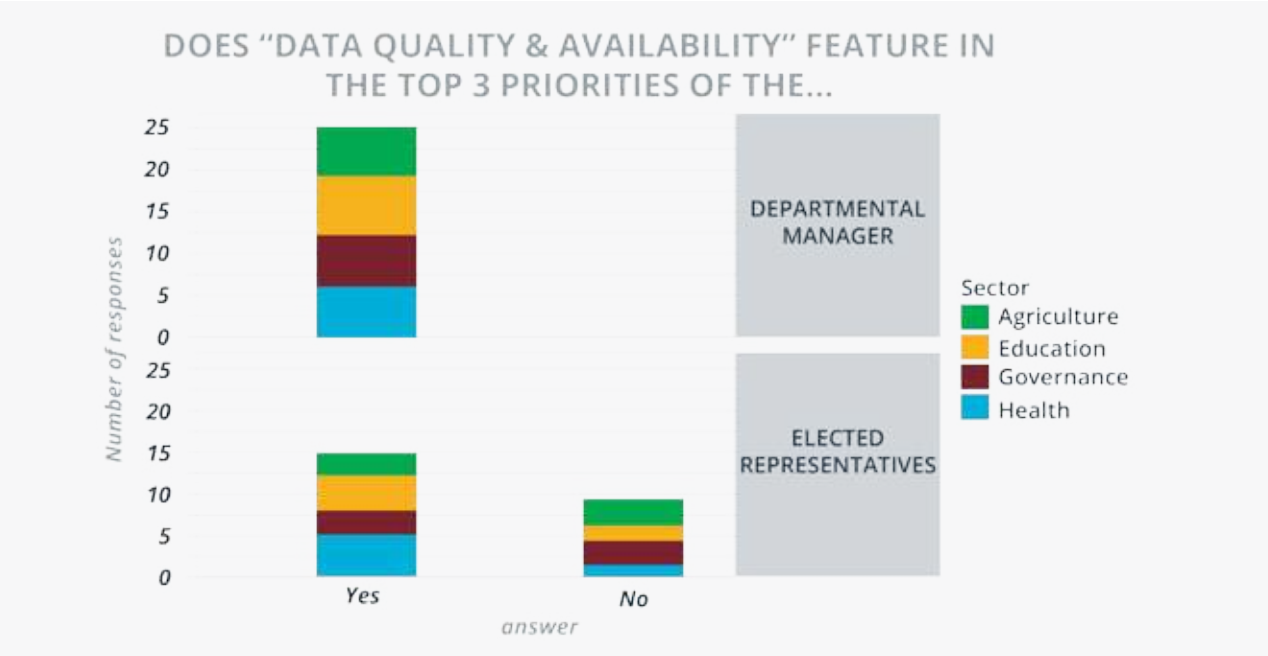


Figure 20: Does data quality & availability feature in the top 3 priorities of the departmental manager vs the elected representatives?

All departmental managers give higher priority to data quality and availability than elected representatives.

Resourcing

Most departments do not have a dedicated funding stream for staff and resources linked to data management. In Figure 21 below, the agriculture and education departments have a higher proportion of their budget dedicated to data management as there are higher numbers of officers collecting data in physical forms and/or templates on the ground. Data is integral to the operations of the governance sector as budgeting and planning activities involve data analysis and most of these exercises are carried out by the officials in charge of planning and monitoring and evaluation under this sector.

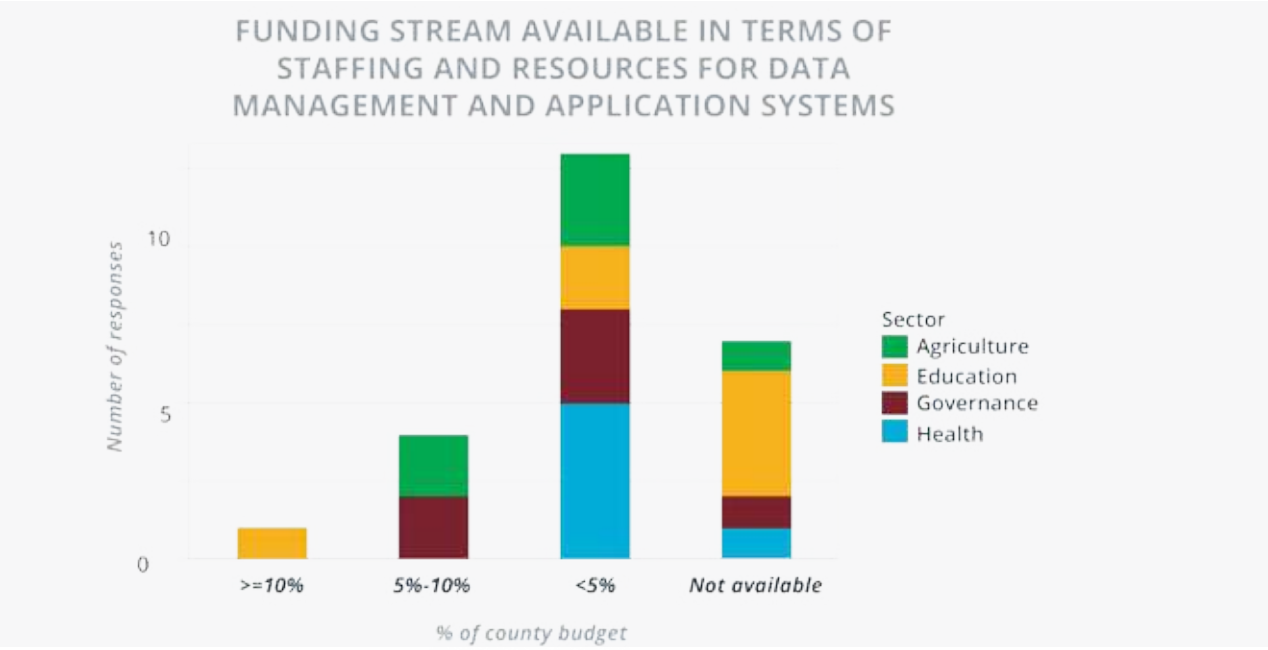


Figure 21: Is there a funding stream available in terms of staffing and resources for data management and application systems?

Education, agriculture and governance sectors allocate higher proportions of their budgets to data management.

More data staff in the governance and health departments receive training specific to data management according to Figure 22 below. This is likely due to the technical requirements of the national databases; sadly the expertise to mine and analyse the data is not thorough in most cases. This may also be linked to the minimal interaction with the database during data collection in the education and agriculture sectors, since the majority of the exercise involves manual input into templates.

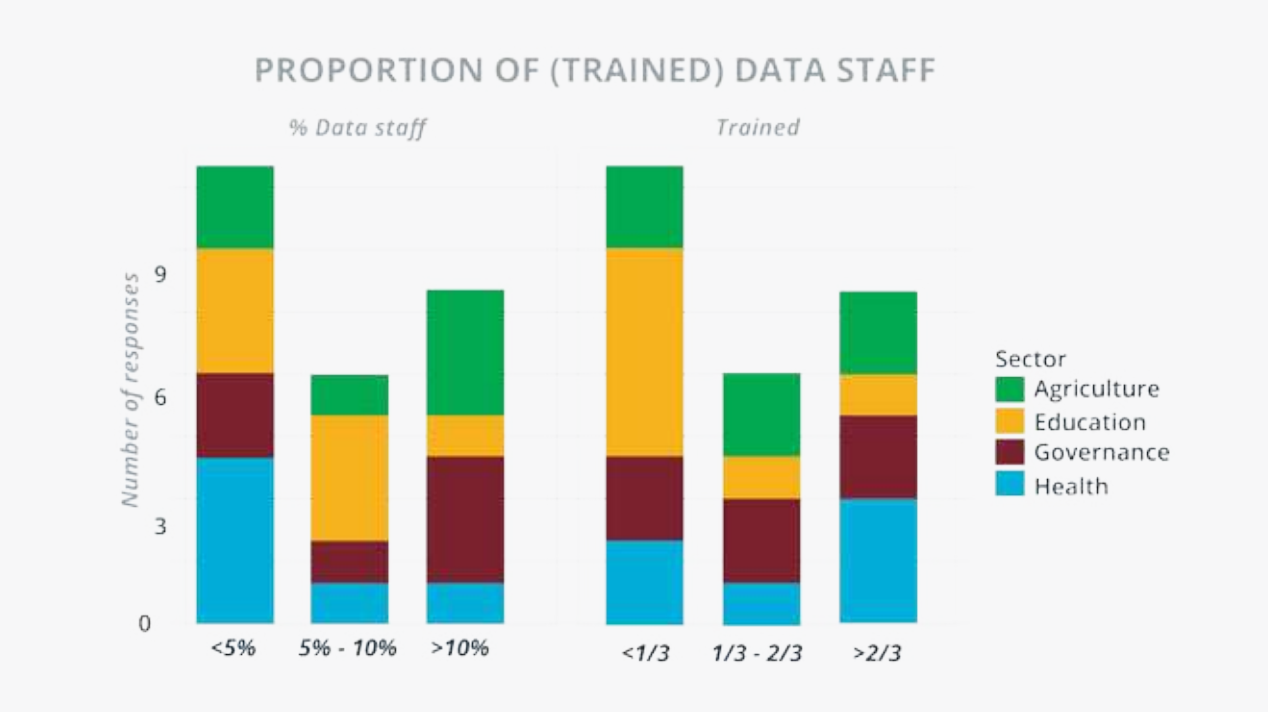


Figure 22: What is the proportion of data staff, and what proportion of these employees have received data specific training?
Although the agriculture and governance sectors have a higher proportion of data staff, more of the data staff within the education sector have received data specific training.

Data Privacy and Security

Most departments either have policies in place to guide data privacy and security, or have intentions of putting guidelines in place for the same in the near future. Data privacy and security is especially important in the health sector with a large proportion of respondents stating that the guidelines are already in place.

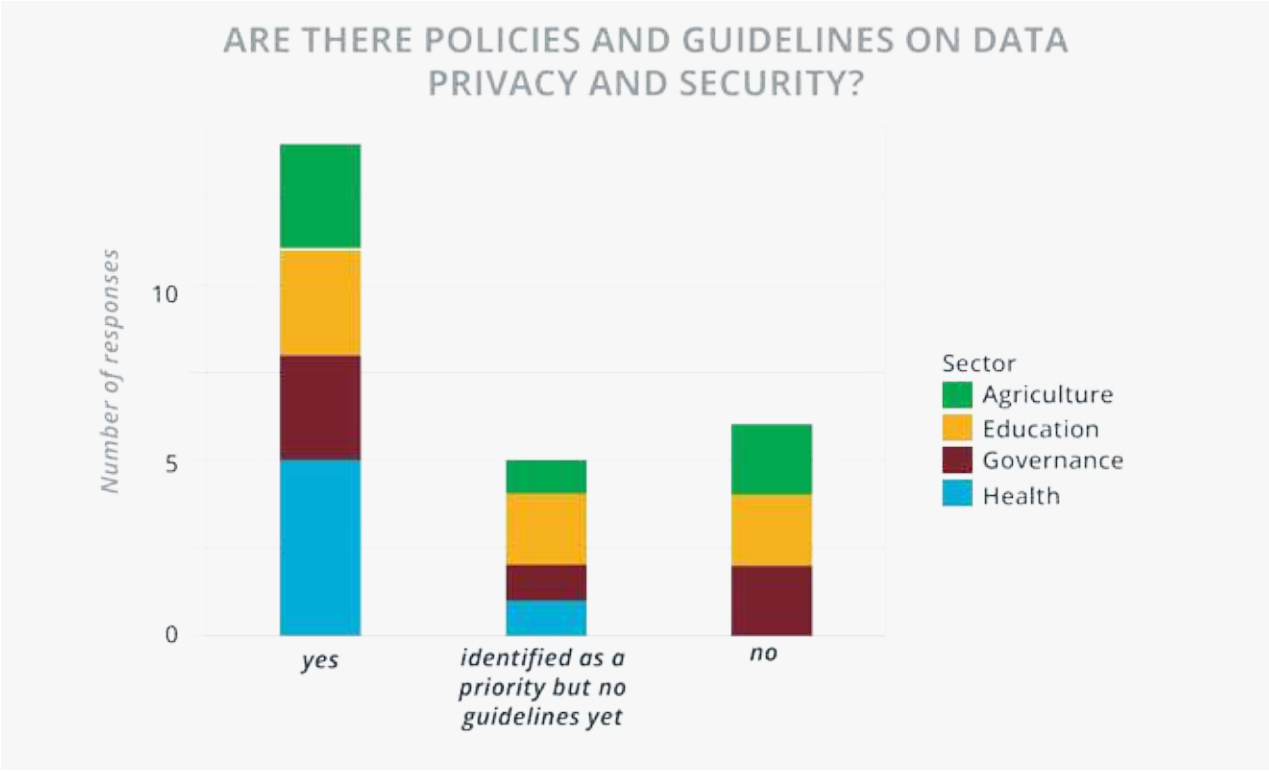


Figure 23: Are there policies and guidelines on data privacy and security?
All sectors demonstrated either ongoing efforts or the desire to put policies and guidelines in place.

Private Sector

The level of data maturity in the private sector at subnational level in digitisation of data management varies by sector (for the 4 sectors). The figure below demonstrates that data management in the private sector is more advanced in the health and education sectors, possibly due to the extent of privatisation of services in these sectors, the number of records kept and wider availability of resources for data management in individual facilities.

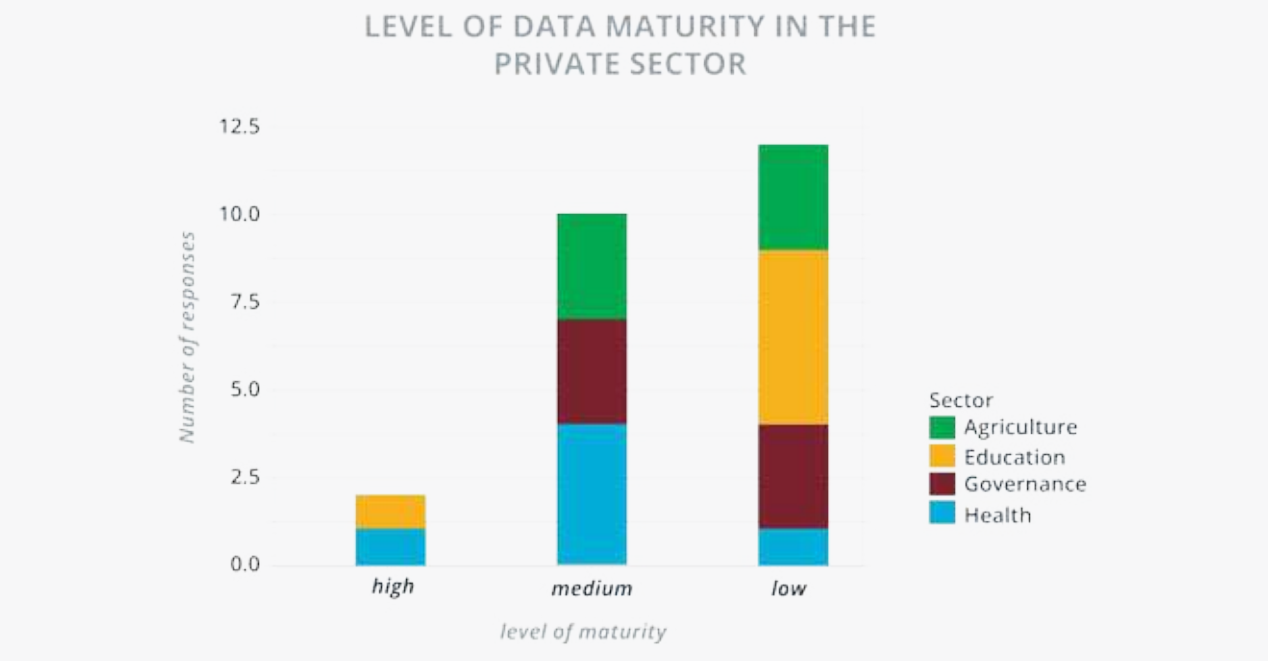


Figure 24: Level of maturity of the private sector.
These responses suggest that the private sector is lagging behind county governments in data maturity.

Data Science Expertise

The level of expertise when it comes to data science/data analysis is generally low. It is attributable to the focus that most departments have towards service delivery (and not really research and analysis). Sadly, such talent at the county level was found to be rare - with most who possess these skills opting to seek 'greener pastures' in better paying jobs in the private sector, CSOs and even academia. The study found that ata f within county planning departments are mostly graduates of economics, mathematics and computer science.

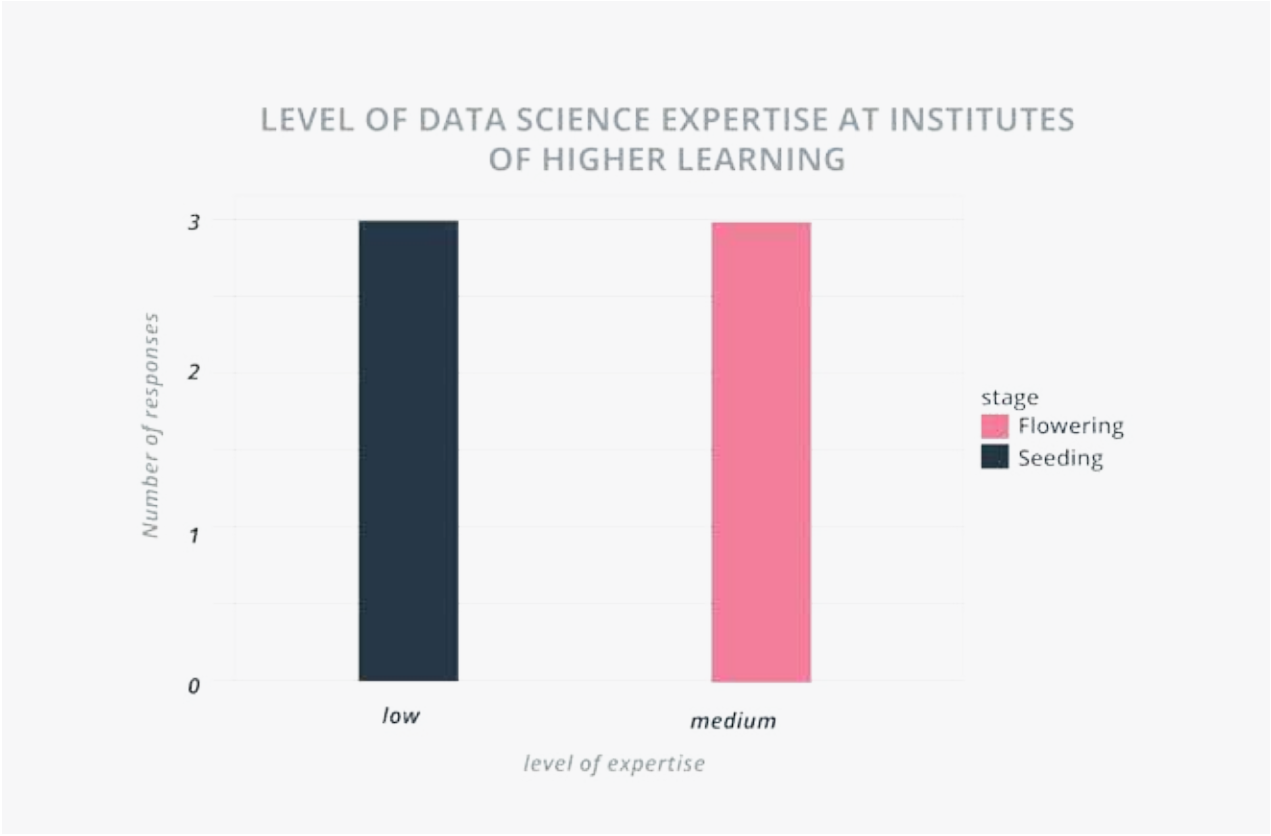


Figure 25: What is the level of data science expertise at institutions of higher learning?
The level of data science expertise at institutions of higher learning is low to medium in all counties in this study.

RECOMMENDATIONS TO ALL COUNTIES ON SECTORAL DATA MATURITY

Based on the sectoral analysis above, we would like to recommend the following actions to improve the sectoral quality of data.

Governance

1. Governance departments should find more innovative uses for data beyond financial planning, monitoring and evaluation.
2. Records on public participation should be digitised for easier access.
3. The Commission on Administrative Justice has developed and issued a model law on access to information for county government,[46] and engaged a number of counties to encourage them to enact their specific access to information laws (for example Kilifi and Makueni)[47]. This is one of the formative steps in ensuring data governance is instituted and it should be embraced by the remaining counties.
4. Even when such data is collected and published, there should be intentionality around reaching the majority especially the marginalised and disadvantaged groups in the communities.

Health

1. Health data is readily available for indicators included in the DHIS. Hence it was suggested by respondents that the questionnaire can be amended to include less common indicators such as neglected tropical diseases.
2. Health data collection and storage should be automated at the facility level to link to the DHIS database in real time.

Agriculture

1. County departments of agriculture should come up with standardised templates and centralised secure web-based databases for data management.
2. Agriculture departments should work with actors in the private sector to collect and use data for planning. This could help with forecasting and forecasting extreme events that affect agricultural outputs.

Education

1. County governments should engage stakeholders in the private sector and non-governmental organisations to collaborate on data collection and use. This should also be intentional when it comes to data collection for children/learners with special skills.
2. Thus the indicators tracked under this department should expand to include special needs education and others that are not linked to budget and planning. This would improve the planning and innovation processes.

General

1. Departments where the private sector is heavily involved should encourage private entities to collect data as part of their practices and collaborate with them for data collection and validation.
2. County governments should invest in an open data system where they collect data on the same indicators and disseminate it in user-friendly formats for ease of access and use.
3. County governments should invest in tools for automated data collection that forward data for analysis and reporting in real time. This is especially pertinent to departments where data is collected on the ground and on a regular basis such as education, health and agriculture.
4. Actors in all sectors should work to ensure that the processes for feedback on the impact of work done by the county government are well documented at every level, to ensure that citizens have access to efficient solutions.

CONCLUSION

DATA QUALITY AND AVAILABILITY

Data Collection:

Most data is collected in physical forms at the facility/event level. Some exceptions to this are using the IFMIS system for finance data under governance and data collected by some non-governmental entities in different sectors. Figures for most indicators in the agriculture sector are calculated based on standard formulas due to the amount of resources required to visit every site.

Data collection processes could be improved by digitising more processes to feed into live databases/dashboards.

Data Reporting

Data is reported quarterly for most of the indicators in this study, and this seems to be the golden standard for all sectors. Primary data sources are collated at the sub-county or county level on a monthly basis for most indicators. County governments release quarterly and yearly reports on progress towards their targets in PDF format.

Reporting could be improved by adding dashboards and data in more usable formats for the public to conduct their own analyses.

Data Availability

Data was available for most indicators in this study and all departments have an administrative requirement for data collection. Data on feedback mechanisms is limited to collection, with hardly any tracing of the subsequent processes addressing the feedback.

County governments should monitor feedback mechanisms more keenly and actively seek feedback from citizens on their work.

Data Quality

Location and gender data is available for most indicators where it is relevant, since the data is collected at the unit/facility level. The national government carries out regular auditing exercises but validation is often left out if not carried out as part of the audits or by the department.

County governments should strengthen data validation to improve the quality of data that is reported from all sectors.

CAUSALITY

Mandate:

County departments are required to regularly report on their progress according to their Annual Development Plans (ADPs) and the County Integrated Development Plans (CIDPs). However, penalties for not reporting some data are not well outlined for all the sectors.

Incentives and Accountability:

The national auditing machinery keeps departments accountable for costs and revenue, hence financial data is required for disbursement of funds needed to proceed with work as planned. Departmental managers prioritise data management but this is not the case on the political side, hence they have had difficulty with amending the local policies to improve data quality and availability. In most cases, the data is reported by the parties responsible for the outcomes, which could have an effect on data quality where data validation by a third party is not part of regular procedures. An example of this is school principals and parents initiating transfers of students without their consent, as they have access to these records but the former systems for quality assurance are not in place[48].

Resourcing:

One common theme that stands out in causality rating is the lack of resourcing - both staff and material resources - specific to data in county governments. The governance and health departments receive systemic data management support from the national government and this is reflected in their scores. Data science expertise is low in institutions of higher learning, although students learning related courses have been able to transfer their skills to applications in statistics and planning. County governments should collaborate with local institutions to build this capacity for their growing data management needs.

Coordination and Governance:

County governments work with the national government to collect, store and disseminate data, mostly in the health and governance sectors. The private sector, CSOs and academia should be engaged and brought into the fold when it comes to the data ecosystem in most sectors. They should not just collaborate on activities but also in the data value chain as well.

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APPENDIX

SURVEY QUESTIONS:

Quality and Availability

No.	Category	Question	Options (Scores)
1.	Availability	Is this data available?	Yes (1) No n/a
2.	Availability	Is this data part of statutory reporting?	Yes (4) No (1) n/a
3.	Availability	Is this data part of administrative reporting (part of the result framework)?	Yes (3) No (1) n/a
4.	Collection	What is the coverage of the collection?	100% (4) Sample (2) n/a
5.	Collection	In case of a sample, how is the sampling done?	Formula available for sampling. (2) Ad hoc. (1) n/a
6.	Collection	What is the mode of collection?	Automated (3) Physical (1) Both physical and automated (2) n/a
7.	Collection	What is the frequency of collection?	As frequent as the benchmark. (3) One level lower than benchmark grade. (2) Two or more levels lower. (1) n/a
8.	Reporting	What is the lag between collection and reporting?	Under one quarter. (4) One quarter – one year. (3) Over one year. (2) n/a
9.	Quality	Is the data gender disaggregated?	Yes/ Not applicable to the data in question. (4) No. (1) n/a
10.	Quality	Is the data geotagged?	Yes/ Not applicable to the data in question. (4) No. (1) n/a

11.	Quality	Is there any third-party validation of the data generated?	Yes (3) No (1) Sometimes(e.g. By NGOs) (2) n/a
12.	Quality	Are there independent process audits?	Yes (3) No (1) n/a
13.	Reporting	Is there public access to the results of such audits?	Yes (4) No (1) n/a
14.	Reporting	What format is the data available in?	Editable soft files, online. (4) Non editable (e.g. PDF) soft files, online. (3) Editable soft files, CD/DVD/Flashdisk. (2) Non-editable soft files, CD/DVD. (2) Paper. (1) n/a
15.	Reporting	Who are potential users of this data?	Global pull. (4) Global on request. (3) Local govt. agencies (on portal). (2) Local govt. agencies (on request). (1) Not shared. (1) n/a
16.	Availability	Is there a mechanism to capture user satisfaction and impact on the target population?	Yes (4) No (1) n/a
17.	Availability	Does the government make any budgetary allocations on the basis of this data?	Yes (3) No (1) n/a

Causality

No.	Category	Question	Options (Scores)
1.	Mandate	a) Is there a legislative mandate for the county department to collect information on this theme? (advised by the 4th schedule of the constitution of Kenya 2010)	Yes, one department. Yes, multiple. No.
		b) Are there clearly articulated penalties attached to not reporting this data?	Yes, with significant penalties. Yes, with token penalties. No.
		c) Is there an overarching "Right to Information" legislation?	Yes No

2.	Resourcing	a) What is the level of digitization of data collection?	Largely digital (over 50% of indicators in theme). Largely non-digital (under 50%). Non-digital (100%).
		b) What is the level of digitization of data storage?	Largely digital (over 50% of indicators in theme). Largely non-digital (under 50%). Non-digital (100%).
		c) What fraction has the overall expenditure on IT been of total budget (past 3-year average)?	Over 10% 5% to 10% 2% to 5% Under 2%
		d) What is the fraction of data staff available as a % of total positions filled?	Over 10% 5% to 10% Under 5%
		e) What fraction of responsible staff has undergone specific data relevant training?	Over two-thirds. One-third to two-thirds. Under one-third.
		f) Funding stream available in terms of staffing and resources for data management and application systems (statistical analysis, digital mapping, GIS, etc.)	Yes, with funding of ~ 10% or more of county budget. Yes, with funding of 5% - 10% of county budget. Yes, with funding of <5% of county budget. No.
3.	Incentives & Accountability	a) Is the reporting agency also responsible for performance on the indicator?	No Yes
		b) Does "data availability and quality" figure in the top 3 priorities of the county elected representatives?	Yes No
		c) Does "data availability and quality" figure in the top 3 priorities of the department manager (responsible for the theme)?	Yes No
		d) For similar seniority, is there a pay difference between statistical staff and operational staff?	Differential of less than 20%. Differential of 20% to 50%. Differential of over 50% No difference
		e) Is there a regular and structured budget allocation linked to data?	Yes No
		f) Is the data collected under the theme used to monitor costs?	Yes No
		g) Is the data collected under the theme used to monitor revenues?	Yes No

4.	Coordination & Governance	a) Are Multiple departments/entities involved in data collection?	Only one entity. Yes – one at local and one at national level. Yes – multiple at local level. No designated owner.
		b) Are there recurrent licenses to be paid in addition to maintenance of applications and databases (in your department) and support?	Yes No
		c) Is there a formal coordination mechanism between entities involved?	Yes (or not applicable) No
		d) Are there process manuals to guide data collection?	Yes, conform to global standards. Yes, local. No.
		e) Are there policies and guidelines on data privacy and security?	Yes – policies and guidelines in place. Identified as a priority but no guidelines yet. No.
		f) Is the collected data available to all actors in the county data ecosystem (county assembly, county executive)?	At highest level of granularity automatically. Yes, but not unit level, automatically. At highest level of granularity on request. On request, but not at unit level. No.

5.	Non-Government ecosystem	a) How do you gauge the level of internet penetration across the county?*	Over 50% 25% - 50% 10% - 25% Under 10%
		b) Are you able to gauge the level of smartphone penetration in the county?*	Over 50% 25% - 50% 10% - 25% Under 10%
		c) Are there data sets from non-governmental entities in this theme?	Yes, regular Yes, one off No
		d) What is the level of openness of the county government to non-governmental data sets?	Mature. Already used such data sets for planning and operations. Open to joint efforts with non-governmental entities for data collection. Open to role in validation, but not collection Not open
		e) What is the maturity of the Private sector on digital data collection, digitization of services and data analysis? warehousing and analytics?	High maturity in all areas. Medium maturity in all areas. Low maturity in all areas.
		f) What is the level of expertise of technical and vocational training colleges, mid level colleges and universities (in the county) around data science?*	High, Medium. Low. In all cases, provide names of institutions

**Question only asked at governance department*

Governance

Data Quality and Availability

Category	Question	Answer	Stage	Frequency
Availability	Is this data available?	Yes	Seedling	69
Availability	Is this data part of statutory reporting?	Yes	Fruitful	57
Availability	Is this data part of statutory reporting?	No	Seedling	11
Availability	Is this data part of administrative reporting (part of the result framework)?	Yes	Flowering	66
Availability	Is this data part of administrative reporting (part of the result framework)?	No	Seedling	2
Collection	What is the coverage of the collection?	100%	Fruitful	65
Collection	What is the coverage of the collection?	Sample	Growing	1
Collection	In case of a sample, how is the sampling done?	Formula available for sampling.	Growing	2
Collection	In case of a sample, how is the sampling done?	Ad hoc.	Seedling	0
Collection	What is the mode of collection?	Automated	Flowering	19
Collection	What is the mode of collection?	Physical	Seedling	20
Collection	What is the mode of collection?	Both physical and automated	Growing	24
Collection	What is the frequency of collection?	As frequent as the benchmark.	Flowering	64
Collection	What is the frequency of collection?	One level lower than benchmark grade.	Growing	0
Collection	What is the frequency of collection?	Two or more levels lower.	Seedling	0
Reporting	What is the lag between collection and reporting?	Under one quarter.	Fruitful	23
Reporting	What is the lag between collection and reporting?	One quarter – one year.	Flowering	38
Reporting	What is the lag between collection and reporting?	Over one year.	Growing	0
Quality	Is the data gender disaggregated?	Yes/ Not applicable to the data in question.	Fruitful	31
Quality	Is the data gender disaggregated?	No.	Seedling	7

Quality	Is the data geotagged?	Yes/ Not applicable to the data in question.	Fruitful	52
Quality	Is the data geotagged?	No.	Seedling	1
Quality	Is there any third-party validation of the data generated?	Yes	Flowering	56
Quality	Is there any third-party validation of the data generated?	No	Seedling	8
Quality	Is there any third-party validation of the data generated?	Sometimes(e.g. By NGOs)	Growing	0
Quality	Are there independent process audits?	Yes	Flowering	54
Quality	Are there independent process audits?	No	Seedling	9
Reporting	Is there public access to the results of such audits?	Yes	Fruitful	51
Reporting	Is there public access to the results of such audits?	No	Seedling	4
Reporting	What format is the data available in?	Editable soft files, online.	Fruitful	12
Reporting	What format is the data available in?	Non editable (e.g. PDF) soft files, online.	Flowering	45
Reporting	What format is the data available in?	Editable soft files, CD/DVD/ Flashdisk.	Growing	0
Reporting	What format is the data available in?	Non-editable soft files, CD/DVD.	Growing	0
Reporting	What format is the data available in?	Paper.	Seedling	7
Reporting	Who are potential users of this data?	Global pull.	Fruitful	44
Reporting	Who are potential users of this data?	Global on request.	Flowering	9
Reporting	Who are potential users of this data?	Local govt. agencies (on portal).	Growing	0
Reporting	Who are potential users of this data?	Local govt. agencies (on request).	Seedling	10
Reporting	Who are potential users of this data?	Not shared.	Seedling	1
Availability	Is there a mechanism to capture user satisfaction and impact on the target population?	Yes	Fruitful	58
Availability	Is there a mechanism to capture user satisfaction and impact on the target population?	No	Seedling	6
Availability	Does the government make any budgetary allocations on the basis of this data?	Yes	Flowering	61
Availability	Does the government make any budgetary allocations on the basis of this data?	No	Seedling	3

Causality

Category	Question	Answer	Stage	Frequency
Mandate	Is there a legislative mandate for the county department to collect information on this theme? (advised by the 4th schedule of the constitution of kenya 2010)	Yes, one department.	Flowering	1
Mandate	Is there a legislative mandate for the county department to collect information on this theme? (advised by the 4th schedule of the constitution of kenya 2010)	Yes, multiple.	Fruitful	5
Mandate	Is there a legislative mandate for the county department to collect information on this theme? (advised by the 4th schedule of the constitution of kenya 2010)	No.	Seedling	0
Mandate	Are there clearly articulated penalties attached to not reporting this data?	Yes, with significant penalties.	Fruitful	3
Mandate	Are there clearly articulated penalties attached to not reporting this data?	Yes, with token penalties.	Flowering	0
Mandate	Are there clearly articulated penalties attached to not reporting this data?	No.	Seedling	3
Mandate	Is there an overarching “Right to Information” legislation?	Yes	Fruitful	6
Mandate	Is there an overarching “Right to Information” legislation?	No	Seedling	0
Resourcing	What is the level of digitization of data collection?	Largely digital (over 50% of indicators in theme).	Fruitful	2
Resourcing	What is the level of digitization of data collection?	Largely non-digital (under 50%).	Growing	4
Resourcing	What is the level of digitization of data collection?	Non-digital (100%).	Seedling	0
Resourcing	What is the level of digitization of data storage?	Largely digital (over 50% of indicators in theme).	Flowering	6
Resourcing	What is the level of digitization of data storage?	Largely non-digital (under 50%).	Growing	0
Resourcing	What is the level of digitization of data storage?	Non-digital (100%).	Seedling	0
Resourcing	What fraction has the overall expenditure on IT been of total budget (past 3-year average)?	Over 10%	Fruitful	0

Resourcing	What fraction has the overall expenditure on IT been of total budget (past 3-year average)?	5% to 10%	Flowering	2
Resourcing	What fraction has the overall expenditure on IT been of total budget (past 3-year average)?	2% to 5%	Growing	2
Resourcing	What fraction has the overall expenditure on IT been of total budget (past 3-year average)?	Under 2%	Seedling	2
Resourcing	What is the fraction of data staff available as a % of total positions filled?	Over 10%	Fruitful	3
Resourcing	What is the fraction of data staff available as a % of total positions filled?	5% to 10%	Flowering	1
Resourcing	What is the fraction of data staff available as a % of total positions filled?	Under 5%	Seedling	2
Resourcing	What fraction of responsible staff has undergone specific data relevant training?	Over two-thirds.	Fruitful	2
Resourcing	What fraction of responsible staff has undergone specific data relevant training?	One-third to two-thirds.	Flowering	2
Resourcing	What fraction of responsible staff has undergone specific data relevant training?	Under one-third.	Growing	2
Resourcing	Funding stream available in terms of staffing and resources for data management and application systems (statistical analysis, digital mapping, GIS, etc.)	Yes, with funding of ~ 10% or more of county budget.	Fruitful	0
Resourcing	Funding stream available in terms of staffing and resources for data management and application systems (statistical analysis, digital mapping, GIS, etc.)	Yes, with funding of 5% - 10% of county budget.	Flowering	2
Resourcing	Funding stream available in terms of staffing and resources for data management and application systems (statistical analysis, digital mapping, GIS, etc.)	Yes, with funding of <5% of county budget.	Growing	3
Resourcing	Funding stream available in terms of staffing and resources for data management and application systems (statistical analysis, digital mapping, GIS, etc.)	No.	Seedling	1
Resourcing	How do you gauge the level of internet penetration across the county?	Over 50%	Fruitful	3
Resourcing	How do you gauge the level of internet penetration across the county?	25% - 50%	Flowering	1
Resourcing	How do you gauge the level of internet penetration across the county?	10% - 25%	Growing	2

Resourcing	How do you gauge the level of internet penetration across the county?	Under 10%	Seedling	0
Resourcing	Are you able to gauge the level of smartphone penetration in the county?	Over 50%	Fruitful	2
Resourcing	Are you able to gauge the level of smartphone penetration in the county?	25% - 50%	Flowering	2
Resourcing	Are you able to gauge the level of smartphone penetration in the county?	10% - 25%	Growing	1
Resourcing	Are you able to gauge the level of smartphone penetration in the county?	Under 10%	Seedling	1
Incentives & Accountability	Is the reporting unit also responsible for performance on the indicator?	Yes	Seedling	3
Incentives & Accountability	Is the reporting unit also responsible for performance on the indicator?	No	Fruitful	3
Incentives & Accountability	Does “data availability and quality” figure in the top 3 priorities of the county elected representatives?	Yes	Fruitful	3
Incentives & Accountability	Does “data availability and quality” figure in the top 3 priorities of the county elected representatives?	No	Seedling	3
Incentives & Accountability	Does “data availability and quality” figure in the top 3 priorities of the departmental manager (responsible for the theme)?	Yes	Fruitful	6
Incentives & Accountability	Does “data availability and quality” figure in the top 3 priorities of the departmental manager (responsible for the theme)?	No	Seedling	0
Incentives & Accountability	For similar seniority, is there a pay difference between statistical staff and operational staff?	Differential of less than 20%.	Flowering	0
Incentives & Accountability	For similar seniority, is there a pay difference between statistical staff and operational staff?	Differential of 20% to 50%.	Growing	0
Incentives & Accountability	For similar seniority, is there a pay difference between statistical staff and operational staff?	Differential of over 50%	Seedling	0
Incentives & Accountability	For similar seniority, is there a pay difference between statistical staff and operational staff?	No difference	Fruitful	6
Incentives & Accountability	Is there a regular and structured budget allocation linked to data?	Yes	Fruitful	5
Incentives & Accountability	Is there a regular and structured budget allocation linked to data?	No	Seedling	1
Incentives & Accountability	Is the data collected under the theme used to monitor costs?	Yes	Flowering	6
Incentives & Accountability	Is the data collected under the theme used to monitor costs?	No	Seedling	0
Incentives & Accountability	Is the data collected under the theme used to monitor revenues?	Yes	Flowering	6

Incentives & Accountability	Is the data collected under the theme used to monitor revenues?	No	Seedling	0
Coordination & Governance	Are Multiple departments/entities involved in data collection?	Only one entity.	Growing	0
Coordination & Governance	Are Multiple departments/entities involved in data collection?	Yes – one at local and one at national level.	Fruitful	3
Coordination & Governance	Are Multiple departments/entities involved in data collection?	Yes – multiple at local level.	Flowering	3
Coordination & Governance	Are Multiple departments/entities involved in data collection?	No designated owner.	Seedling	0
Coordination & Governance	Are there recurrent licenses to be paid in addition to maintenance and support of applications and databases in your unit/department?	Yes	Fruitful	5
Coordination & Governance	Are there recurrent licenses to be paid in addition to maintenance and support of applications and databases in your unit/department?	No	Seedling	1
Coordination & Governance	Is there a formal coordination mechanism between entities involved?	Yes (or not applicable)	Fruitful	4
Coordination & Governance	Is there a formal coordination mechanism between entities involved?	No	Seedling	2
Coordination & Governance	Are there process manuals to guide data collection?	Yes, conform to global standards.	Fruitful	4
Coordination & Governance	Are there process manuals to guide data collection?	Yes, local.	Flowering	2
Coordination & Governance	Are there process manuals to guide data collection?	No.	Seedling	0
Coordination & Governance	Are there policies and guidelines on data privacy and security	Yes – policies and guidelines in place.	Fruitful	3
Coordination & Governance	Are there policies and guidelines on data privacy and security	Identified as a priority but no guidelines yet.	Growing	1
Coordination & Governance	Are there policies and guidelines on data privacy and security	No.	Seedling	2
Coordination & Governance	Is the collected data available to all actors in the county data ecosystem (county assembly, county executive)?	At highest level of granularity automatically.	Fruitful	4
Coordination & Governance	Is the collected data available to all actors in the county data ecosystem (county assembly, county executive)?	Yes, but not unit level, automatically .	Growing	0
Coordination & Governance	Is the collected data available to all actors in the county data ecosystem (county assembly, county executive)?	At highest level of granularity on request.	Flowering	2
Coordination & Governance	Is the collected data available to all actors in the county data ecosystem (county assembly, county executive)?	On request, but not at unit level.	Seedling	0
Coordination & Governance	Is the collected data available to all actors in the county data ecosystem (county assembly, county executive)?	No.	Seedling	0

Non-government ecosystem	Are there data sets from non-governmental entities in this theme?	Yes, regular	Fruitful	3
Non-government ecosystem	Are there data sets from non-governmental entities in this theme?	Yes, one off	Flowering	2
Non-government ecosystem	Are there data sets from non-governmental entities in this theme?	No	Seedling	1
Non-government ecosystem	What is the level of openness of the county government to non-governmental data sets?	Mature. Already used such data sets for planning and operations.	Fruitful	4
Non-government ecosystem	What is the level of openness of the county government to non-governmental data sets?	Open to joint efforts with non-governmental entities for data collection.	Flowering	2
Non-government ecosystem	What is the level of openness of the county government to non-governmental data sets?	Open to role in validation, but not collection	Growing	0
Non-government ecosystem	What is the level of openness of the county government to non-governmental data sets?	Not open	Seedling	0
Non-government ecosystem	What is the maturity of the Private sector	High maturity in all areas.	Flowering	0
Non-government ecosystem	What is the maturity of the Private sector	Medium maturity in all areas.	Growing	3
Non-government ecosystem	What is the maturity of the Private sector	Low maturity in all areas.	Seedling	3
Non-government ecosystem	What is the level of expertise of technical and vocational training colleges, mid level colleges and universities (in the county) around data science?	High,	Fruitful	0
Non-government ecosystem	What is the level of expertise of technical and vocational training colleges, mid level colleges and universities (in the county) around data science?	Medium.	Flowering	3
Non-government ecosystem	What is the level of expertise of technical and vocational training colleges, mid level colleges and universities (in the county) around data science?	Low.	Seedling	3

Health

Data Quality and Availability

Category	Question	Answer	Stage	Frequency
Availability	Is this data available?	Yes	Seedling	60
Availability	Is this data available?	No	Seedling	0
Availability	Is this data part of statutory reporting?	Yes	Fruitful	43
Availability	Is this data part of statutory reporting?	No	Seedling	17
Availability	Is this data part of administrative reporting (part of the result framework)?	Yes	Flowering	58
Availability	Is this data part of administrative reporting (part of the result framework)?	No	Seedling	2
Collection	What is the coverage of the collection?	100%	Fruitful	52
Collection	What is the coverage of the collection?	Sample	Growing	8
Collection	In case of a sample, how is the sampling done?	Formula available for sampling.	Growing	1
Collection	In case of a sample, how is the sampling done?	Ad hoc.	Seedling	8
Collection	What is the mode of collection?	Automated	Flowering	17
Collection	What is the mode of collection?	Physical	Seedling	17
Collection	What is the mode of collection?	Both physical and automated	Growing	26
Collection	What is the frequency of collection?	As frequent as the benchmark.	Flowering	59
Collection	What is the frequency of collection?	One level lower than benchmark grade.	Growing	0
Collection	What is the frequency of collection?	Two or more levels lower.	Seedling	1
Reporting	What is the lag between collection and reporting?	Under one quarter.	Fruitful	28
Reporting	What is the lag between collection and reporting?	One quarter – one year.	Flowering	31
Reporting	What is the lag between collection and reporting?	Over one year.	Growing	1
Quality	Is the data gender disaggregated?	Yes/ Not applicable to the data in question.	Fruitful	24
Quality	Is the data gender disaggregated?	No.	Seedling	5
Quality	Is the data geotagged?	Yes/ Not applicable to the data in question.	Fruitful	56

Quality	Is the data geotagged?	No.	Seedling	4
Quality	Is there any third-party validation of the data generated?	Yes	Flowering	46
Quality	Is there any third-party validation of the data generated?	No	Seedling	14
Quality	Are there independent process audits?	Yes	Flowering	42
Quality	Are there independent process audits?	No	Seedling	18
Reporting	Is there public access to the results of such audits?	Yes	Fruitful	34
Reporting	Is there public access to the results of such audits?	No	Seedling	8
Reporting	What format is the data available in?	Editable soft files, online.	Fruitful	32
Reporting	What format is the data available in?	Non editable (e.g. PDF) soft files, online.	Flowering	25
Reporting	What format is the data available in?	Editable soft files, CD/DVD/ Flashdisk.	Growing	2
Reporting	What format is the data available in?	Non-editable soft files, CD/ DVD.	Growing	0
Reporting	What format is the data available in?	Paper.	Seedling	1
Reporting	Who are potential users of this data?	Global pull.	Fruitful	32
Reporting	Who are potential users of this data?	Global on request.	Flowering	28
Reporting	Who are potential users of this data?	Local govt. agencies (on portal).	Growing	0
Reporting	Who are potential users of this data?	Local govt. agencies (on request).	Seedling	0
Reporting	Who are potential users of this data?	Not shared.	Seedling	0
Availability	Is there a mechanism to capture user satisfaction and impact on the target population?	Yes	Fruitful	48
Availability	Is there a mechanism to capture user satisfaction and impact on the target population?	No	Seedling	11
Availability	Does the government make any budgetary allocations on the basis of this data?	Yes	Flowering	59
Availability	Does the government make any budgetary allocations on the basis of this data?	No	Seedling	1

Causality

Category	Question	Answer	Stage	Frequency
Mandate	Is there a legislative mandate for the county department to collect information on this theme? (advised by the 4th schedule of the constitution of kenya 2010)	Yes, one department.	Flowering	5
Mandate	Is there a legislative mandate for the county department to collect information on this theme? (advised by the 4th schedule of the constitution of kenya 2010)	Yes, multiple.	Fruitful	1
Mandate	Is there a legislative mandate for the county department to collect information on this theme? (advised by the 4th schedule of the constitution of kenya 2010)	No.	Seedling	0
Mandate	Are there clearly articulated penalties attached to not reporting this data?	Yes, with significant penalties.	Fruitful	2
Mandate	Are there clearly articulated penalties attached to not reporting this data?	Yes, with token penalties.	Flowering	0
Mandate	Are there clearly articulated penalties attached to not reporting this data?	No.	Seedling	4
Mandate	Is there an overarching “Right to Information” legislation?	Yes	Fruitful	4
Mandate	Is there an overarching “Right to Information” legislation?	No	Seedling	2
Resourcing	What is the level of digitization of data collection?	Largely digital (over 50% of indicators in theme).	Fruitful	2
Resourcing	What is the level of digitization of data collection?	Largely non-digital (under 50%).	Growing	3
Resourcing	What is the level of digitization of data collection?	Non-digital (100%)	Seedling	1
Resourcing	What is the level of digitization of data storage?	Largely digital (over 50% of indicators in theme).	Flowering	6
Resourcing	What is the level of digitization of data storage?	Largely non-digital (under 50%).	Growing	0
Resourcing	What is the level of digitization of data storage?	Non-digital (100%).	Seedling	0
Resourcing	What is the fraction of data staff available as a % of total positions filled?	Over 10%	Fruitful	1

Resourcing	What is the fraction of data staff available as a % of total positions filled?	5% to 10%	Flowering	1
Resourcing	What is the fraction of data staff available as a % of total positions filled?	Under 5%	Seedling	4
Resourcing	What fraction of responsible staff has undergone specific data relevant training?	Over two-thirds.	Fruitful	3
Resourcing	What fraction of responsible staff has undergone specific data relevant training?	One-third to two-thirds.	Flowering	1
Resourcing	What fraction of responsible staff has undergone specific data relevant training?	Under one-third.	Seedling	2
Resourcing	Funding stream available in terms of staffing and resources for data management and application systems (statistical analysis, digital mapping, GIS, etc.)	Yes, with funding of ~ 10% or more of county budget.	Fruitful	0
Resourcing	Funding stream available in terms of staffing and resources for data management and application systems (statistical analysis, digital mapping, GIS, etc.)	Yes, with funding of 5% - 10% of county budget.	Flowering	0
Resourcing	Funding stream available in terms of staffing and resources for data management and application systems (statistical analysis, digital mapping, GIS, etc.)	Yes, with funding of <5% of county budget.	Growing	5
Resourcing	Funding stream available in terms of staffing and resources for data management and application systems (statistical analysis, digital mapping, GIS, etc.)	No.	Seedling	1
Resourcing	Is the reporting unit also responsible for performance on the indicator?	Yes	Fruitful	6
Resourcing	Is the reporting unit also responsible for performance on the indicator?	No	Seedling	0
Resourcing	Does “data availability and quality” figure in the top 3 priorities of the county elected representatives?	Yes	Fruitful	5
Resourcing	Does “data availability and quality” figure in the top 3 priorities of the county elected representatives?	No	Seedling	1
Incentives & Accountability	Does “data availability and quality” figure in the top 3 priorities of the departmental manager (responsible for the theme)?	Yes	Fruitful	6
Incentives & Accountability	Does “data availability and quality” figure in the top 3 priorities of the departmental manager (responsible for the theme)?	No	Seedling	0

Incentives & Accountability	For similar seniority, is there a pay difference between statistical staff and operational staff?	Differential of less than 20%.	Flowering	0
Incentives & Accountability	For similar seniority, is there a pay difference between statistical staff and operational staff?	Differential of 20% to 50%.	Growing	0
Incentives & Accountability	For similar seniority, is there a pay difference between statistical staff and operational staff?	Differential of over 50%.	Seedling	0
Incentives & Accountability	For similar seniority, is there a pay difference between statistical staff and operational staff?	No Difference	Fruitful	6
Incentives & Accountability	Is there a regular and structured budget allocation linked to data?	Yes	Fruitful	5
Incentives & Accountability	Is there a regular and structured budget allocation linked to data?	No	Seedling	1
Incentives & Accountability	Is the data collected under the theme used to monitor costs?	Yes	Flowering	5
Incentives & Accountability	Is the data collected under the theme used to monitor costs?	No	Seedling	1
Incentives & Accountability	Is the data collected under the theme used to monitor revenues?	Yes	Flowering	5
Incentives & Accountability	Is the data collected under the theme used to monitor revenues?	No	Seedling	1
Incentives & Accountability	Are Multiple departments/entities involved in data collection?	Only one entity.	Growing	1
Incentives & Accountability	Are Multiple departments/entities involved in data collection?	Yes – one at local and one at national level.	Fruitful	3
Incentives & Accountability	Are Multiple departments/entities involved in data collection?	Yes – multiple at local level.	Flowering	2
Incentives & Accountability	Are Multiple departments/entities involved in data collection?	No designated owner.	Seedling	0
Coordination & Governance	Are there recurrent licenses to be paid in addition to maintenance and support of applications and databases in your unit/department?	Yes	Fruitful	4
Coordination & Governance	Are there recurrent licenses to be paid in addition to maintenance and support of applications and databases in your unit/department?	No	Seedling	2
Coordination & Governance	Is there a formal coordination mechanism between entities involved?	Yes (or not applicable)	Fruitful	5
Coordination & Governance	Is there a formal coordination mechanism between entities involved?	No	Seedling	1
Coordination & Governance	Are there process manuals to guide data collection?	Yes, conform to global standards.	Fruitful	5
Coordination & Governance	Are there process manuals to guide data collection?	Yes, local.	Flowering	0
Coordination & Governance	Are there process manuals to guide data collection?	No.	Seedling	1

Coordination & Governance	Are there policies and guidelines on data privacy and security	Yes – policies and guidelines in place.	Fruitful	5
Coordination & Governance	Are there policies and guidelines on data privacy and security	Identified as a priority but no guidelines yet.	Growing	1
Coordination & Governance	Are there policies and guidelines on data privacy and security	No.	Seedling	0
Coordination & Governance	Is the collected data available to all actors in the county data ecosystem (county assembly, county executive)?	At highest level of granularity automatically (portal).	Fruitful	3
Coordination & Governance	Is the collected data available to all actors in the county data ecosystem (county assembly, county executive)?	Yes, but not unit level, automatically (portal).	Growing	0
Coordination & Governance	Is the collected data available to all actors in the county data ecosystem (county assembly, county executive)?	At highest level of granularity on request.	Flowering	3
Coordination & Governance	Is the collected data available to all actors in the county data ecosystem (county assembly, county executive)?	On request, but not at unit level.	Seedling	0
Coordination & Governance	Is the collected data available to all actors in the county data ecosystem (county assembly, county executive)?	No.	Seedling	0
Coordination & Governance	Are there data sets from non-governmental entities in this theme?	Yes, regular	Fruitful	1
Coordination & Governance	Are there data sets from non-governmental entities in this theme?	Yes, one off	Flowering	3
Coordination & Governance	Are there data sets from non-governmental entities in this theme?	No	Seedling	2
Coordination & Governance	What is the level of openness of the county government to non-governmental data sets?	Mature. Already used such data sets for planning and operations.	Fruitful	3
Non-government ecosystem	What is the level of openness of the county government to non-governmental data sets?	Open to joint efforts with non-governmental entities for data collection.	Flowering	1
Non-government ecosystem	What is the level of openness of the county government to non-governmental data sets?	Open to role in validation, but not collection	Growing	1
Non-government ecosystem	What is the level of openness of the county government to non-governmental data sets?	Not open	Seedling	1
Non-government ecosystem	What is the maturity of the Private sector	High maturity in all areas.	Flowering	1
Non-government ecosystem	What is the maturity of the Private sector	Medium maturity in all areas	Growing	4
Non-government ecosystem	What is the maturity of the Private sector	Low maturity in all areas.	Seedling	1

Education

Data Quality and Availability

Category	Question	Answer	Stage	Frequency
Availability	Is this data available?	Yes	Seedling	72
Availability	Is this data available?	No	Seedling	12
Availability	Is this data part of statutory reporting?	Yes	Fruitful	56
Availability	Is this data part of statutory reporting?	No	Seedling	17
Availability	Is this data part of administrative reporting (part of the result framework)?	Yes	Flowering	70
Availability	Is this data part of administrative reporting (part of the result framework)?	No	Seedling	5
Collection	What is the coverage of the collection?	100%	Fruitful	70
Collection	What is the coverage of the collection?	Sample	Growing	2
Collection	In case of a sample, how is the sampling done?	Formula available for sampling.	Growing	0
Collection	In case of a sample, how is the sampling done?	Ad hoc.	Seedling	9
Collection	What is the mode of collection?	Automated	Flowering	0
Collection	What is the mode of collection?	Physical	Seedling	71
Collection	What is the mode of collection?	Both physical and automated	Growing	1
Collection	What is the frequency of collection?	As frequent as the benchmark.	Flowering	68
Collection	What is the frequency of collection?	One level lower than benchmark grade.	Growing	2
Collection	What is the frequency of collection?	Two or more levels lower.	Seedling	2
Reporting	What is the lag between collection and reporting?	Under one quarter.	Fruitful	35
Reporting	What is the lag between collection and reporting?	One quarter – one year.	Flowering	32
Reporting	What is the lag between collection and reporting?	Over one year.	Growing	4
Quality	Is the data gender disaggregated?	Yes/ Not applicable to the data in question.	Fruitful	29
Quality	Is the data gender disaggregated?	No.	Seedling	2

Quality	Is the data geotagged?	Yes/ Not applicable to the data in question.	Fruitful	69
Quality	Is the data geotagged?	No.	Seedling	7
Quality	Is there any third-party validation of the data generated?	Yes	Flowering	37
Quality	Is there any third-party validation of the data generated?	No	Seedling	36
Quality	Is there any third-party validation of the data generated?	Sometimes(e.g. By NGOs)	Growing	1
Quality	Are there independent process audits?	Yes	Flowering	40
Quality	Are there independent process audits?	No	Seedling	35
Reporting	Is there public access to the results of such audits?	Yes	Fruitful	24
Reporting	Is there public access to the results of such audits?	No	Seedling	30
Reporting	What format is the data available in?	Editable soft files, online.	Fruitful	21
Reporting	What format is the data available in?	Non editable (e.g. PDF) soft files, online.	Flowering	22
Reporting	What format is the data available in?	Editable soft files, CD/DVD/ Flashdisk.	Growing	28
Reporting	What format is the data available in?	Non-editable soft files, CD/ DVD.	Growing	0
Reporting	What format is the data available in?	Paper.	Seedling	1
Reporting	Who are potential users of this data?	Global pull.	Fruitful	35
Reporting	Who are potential users of this data?	Global on request.	Flowering	22
Reporting	Who are potential users of this data?	Local govt. agencies (on portal).	Growing	0
Reporting	Who are potential users of this data?	Local govt. agencies (on request).	Seedling	14
Reporting	Who are potential users of this data?	Not shared.	Seedling	1
Availability	Is there a mechanism to capture user satisfaction and impact on the target population?	Yes	Fruitful	59
Availability	Is there a mechanism to capture user satisfaction and impact on the target population?	No	Seedling	15
Availability	Does the government make any budgetary allocations on the basis of this data?	Yes	Flowering	57
Availability	Does the government make any budgetary allocations on the basis of this data?	No	Seedling	6

Causality

Category	Question	Answer	Stage	Frequency
Mandate	Is there a legislative mandate for the county department to collect information on this theme? (advised by the 4th schedule of the constitution of kenya 2010)	Yes, one department.	Flowering	3
Mandate	Is there a legislative mandate for the county department to collect information on this theme? (advised by the 4th schedule of the constitution of kenya 2010)	Yes, multiple.	Fruitful	3
Mandate	Is there a legislative mandate for the county department to collect information on this theme? (advised by the 4th schedule of the constitution of kenya 2010)	No.	Seedling	1
Mandate	Are there clearly articulated penalties attached to not reporting this data?	Yes, with significant penalties.	Fruitful	2
Mandate	Are there clearly articulated penalties attached to not reporting this data?	Yes, with token penalties.	Flowering	0
Mandate	Are there clearly articulated penalties attached to not reporting this data?	No.	Seedling	5
Mandate	Is there an overarching “Right to Information” legislation?	Yes	Fruitful	4
Mandate	Is there an overarching “Right to Information” legislation?	No	Seedling	3
Resourcing	What is the level of digitization of data collection?	Largely digital (over 50% of indicators in theme).	Fruitful	0
Resourcing	What is the level of digitization of data collection?	Largely non-digital (under 50%).	Growing	4
Resourcing	What is the level of digitization of data collection?	Non-digital (100%)	Seedling	3
Resourcing	What is the level of digitization of data storage?	Largely digital (over 50% of indicators in theme).	Flowering	5
Resourcing	What is the level of digitization of data storage?	Largely non-digital (under 50%).	Growing	2
Resourcing	What is the level of digitization of data storage?	Non-digital (100%).	Seedling	0
Resourcing	What is the fraction of data staff available as a % of total positions filled?	Over 10%	Fruitful	1
Resourcing	What is the fraction of data staff available as a % of total positions filled?	5% to 10%	Flowering	3

Resourcing	What is the fraction of data staff available as a % of total positions filled?	Under 5%	Seedling	3
Resourcing	What fraction of responsible staff has undergone specific data relevant training?	Over two-thirds.	Fruitful	1
Resourcing	What fraction of responsible staff has undergone specific data relevant training?	One-third to two-thirds.	Flowering	1
Resourcing	What fraction of responsible staff has undergone specific data relevant training?	Under one-third.	Seedling	5
Resourcing	Funding stream available in terms of staffing and resources for data management and application systems (statistical analysis, digital mapping, GIS, etc.)	Yes, with funding of ~ 10% or more of county budget.	Fruitful	1
Resourcing	Funding stream available in terms of staffing and resources for data management and application systems (statistical analysis, digital mapping, GIS, etc.)	Yes, with funding of 5% - 10% of county budget.	Flowering	0
Resourcing	Funding stream available in terms of staffing and resources for data management and application systems (statistical analysis, digital mapping, GIS, etc.)	Yes, with funding of <5% of county budget.	Growing	2
Resourcing	Funding stream available in terms of staffing and resources for data management and application systems (statistical analysis, digital mapping, GIS, etc.)	No.	Seedling	4
Resourcing	Is the reporting unit also responsible for performance on the indicator?	Yes	Fruitful	7
Resourcing	Is the reporting unit also responsible for performance on the indicator?	No	Seedling	0
Resourcing	Does “data availability and quality” figure in the top 3 priorities of the county elected representatives?	Yes	Fruitful	4
Resourcing	Does “data availability and quality” figure in the top 3 priorities of the county elected representatives?	No	Seedling	2
Incentives & Accountability	Does “data availability and quality” figure in the top 3 priorities of the departmental manager (responsible for the theme)?	Yes	Fruitful	7
Incentives & Accountability	Does “data availability and quality” figure in the top 3 priorities of the departmental manager (responsible for the theme)?	No	Seedling	0
Incentives & Accountability	For similar seniority, is there a pay difference between statistical staff and operational staff?	Differential of less than 20%.	Flowering	1

Incentives & Accountability	For similar seniority, is there a pay difference between statistical staff and operational staff?	Differential of 20% to 50%.	Growing	0
Incentives & Accountability	For similar seniority, is there a pay difference between statistical staff and operational staff?	Differential of over 50%.	Seedling	0
Incentives & Accountability	For similar seniority, is there a pay difference between statistical staff and operational staff?	No Difference	Fruitful	6
Incentives & Accountability	Is there a regular and structured budget allocation linked to data?	Yes	Fruitful	2
Incentives & Accountability	Is there a regular and structured budget allocation linked to data?	No	Seedling	5
Incentives & Accountability	Is the data collected under the theme used to monitor costs?	Yes	Flowering	5
Incentives & Accountability	Is the data collected under the theme used to monitor costs?	No	Seedling	2
Incentives & Accountability	Is the data collected under the theme used to monitor revenues?	Yes	Flowering	2
Incentives & Accountability	Is the data collected under the theme used to monitor revenues?	No	Seedling	5
Incentives & Accountability	Are Multiple departments/entities involved in data collection?	Only one entity.	Growing	3
Incentives & Accountability	Are Multiple departments/entities involved in data collection?	Yes – one at local and one at national level.	Fruitful	1
Incentives & Accountability	Are Multiple departments/entities involved in data collection?	Yes – multiple at local level.	Flowering	3
Incentives & Accountability	Are Multiple departments/entities involved in data collection?	No designated owner.	Seedling	0
Coordination & Governance	Are there recurrent licenses to be paid in addition to maintenance and support of applications and databases in your unit/department?	Yes	Fruitful	2
Coordination & Governance	Are there recurrent licenses to be paid in addition to maintenance and support of applications and databases in your unit/department?	No	Seedling	5
Coordination & Governance	Is there a formal coordination mechanism between entities involved?	Yes (or not applicable)	Fruitful	5
Coordination & Governance	Is there a formal coordination mechanism between entities involved?	No	Seedling	2
Coordination & Governance	Are there process manuals to guide data collection?	Yes, conform to global standards.	Fruitful	1
Coordination & Governance	Are there process manuals to guide data collection?	Yes, local.	Flowering	5
Coordination & Governance	Are there process manuals to guide data collection?	No.	Seedling	1

Coordination & Governance	Are there policies and guidelines on data privacy and security	Yes – policies and guidelines in place.	Fruitful	3
Coordination & Governance	Are there policies and guidelines on data privacy and security	Identified as a priority but no guidelines yet.	Growing	2
Coordination & Governance	Are there policies and guidelines on data privacy and security	No.	Seedling	2
Coordination & Governance	Is the collected data available to all actors in the county data ecosystem (county assembly, county executive)?	At highest level of granularity automatically (portal).	Fruitful	2
Coordination & Governance	Is the collected data available to all actors in the county data ecosystem (county assembly, county executive)?	Yes, but not unit level, automatically (portal).	Growing	0
Coordination & Governance	Is the collected data available to all actors in the county data ecosystem (county assembly, county executive)?	At highest level of granularity on request.	Flowering	4
Coordination & Governance	Is the collected data available to all actors in the county data ecosystem (county assembly, county executive)?	On request, but not at unit level.	Seedling	1
Coordination & Governance	Is the collected data available to all actors in the county data ecosystem (county assembly, county executive)?	No.	Seedling	0
Coordination & Governance	Are there data sets from non-governmental entities in this theme?	Yes, regular	Fruitful	1
Coordination & Governance	Are there data sets from non-governmental entities in this theme?	Yes, one off	Flowering	3
Coordination & Governance	Are there data sets from non-governmental entities in this theme?	No	Seedling	3
Coordination & Governance	What is the level of openness of the county government to non-governmental data sets?	Mature. Already used such data sets for planning and operations.	Fruitful	4
Non-government ecosystem	What is the level of openness of the county government to non-governmental data sets?	Open to joint efforts with non-governmental entities for data collection.	Flowering	2
Non-government ecosystem	What is the level of openness of the county government to non-governmental data sets?	Open to role in validation, but not collection	Growing	0
Non-government ecosystem	What is the level of openness of the county government to non-governmental data sets?	Not open	Seedling	1
Non-government ecosystem	What is the maturity of the Private sector	High maturity in all areas.	Flowering	1
Non-government ecosystem	What is the maturity of the Private sector	Low maturity in all areas.	Seedling	5

Agriculture

Data Quality and Availability

Category	Question	Answer	Stage	Frequency
Availability	Is this data available?	Yes	Seedling	53
Availability	Is this data available?	No	Seedling	11
Availability	Is this data part of statutory reporting?	Yes	Fruitful	42
Availability	Is this data part of statutory reporting?	No	Seedling	14
Availability	Is this data part of administrative reporting (part of the result framework)?	Yes	Flowering	56
Availability	Is this data part of administrative reporting (part of the result framework)?	No	Seedling	1
Collection	What is the coverage of the collection?	100%	Fruitful	41
Collection	What is the coverage of the collection?	Sample	Growing	15
Collection	In case of a sample, how is the sampling done?	Formula available for sampling.	Growing	10
Collection	In case of a sample, how is the sampling done?	Ad hoc.	Seedling	5
Collection	What is the mode of collection?	Automated	Flowering	0
Collection	What is the mode of collection?	Physical	Seedling	49
Collection	What is the mode of collection?	Both physical and automated	Growing	8
Collection	What is the frequency of collection?	As frequent as the benchmark.	Flowering	54
Collection	What is the frequency of collection?	One level lower than benchmark grade.	Growing	3
Collection	What is the frequency of collection?	Two or more levels lower.	Seedling	0
Reporting	What is the lag between collection and reporting?	Under one quarter.	Fruitful	18
Reporting	What is the lag between collection and reporting?	One quarter – one year.	Flowering	36
Reporting	What is the lag between collection and reporting?	Over one year.	Growing	3
Quality	Is the data gender disaggregated?	Yes/ Not applicable to the data in question.	Fruitful	24
Quality	Is the data gender disaggregated?	No.	Seedling	4

Quality	Is the data geotagged?	Yes/ Not applicable to the data in question.	Fruitful	51
Quality	Is the data geotagged?	No.	Seedling	5
Quality	Is there any third-party validation of the data generated?	Yes	Flowering	28
Quality	Is there any third-party validation of the data generated?	No	Seedling	28
Quality	Is there any third-party validation of the data generated?	Sometimes(e.g. By NGOs)	Growing	1
Quality	Are there independent process audits?	Yes	Flowering	14
Quality	Are there independent process audits?	No	Seedling	44
Reporting	Is there public access to the results of such audits?	Yes	Fruitful	5
Reporting	Is there public access to the results of such audits?	No	Seedling	16
Reporting	What format is the data available in?	Editable soft files, online.	Fruitful	14
Reporting	What format is the data available in?	Non editable (e.g. PDF) soft files, online.	Flowering	29
Reporting	What format is the data available in?	Editable soft files, CD/DVD/ Flashdisk.	Growing	9
Reporting	What format is the data available in?	Non-editable soft files, CD/ DVD.	Growing	0
Reporting	What format is the data available in?	Paper.	Seedling	11
Reporting	Who are potential users of this data?	Global pull.	Fruitful	30
Reporting	Who are potential users of this data?	Global on request.	Flowering	16
Reporting	Who are potential users of this data?	Local govt. agencies (on portal).	Growing	0
Reporting	Who are potential users of this data?	Local govt. agencies (on request).	Seedling	17
Reporting	Who are potential users of this data?	Not shared.	Seedling	0
Availability	Is there a mechanism to capture user satisfaction and impact on the target population?	Yes	Fruitful	27
Availability	Is there a mechanism to capture user satisfaction and impact on the target population?	No	Seedling	28
Availability	Does the government make any budgetary allocations on the basis of this data?	Yes	Flowering	45
Availability	Does the government make any budgetary allocations on the basis of this data?	No	Seedling	9

Causality

Category	Question	Answer	Stage	Frequency
Mandate	Is there a legislative mandate for the county department to collect information on this theme? (advised by the 4th schedule of the constitution of kenya 2010)	Yes, one department.	Flowering	1
Mandate	Is there a legislative mandate for the county department to collect information on this theme? (advised by the 4th schedule of the constitution of kenya 2010)	Yes, multiple.	Fruitful	5
Mandate	Is there a legislative mandate for the county department to collect information on this theme? (advised by the 4th schedule of the constitution of kenya 2010)	No.	Seedling	0
Mandate	Are there clearly articulated penalties attached to not reporting this data?	Yes, with significant penalties.	Fruitful	3
Mandate	Are there clearly articulated penalties attached to not reporting this data?	Yes, with token penalties.	Flowering	0
Mandate	Are there clearly articulated penalties attached to not reporting this data?	No.	Seedling	3
Mandate	Is there an overarching “Right to Information” legislation?	Yes	Fruitful	6
Mandate	Is there an overarching “Right to Information” legislation?	No	Seedling	0
Resourcing	What is the level of digitization of data collection?	Largely digital (over 50% of indicators in theme).	Fruitful	2
Resourcing	What is the level of digitization of data collection?	Largely non-digital (under 50%).	Growing	4
Resourcing	What is the level of digitization of data collection?	Non-digital (100%).	Seedling	0
Resourcing	What is the level of digitization of data storage?	Largely digital (over 50% of indicators in theme).	Flowering	6
Resourcing	What is the level of digitization of data storage?	Largely non-digital (under 50%).	Growing	0
Resourcing	What is the level of digitization of data storage?	Non-digital (100%).	Seedling	0
Resourcing	What fraction has the overall expenditure on IT been of total budget (past 3-year average)?	Over 10%	Fruitful	0
Resourcing	What fraction has the overall expenditure on IT been of total budget (past 3-year average)?	5% to 10%	Flowering	2

Resourcing	What fraction has the overall expenditure on IT been of total budget (past 3-year average)?	2% to 5%	Growing	2
Resourcing	What fraction has the overall expenditure on IT been of total budget (past 3-year average)?	Under 2%	Seedling	2
Resourcing	What is the fraction of data staff available as a % of total positions filled?	Over 10%	Fruitful	3
Resourcing	What is the fraction of data staff available as a % of total positions filled?	5% to 10%	Flowering	1
Resourcing	What is the fraction of data staff available as a % of total positions filled?	Under 5%	Seedling	2
Resourcing	What fraction of responsible staff has undergone specific data relevant training?	Over two-thirds.	Fruitful	2
Resourcing	What fraction of responsible staff has undergone specific data relevant training?	One-third to two-thirds.	Flowering	2
Resourcing	What fraction of responsible staff has undergone specific data relevant training?	Under one-third.	Growing	2
Resourcing	Funding stream available in terms of staffing and resources for data management and application systems (statistical analysis, digital mapping, GIS, etc.)	Yes, with funding of ~ 10% or more of county budget.	Fruitful	0
Resourcing	Funding stream available in terms of staffing and resources for data management and application systems (statistical analysis, digital mapping, GIS, etc.)	Yes, with funding of 5% - 10% of county budget.	Flowering	2
Resourcing	Funding stream available in terms of staffing and resources for data management and application systems (statistical analysis, digital mapping, GIS, etc.)	Yes, with funding of <5% of county budget.	Growing	3
Resourcing	Funding stream available in terms of staffing and resources for data management and application systems (statistical analysis, digital mapping, GIS, etc.)	No.	Seedling	1
Resourcing	How do you gauge the level of internet penetration across the county?	Over 50%	Fruitful	3
Resourcing	How do you gauge the level of internet penetration across the county?	25% - 50%	Flowering	1
Resourcing	How do you gauge the level of internet penetration across the county?	10% - 25%	Growing	2

Resourcing	How do you gauge the level of internet penetration across the county?	Under 10%	Seedling	0
Resourcing	Are you able to gauge the level of smartphone penetration in the county?	Over 50%	Fruitful	2
Resourcing	Are you able to gauge the level of smartphone penetration in the county?	25% - 50%	Flowering	2
Resourcing	Are you able to gauge the level of smartphone penetration in the county?	10% - 25%	Growing	1
Resourcing	Are you able to gauge the level of smartphone penetration in the county?	Under 10%	Seedling	1
Incentives & Accountability	Is the reporting unit also responsible for performance on the indicator?	Yes	Seedling	3
Incentives & Accountability	Is the reporting unit also responsible for performance on the indicator?	No	Fruitful	3
Incentives & Accountability	Does “data availability and quality” figure in the top 3 priorities of the county elected representatives?	Yes	Fruitful	3
Incentives & Accountability	Does “data availability and quality” figure in the top 3 priorities of the county elected representatives?	No	Seedling	3
Incentives & Accountability	Does “data availability and quality” figure in the top 3 priorities of the departmental manager (responsible for the theme)?	Yes	Fruitful	6
Incentives & Accountability	Does “data availability and quality” figure in the top 3 priorities of the departmental manager (responsible for the theme)?	No	Seedling	0
Incentives & Accountability	For similar seniority, is there a pay difference between statistical staff and operational staff?	Differential of less than 20%.	Flowering	0
Incentives & Accountability	For similar seniority, is there a pay difference between statistical staff and operational staff?	Differential of 20% to 50%.	Growing	0
Incentives & Accountability	For similar seniority, is there a pay difference between statistical staff and operational staff?	Differential of over 50%	Seedling	0
Incentives & Accountability	For similar seniority, is there a pay difference between statistical staff and operational staff?	No difference	Fruitful	6
Incentives & Accountability	Is there a regular and structured budget allocation linked to data?	Yes	Fruitful	5
Incentives & Accountability	Is there a regular and structured budget allocation linked to data?	No	Seedling	1
Incentives & Accountability	Is the data collected under the theme used to monitor costs?	Yes	Flowering	6
Incentives & Accountability	Is the data collected under the theme used to monitor costs?	No	Seedling	0

Incentives & Accountability	Is the data collected under the theme used to monitor revenues?	Yes	Flowering	6
Incentives & Accountability	Is the data collected under the theme used to monitor revenues?	No	Seedling	0
Coordination & Governance	Are Multiple departments/entities involved in data collection?	Only one entity.	Growing	0
Coordination & Governance	Are Multiple departments/entities involved in data collection?	Yes – one at local and one at national level.	Fruitful	3
Coordination & Governance	Are Multiple departments/entities involved in data collection?	Yes – multiple at local level.	Flowering	3
Coordination & Governance	Are Multiple departments/entities involved in data collection?	No designated owner.	Seedling	0
Coordination & Governance	Are there recurrent licenses to be paid in addition to maintenance and support of applications and databases in your unit/department?	Yes	Fruitful	5
Coordination & Governance	Are there recurrent licenses to be paid in addition to maintenance and support of applications and databases in your unit/department?	No	Seedling	1
Coordination & Governance	Is there a formal coordination mechanism between entities involved?	Yes (or not applicable)	Fruitful	4
Coordination & Governance	Is there a formal coordination mechanism between entities involved?	No	Seedling	2
Coordination & Governance	Are there process manuals to guide data collection?	Yes, conform to global standards.	Fruitful	4
Coordination & Governance	Are there process manuals to guide data collection?	Yes, local.	Flowering	2
Coordination & Governance	Are there process manuals to guide data collection?	No.	Seedling	0
Coordination & Governance	Are there policies and guidelines on data privacy and security	Yes – policies and guidelines in place.	Fruitful	3
Coordination & Governance	Are there policies and guidelines on data privacy and security	Identified as a priority but no guidelines yet.	Growing	1
Coordination & Governance	Are there policies and guidelines on data privacy and security	No.	Seedling	2
Coordination & Governance	Is the collected data available to all actors in the county data ecosystem (county assembly, county executive)?	At highest level of granularity automatically.	Fruitful	4
Coordination & Governance	Is the collected data available to all actors in the county data ecosystem (county assembly, county executive)?	Yes, but not unit level, automatically .	Growing	0
Coordination & Governance	Is the collected data available to all actors in the county data ecosystem (county assembly, county executive)?	At highest level of granularity on request.	Flowering	2
Coordination & Governance	Is the collected data available to all actors in the county data ecosystem (county assembly, county executive)?	On request, but not at unit level.	Seedling	0

Coordination & Governance	Is the collected data available to all actors in the county data ecosystem (county assembly, county executive)?	No.	Seedling	0
Non-government ecosystem	Are there data sets from non-governmental entities in this theme?	Yes, regular	Fruitful	3
Non-government ecosystem	Are there data sets from non-governmental entities in this theme?	Yes, one off	Flowering	2
Non-government ecosystem	Are there data sets from non-governmental entities in this theme?	No	Seedling	1
Non-government ecosystem	What is the level of openness of the county government to non-governmental data sets?	Mature. Already used such data sets for planning and operations.	Fruitful	4
Non-government ecosystem	What is the level of openness of the county government to non-governmental data sets?	Open to joint efforts with non-governmental entities for data collection.	Flowering	2
Non-government ecosystem	What is the level of openness of the county government to non-governmental data sets?	Open to role in validation, but not collection	Growing	0
Non-government ecosystem	What is the level of openness of the county government to non-governmental data sets?	Not open	Seedling	0
Non-government ecosystem	What is the maturity of the Private sector	High maturity in all areas.	Flowering	0
Non-government ecosystem	What is the maturity of the Private sector	Medium maturity in all areas.	Growing	3
Non-government ecosystem	What is the maturity of the Private sector	Low maturity in all areas.	Seedling	3
Non-government ecosystem	What is the level of expertise of technical and vocational training colleges, mid level colleges and universities (in the county) around data science?	High,	Fruitful	0
Non-government ecosystem	What is the level of expertise of technical and vocational training colleges, mid level colleges and universities (in the county) around data science?	Medium.	Flowering	3
Non-government ecosystem	What is the level of expertise of technical and vocational training colleges, mid level colleges and universities (in the county) around data science?	Low.	Seedling	3

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