How To

# Ecosystem Map
## Digital Agriculture Landscape Assessment Toolkit

JengaLab    TechChange    DEVELOPMENT GATEWAY
An IREX Venture

# ECOSYSTEM MAP :
## DIGITAL AGRICULTURE LANDSCAPE ASSESSMENT TOOLKIT

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**IFAD**

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# PART 6 : ECOSYSTEM MAP

Also called a "data flow chart", a **digital ecosystem map** is a way of visualizing flows of information, decisions, finances, and other relevant information. Data and digital ecosystem maps are similar to stakeholder maps but use **data sources** or **digital tools** as the unit of analysis. They are also usually visualized with lines and shapes rather than plots.
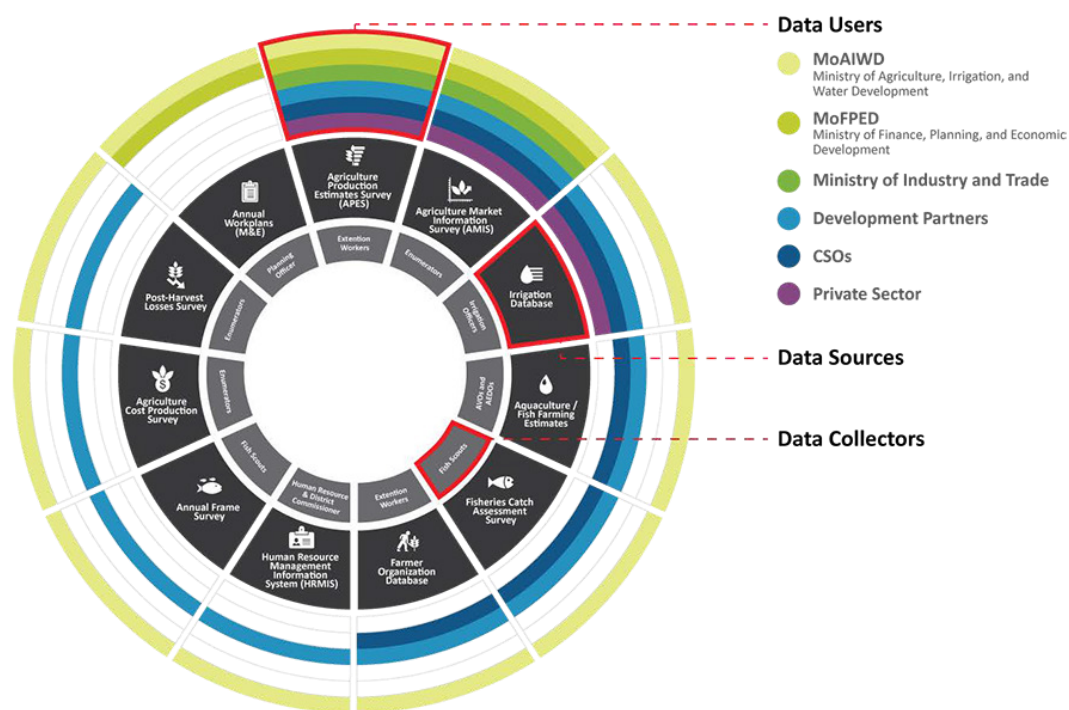


*Example: NEMIS Data Ecosystem Map (RDI - Malawi)* - used to visualize the relationship between data users, data collectors, and data sources in Malawi and eventually write requirements for the NEMIS dashboard.

## USES FOR ASSESSMENT TEAMS

**A digital ecosystem map is very useful if you do not have a detailed understanding of all the various data sources or digital tools in use.** It can help audiences of assessment reports understand exactly what kinds of data or digital tools are within an ecosystem being assessed and how they relate to one another. As with other assessment outputs, a map helps both partners and assessment teams establish clarity and understanding through feedback and iteration.

**An ecosystem map can also be a great starting point for analysis after the analytical framework has been populated.**

A digital ecosystem map can serve as a baseline for other analytical outputs, like the stakeholder map (which shows how stakeholders are related to the datasets in this ecosystem) or user personas (the groups using these datasets). Indeed, clarification of the data and digital resources within an ecosystem should be the starting point of any good assessment. Maps that contain visualized ecosystems can help entire assessment teams quickly reference information and serve as a communication tool for external partners and audiences.

## DIGITAL ECOSYSTEM MAP VS. STAKEHOLDER MAP

Unlike stakeholder maps which gain their value from the discussions taken to develop them, digital ecosystem maps are inherently important. Digital ecosystem maps are more objective than stakeholder maps because they are based on observation rather than opinions of "power" or "influence". **For that reason, digital ecosystem maps are often created internally by assessment teams and then validated by partners – the workshop format is typically not used for map co-creation**. However, for very complex data or digital ecosystems, an adapted stakeholder mapping workshop may be necessary for the ecosystem. For more on how to conduct a mapping workshop, see *Section 06: Stakeholder Mapping*.

Furthermore, plotting data sources along XY axes is less common on digital ecosystem maps in comparison to stakeholder maps, chiefly because there is less utility in doing so. One use case is plotting datasets on scales of trustworthiness to evaluate trust in the most and least commonly used sources. However, because ecosystem maps generally are used to map flows, analysis of an ecosystem map is typically limited to using lines or shapes to visualize any outliers or bottlenecks. Remember, for both ecosystem and stakeholder maps alike, less is more.

# HOW TO CREATE A DIGITAL ECOSYSTEM MAP

**There are five basic steps to ecosystem mapping:**
1. Define use case for mapping
2. Define boundaries
3. Define variables of interest
4. Define stakeholders
5. Map and analyze

## STEP 1: DEFINE USE CASES FOR MAPPING

Before doing any kind of data or digital ecosystem mapping, consider **why and how the team wants to use this analytical output**:

➔ **Informational/factual**: Is it to visualize a complicated network of data, resource, or decision flows?

➔ **Prioritization and recommendations:** Is it to understand which datasets or digital tools should be prioritized, or look for opportunities and gaps?

➔ **Risk management**: Is it to identify potential barriers, bottlenecks, or loose ends?

## Example
**Defining the Use Case for Your Ecosystem Map**

*--> TIP: Do not overthink the use case. "I'm confused about or unfamiliar with this space and I want to map it so I better understand it" is a perfectly good use case for any map!*

After defining the use case, define the goals of the ecosystem map. Setting goals at the onset of ecosystem mapping helps determine what variable(s) should be analyzed and establishes a "use case" on how the ecosystem map will be used. However, remember to refine the goals of the ecosystem mapping if they change as new insights emerge.

Goals of an ecosystem mapping in a digital/data ecosystem could include:

- Visualizing what data sources are included or excluded from this assessment

- Determining which datasets or tools to prioritize and how to do so

- Determining which data use cases to prioritize and how to do so

- Identifying ways to optimize sharing, sending, and receiving of data

*Ecosystem map for a challenge project on reducing snakebite in India. Image credit: ODI[1]*

# STEP 2: DEFINE BOUNDARIES

When looking at digital ecosystem maps, ensure that the team captures all data or digital elements within that system (more on this in Step 4: Define Units/Data Sources). For example, an assessment may focus on administrative data that could be collected from household surveys or national censuses. In this case, the team should certainly include census data in the ecosystem assessment and show how those two datasets are related.

At the same time, be specific about the boundaries of the map, otherwise it could get so large that it loses its value (a common pitfall in ecosystem maps!) A "fill in the blank" digital ecosystem is broad, and there can be many units within it to map. As such, consider the ones most important for the scope.

For example, imagine you are assessing the digital ecosystem of a specific agricultural resource or value chain, such as seeds.

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[1]https://open-data-institute.gitbook.io/data-landscape-playbook/play-two-map-the-data-ecosystem/create-an-ecosystem-map

To define the boundaries of your stakeholder map, ask yourself if you are interested in mapping.

- The entire seed ecosystem, all the way down to smallholder farmers
- The seed policy ecosystem, focusing mostly on policy actors rather than farmers
- The seed ecosystem, focusing on data related to seed research (source = academia, government data) or seed supply chain and markets (source = private sector)

In other words, think back to the overall data use cases and user stories you defined in Toolkit Part 05. **What is the main use case for the data you are interested in, or the specific landscape assessment you are conducting?**
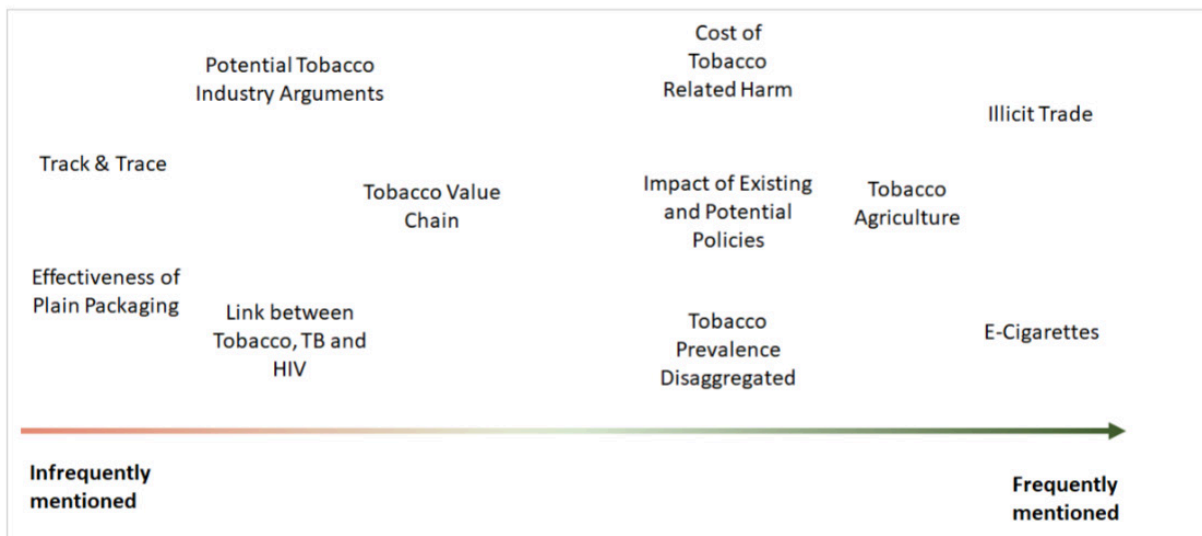
*Example: TCDI South African Stakeholder Data Ecosystem Map*

For more on defining your digital ecosystem, see Section 06: Stakeholder Mapping.

# STEP 3: DEFINE METRICS/VARIABLES

The next step is to choose variables: what exactly should be plotted, mapped, or analyzed?

Like stakeholder maps, there are infinite numbers and combinations of variables that could be used to analyze the datasets in a digital ecosystem map. However, as discussed in the introduction section, digital ecosystem maps are most commonly used to visualize flows. In that sense, **the variable of interest in digital ecosystem maps is often the connection or flow between data sources**.

Connections between data or digital units in an ecosystem map can represent an application programming interface (API) or other methods of digitally transferring information, such as sending data from the rural health outpost to the district health administrators office, or submitting monitoring and evaluation data from the field office to regional headquarters.

**Ecosystem map of a typical agronomy project**

Creating maps of data ecosystems can help us to understand and explain where and how the use of data creates value. A data ecosystem map can help to identify the key roles and the relationships between them.

These organisations playing these roles may be operating in the public, private and third-sectors. The same organisation may also play multiple roles in an ecosystem.

Drawing these relationships can help us to:

- develop a shared understanding of the variety of ways in which participants add and create value
- clarify roles and responsibilities to help improve an ecosystem and the adoption of best practices
- support engagement, e.g. by identifying key stakeholders or identifying areas where guidance and training might be useful

For data to be FAIR and open we need to understand more about who is collecting, managing and using data.

This map shows a typical data ecosystem for a grant funded agronomy project, but there may be similarities with other sectors. The map helps to identify where funding flows, how
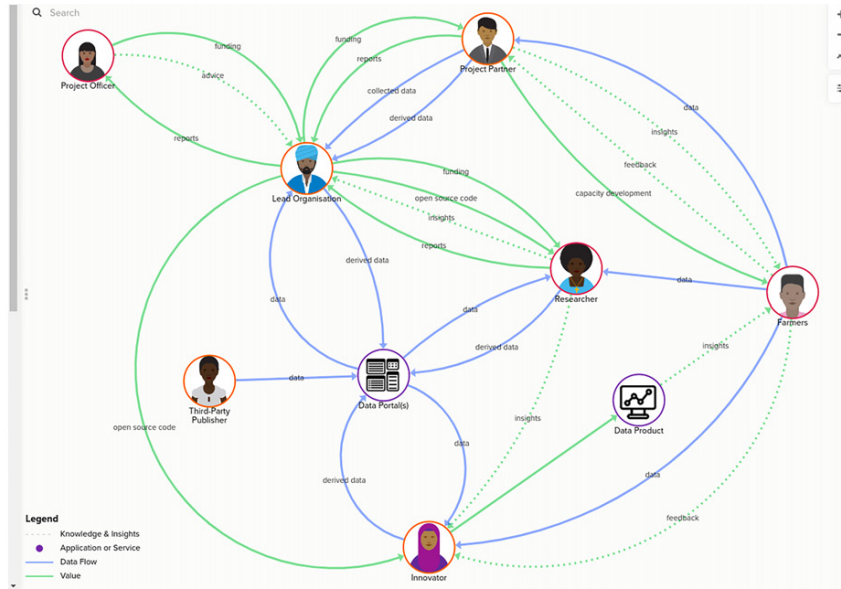
Ecosystem map of a typical Gates Foundation agronomy project[2]

Each dataset or digital tool could be assessed in terms of more qualitative variables like the ones used in stakeholder mapping, such as level of data use or awareness. Just ensure that there is a clear case for using these qualitative variables in a digital ecosystem map.

## Example

### Clearly Defining the Variables

→*TIP: Ensure there is a common understanding of each variable used in your ecosystem map - even if it is just a line to show "flows"* Consider, for example, an ecosystem map with lines connecting datasets and no context. Without any additional context, it is unclear how exactly those two datasets are connected. Is it:

- Through an API?
- Through a cloud database?
- Manual transfer or data entry?

Furthermore, it is important to understand whether a given dataset or tool is:

- Used
- Known but not used
- Unknown

And so on. Refer back to your use case from Step 1 and your boundaries from Step 2 to define and ensure that your ecosystem map is clear.

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[2] https://kumu.io/ODI/fair-data-in-bmgf-agronomy-programmes

# STEP 4: DEFINE UNITS

In landscape assessments, the units within a digital ecosystem map include datasets or digital tools within the ecosystem of interest. Depending on the goals of the stakeholder mapping, they could also include current datasets/tools as well as future or ideal datasets/tools.

Assessment teams often start maintaining lists of key datasets or indicators **referenced in key desk review documents or key informant interviews**. The teams then directly transfer these lists to digital ecosystem maps.  While this research and data collection is typically adequate for completing a digital ecosystem map, it is always good to have assessment partners and stakeholders validate the mapping to ensure all data sources and tools are included.

If the team has set up a great analytical framework, unit definition should be easy. Refer to *Section 04: Analytical Framework* for more information on how to set up and easily define the units.

# STEP 5: MAP AND ANALYZE

As mentioned above, lines are the most common way to map and analyze data or digital ecosystems. Shapes can also help organize and visualize digital ecosystem stakeholders in meaningful ways. For example, overlapping circles can be used to represent venn diagrams, or onion diagrams can be utilized to organize indicators by source question, indicator, and datasource.

Plotting datasets or tools against the variables on a matrix is another common approach to digital ecosystem mapping. If analyzing datasets or tools on their level of data use and level of trustworthiness, data use and trustworthiness would be the two variables, and the digital ecosystem map would look like an XY graph from algebra class.

Try not to plot more than two variables unless there is an expert in three-dimensional calculus. However, if more information is needed in the data or digital ecosystem map, think creatively about how other data visualization design hacks could be used to demonstrate more information:

- Use shapes or colors of each symbol on the plot to represent data/tool category
- Combine shapes and colors to represent more than one category: squares represent government datasets: green squares are Ministry of Agriculture datasets, blue squares are ministries of Finance or Development datasets, and red squares are local government datasets
- Ensure that the size of each symbol on the plot is proportional to the value, such as amount of annual funding, number of data points, and reported levels of data use

There are many ways to visualize data or digital ecosystems. Be sure to keep the visualization simple and clear, and always connect it back to the use case.

# HOW TO MAP YOUR VARIABLES

There are a few different ways you can map your variables on a digital ecosystem map:

- Using lines to connect data units is a good strategy for visualizing data, information, or funding **flows**
- You can also **plot** datasets on a grid or axes, which is a good strategy for visualizing priorities, level of use, and other qualitative variables
- More complex digital ecosystem maps can also utilize **shapes** to visualize relationships or categories

# 1. LINES
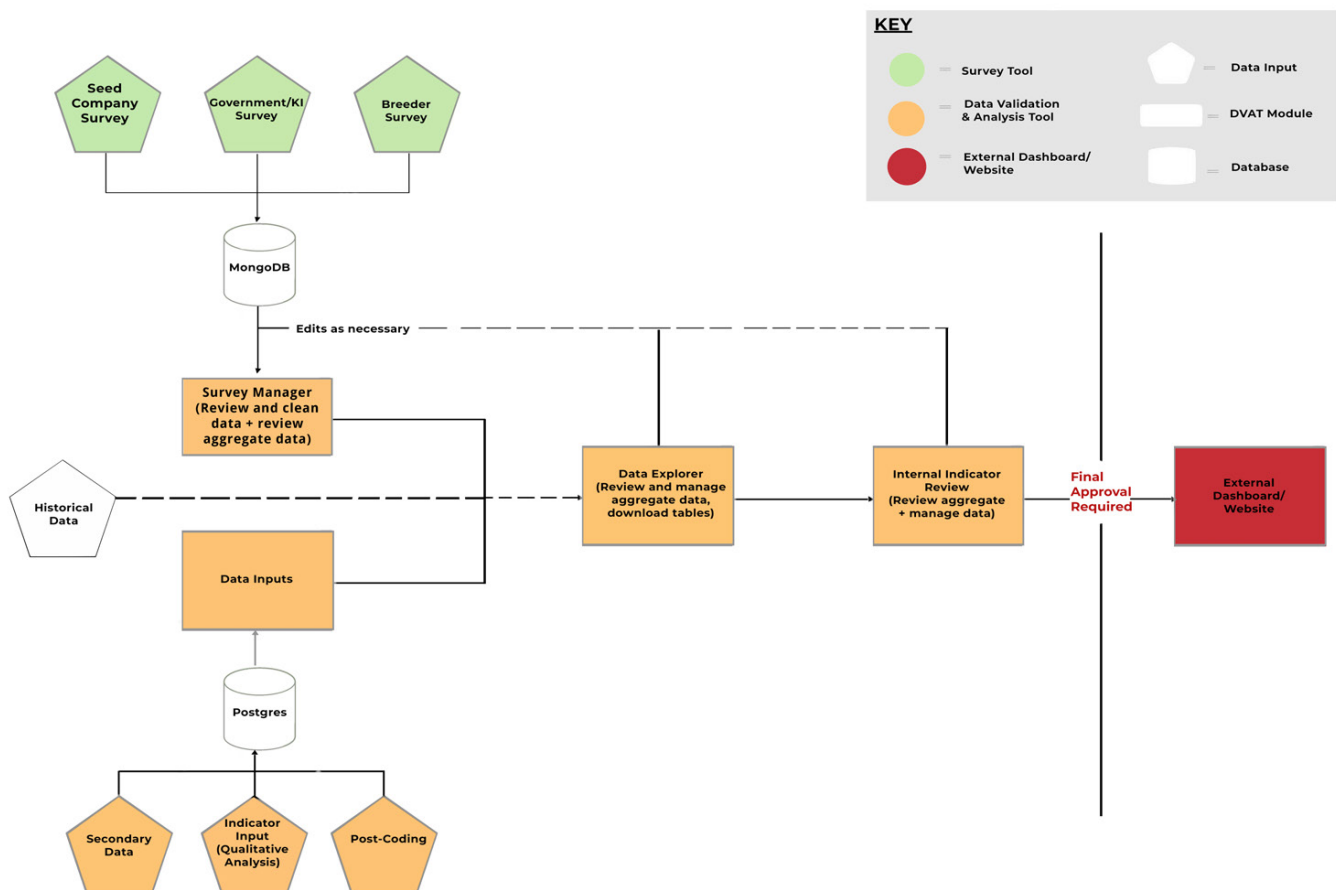


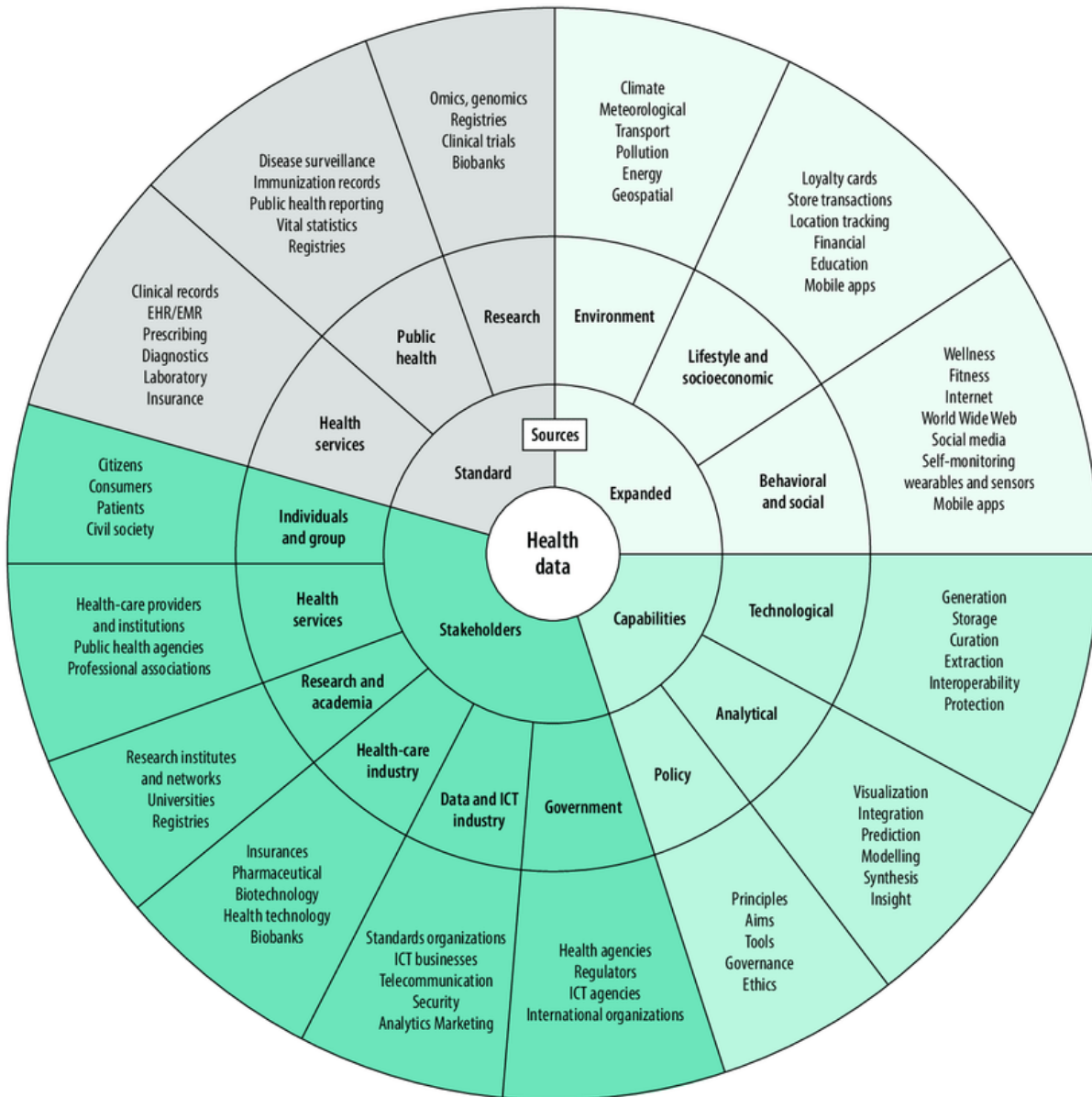*Example: TASAI Data Ecosystem Map*

# 2. SHAPES
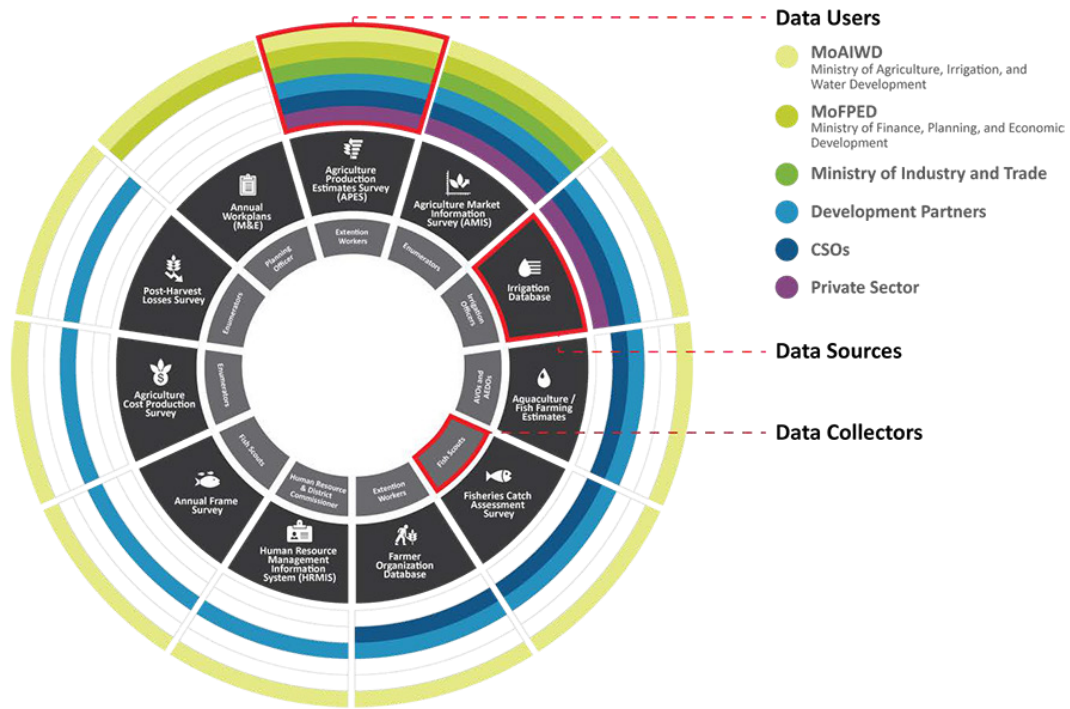


*Example: Digital Ecosystem Map Using Venn Diagram*[3]

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[3] source:
https://www.ictworks.org/digital-ecosystem-international-development/
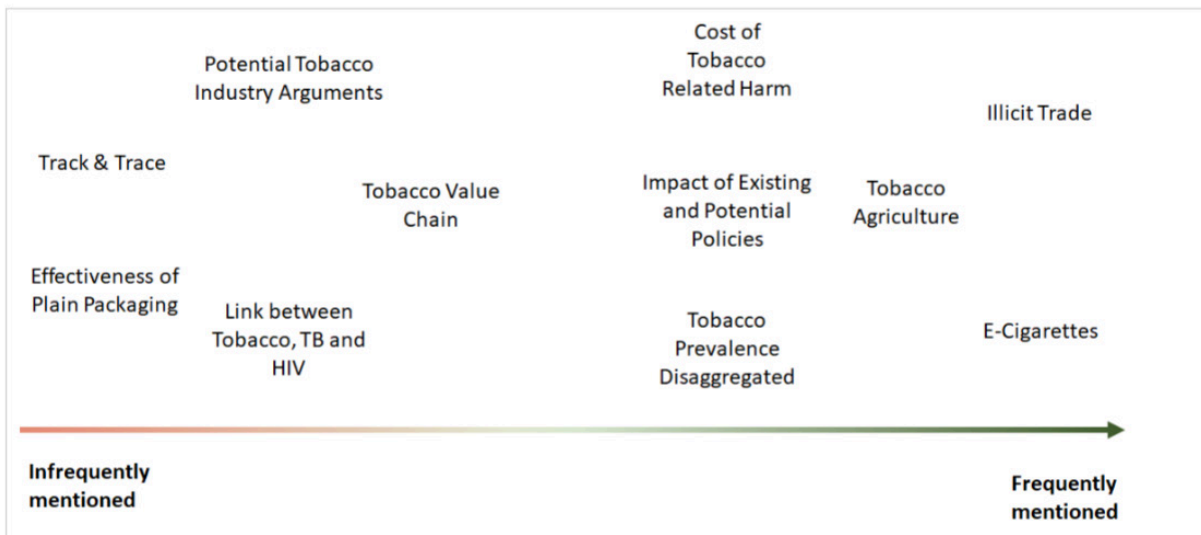
*Example: Health Data Ecosystem Map*

Note that this data ecosystem map organizes health data not only by standard and expanded *data sources*, but also by health data *stakeholders* and *capabilities*.

*Example: NEMIS Data Ecosystem Map (RDI - Malawi)*

The above ecosystem map was used to visualize the relationship between data users, data collectors, and data sources in Malawi and eventually used to write requirements for the NEMIS dashboard.

# 3. PLOTS



*Example: TCDI South African Stakeholder Data Ecosystem Map*

# COMMON PITFALLS (AND HOW TO AVOID THEM)

| PITFALL | HOW TO AVOID THEM |
|---|---|
| Map is too big | <ul><li>Refine the boundaries. Create distinct maps if needed</li><li>Refine and strategically combine the units</li></ul> |
| Map is too small | <ul><li>Expand the boundaries</li><li>Expand the units, break the datasets down into indicators, and the indicators down into data points</li></ul> |
| Too many variables | <ul><li>Revisit the use cases for the map and redefine the variables</li><li>Create separate maps as needed</li></ul> |
| No useful information | Is there another variable to compare this map to? For example, if mapped data flows have not revealed any new information, consider using the same datasets to look at stated levels of use or number of citations in policy documents |

# ADDITIONAL RESOURCES

ODI Data Landscape Playbook

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