

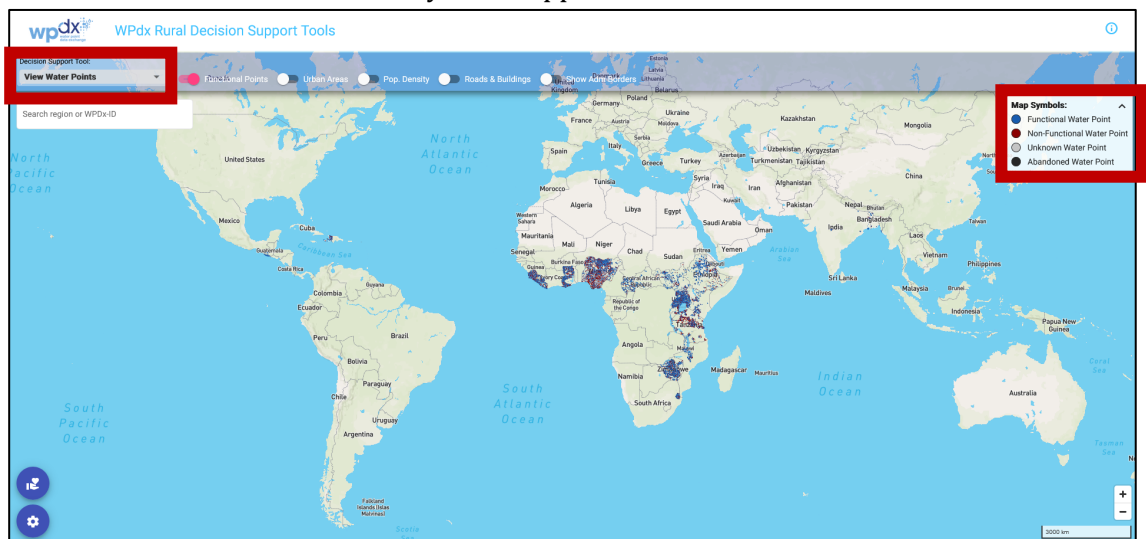


## I. WPdx Decision Support Tools App – Landing Page Orientation

1. Navigate to <https://tools.waterpointdata.org>
2. Orient yourself to the landing page for the WPdx Rural Decision Support Tools.
  - a. The drop-down menu in the upper left corner includes each of the available decision-support tools
    - i. View Water Points (default)
    - ii. Adm Region Analysis
    - iii. Rehab Priority Analysis
    - iv. Service Gap Identification Analysis
    - v. Data Quality Analysis
  - b. A legend for each tool can be found in the right-hand corner of the map.
  - c. Click on the  to view a list of all datasets in the current map view. Select “Current Map View” to view all of the datasets visible in the current map extent. This is useful if you have zoomed into a particular area of interest and wish to see the source data. Select “All our data” to view the entire data catalog. Click on one of the dataset links to open the WPdx data catalog page for a specific dataset in a new tab. Users can download the raw source file at the bottom of the data catalog page.
  - d. Click on the  icon to view Setting and Filter Options.
    - i. Filter by Attribute: Click this option to filter by water point source, water point tech, and management.
    - ii. Filter by Region: Click this option to filter by country and administrative district.
    - iii. View Settings: Click this option to choose which layers of the map to view.
    - iv. Download Data: Click this option to download the results from the tools. The downloaded data will only include points visible on the current map extent and included in any filters applied.

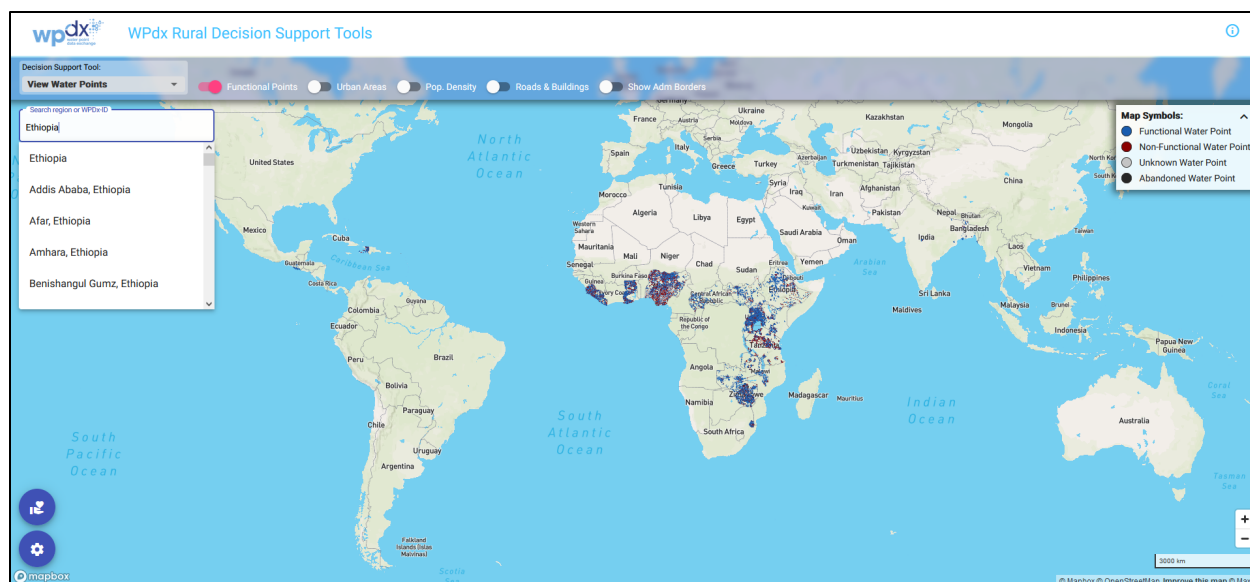



## II. WPdx Decision Support Tools App Guided Tutorial

### a. View Water Points: Filter and Zoom to Area of Interest

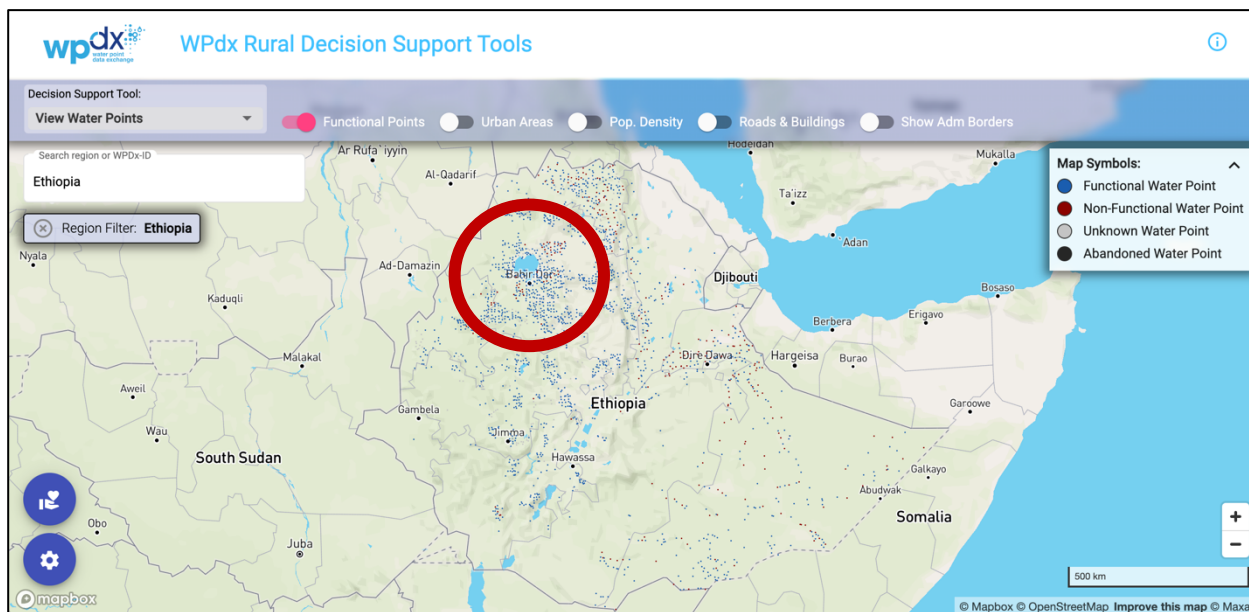
This section will guide you through the steps to filter and zoom to a specific administrative region of interest. WPdx includes Administrative levels 0 (country) through Administrative Division 3 (typically district) or Administrative Division 4 (typically sub-district) depending on available boundary data.

[Link to video clip demo on Filter and Zoom to Area of Interest](#)



1. Each dot on the map represents a water point. The legend in the right-hand corner shows whether the water points are functional, non-functional, unknown status, or abandoned.
2. Type Ethiopia in the search box in the upper left corner.
3. A drop-down menu will appear with a list of administrative divisions which contain 'Ethiopia.' Select the top option to filter and zoom to Ethiopia region on the map.
4. You are now viewing all available data for Ethiopia.
5. Click on the  to view a list of all available datasets for Ethiopia. Click on one of the dataset links to open the WPdx Data Catalog entry for that dataset in a separate tab. The Catalog provides essential metadata about the dataset, an upload summary, and an opportunity to download the original source file shared by the uploading organization.
6. Go back to the tools tab and close the data sharing pop-up box.

- Zoom into Bahir Dar. In the top navigation bar, you can toggle to show/hide functional points, view urban areas, population density, roads and building and administrative borders depending on user preferences. (\*See Key Considerations section at end of document for additional details on the data sources for these layers.)



- Click on one of the dots representing a water point. A pop-up window will appear on the right-hand side of the screen providing details on that point, including the **water source and technology, the population living within 1km, the usage capacity based on the technology, the data sharing organization, the management type, the date of installation, and the last known status**. Note that the type of information included in the side panel will vary depending on what was included by the uploading organization.

# 7G3VHF73+CF9

📍 Ethiopia > Amhara > West Gojam > Bahir Dar town >

🏠 Protected Well

⚙️ Hand Pump

👤 Population in 1km radius: 297 ppl

📈 Usage Capacity for this Point: 300 ppl

👨‍🔧 COWASH

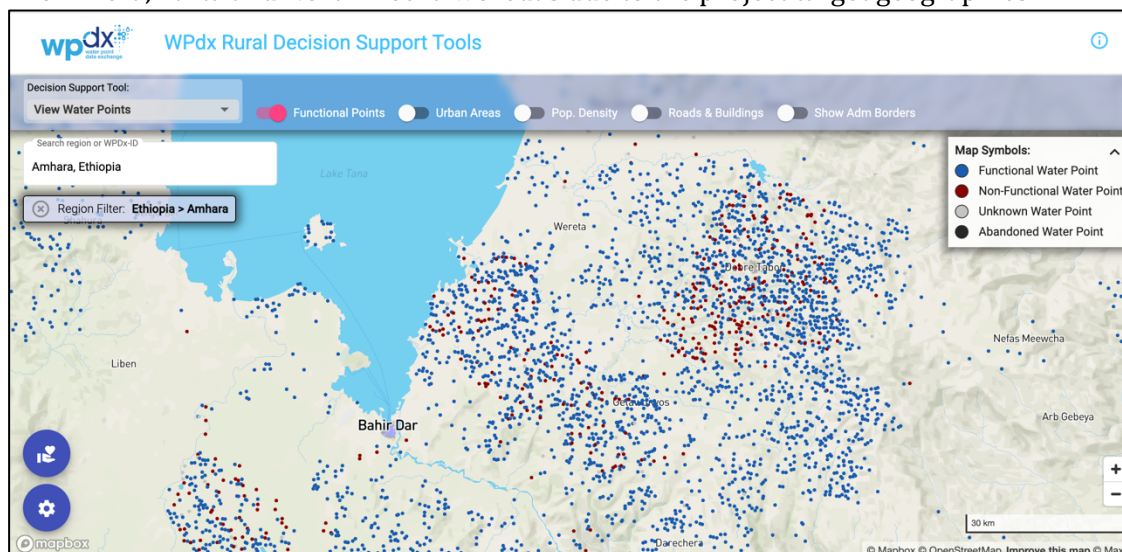
📅 Community Management

📅 2007

📅 Reported as **Functional** at 2021-01-01

- Type Amhara into the search box in the upper left corner.
- A drop-down menu will appear with a list of administrative divisions which contain 'Amhara'. Select the top option to filter and zoom to the Amhara region on the map.

11. You are now viewing all available data for the Amhara region. Note that most of the data is from Dera, Farta and North Mecha woredas due to the project target geographies.

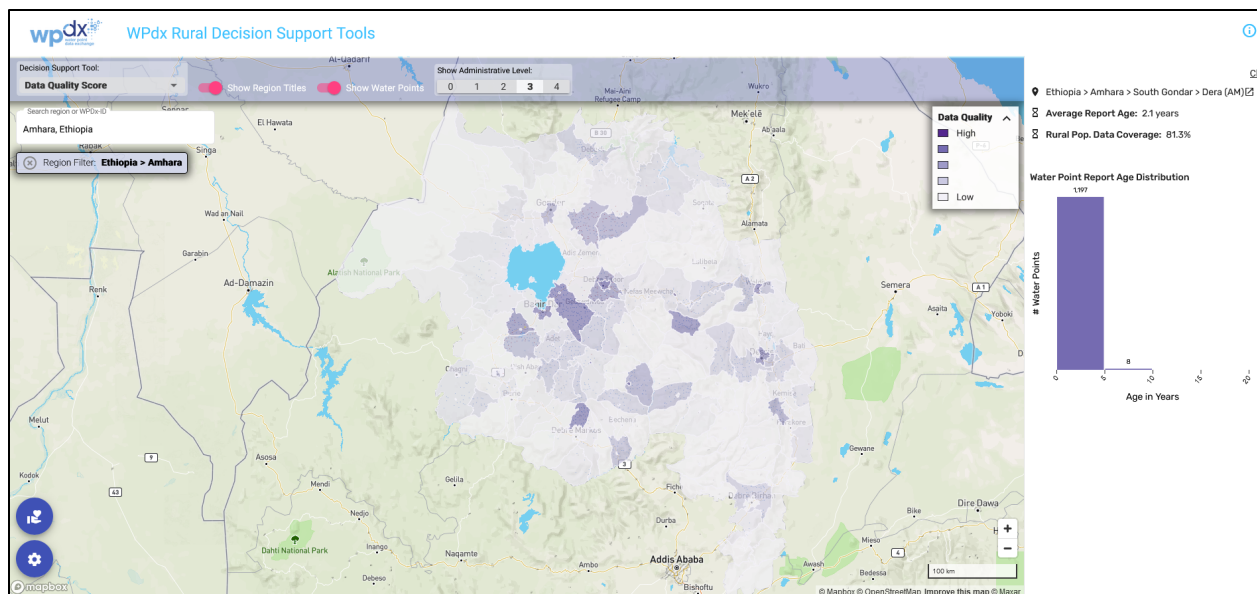


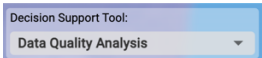

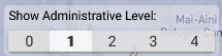

12. Let's zoom into the cluster of water points around Lake Tana. Zooming into a group of water points lets us understand how many water points are functional or non-functional and where those points are located.
13. Note that if you zoom into a point the map changes to a satellite view providing more context about where the point is located.

## **b. Data Quality Analysis**

*This section will guide you through the steps to review the quality of available data in WPdx. The analyses combine an average "staleness" score which represents the depreciation of a point's relevance (i.e., older data are less valuable than more recent data). The data quality tool also provides information on the percentage of the population which lives within 1km of water points (both functional and non-functional) included in the dataset.*

[Link to video clip demo on Data Quality Analysis](#)



1. From the Decision Support Tool dropdown menu, select **“Data Quality Analysis”**  

2. The screen will show a choropleth map with shades of purple providing a qualitative score for data quality based on the age and coverage of available data. Lower scores will be assigned to administrative regions with older data or lesser coverage (i.e., fewer water points).
3. Ensure that the map still has the region filtered to Amhara, Ethiopia.  

4. In the Show Administrative Level box,  click on each number to see how the map visualizations change to show the administrative divisions. In Ethiopia, Adm1 is the Region, Adm2 is the Zone, Adm3 is the Woreda. WPdx does not currently have Adm4 boundaries available, though this could be updated in the future if the data becomes available. (Note that if you select Adm0 nothing will appear on the map as Adm0 is country level and the filters are set for Adm1.)
5. Select Adm3 and then click on a few different woredas. A pop-up box with an overview of the available data will appear on the right-hand side of the screen.
6. Click on the Farta woreda boundary. Note that the average age of the data is ~ 2 years old and that over 60% of the rural population lives within 1km of water points included in the Farta dataset.
7. Data can be downloaded by clicking on the settings button  and selecting Download Data > Admin Region & Data Quality Analysis. Please note that only data visible on the screen will be downloaded, so if you have zoomed into a specific area of interest, only those points will be included and/or if you want the whole area you may need to reset your view.
8. The downloaded file will include three rows which comprise the data quality analysis results. These rows are: staleness\_score, data\_quality\_score and average\_report\_age\_years. The data\_quality\_score column is the product of the staleness score and the ‘charted’ population (rural population living within 1km of a known water point).

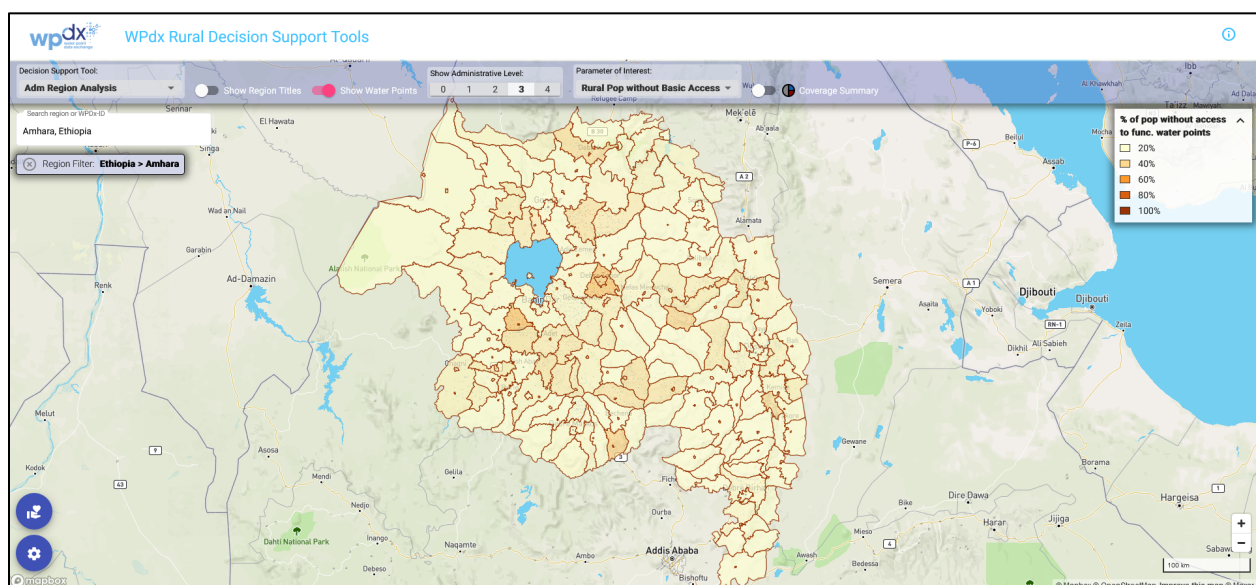


- The Data Quality Analysis can be used to evaluate the available data for a specific area of interest before moving on to the other WPdx tools. It can also be used to identify areas where additional data collection may be needed.

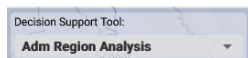
## c. Administrative Region Analysis

*This section will guide you through the steps to use the Administrative Region Analysis Tool. This tool provides an estimate for rural access/lack of access to basic services. Basic services are defined as improved sources within 1km of a population. The results from this tool can help to prioritize districts and/or subdistricts for investment.*

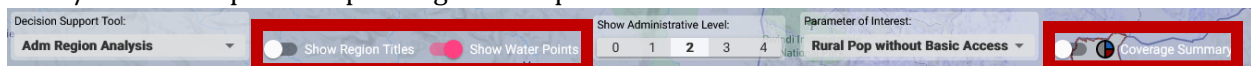
[Link to video clip demo on Administrative Region Analysis](#)



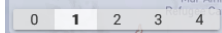
- From the Decision Support Tool dropdown menu, select “Adm Region Analysis.”

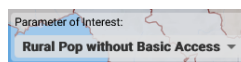


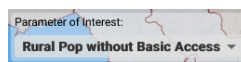

- In the top navigation bar, you can choose to toggle to show/hide region titles and show/hide water points depending on user preferences.



Note that these options work best when you are zoomed in so that there are fewer administrative areas in view.

- In the Show Administrative Level box,  click on each number to see how the map visualizations change to show the administrative divisions. In Ethiopia, Adm1 is the Region, Adm2 is the Zone, Adm3 is the Woreda. WPdx does not currently have Adm4 boundaries available, though this could be updated in the future if the data becomes available. (Note that if you select Adm0 nothing will appear on the map as Adm0 is country level and the filters are set for Adm1.)

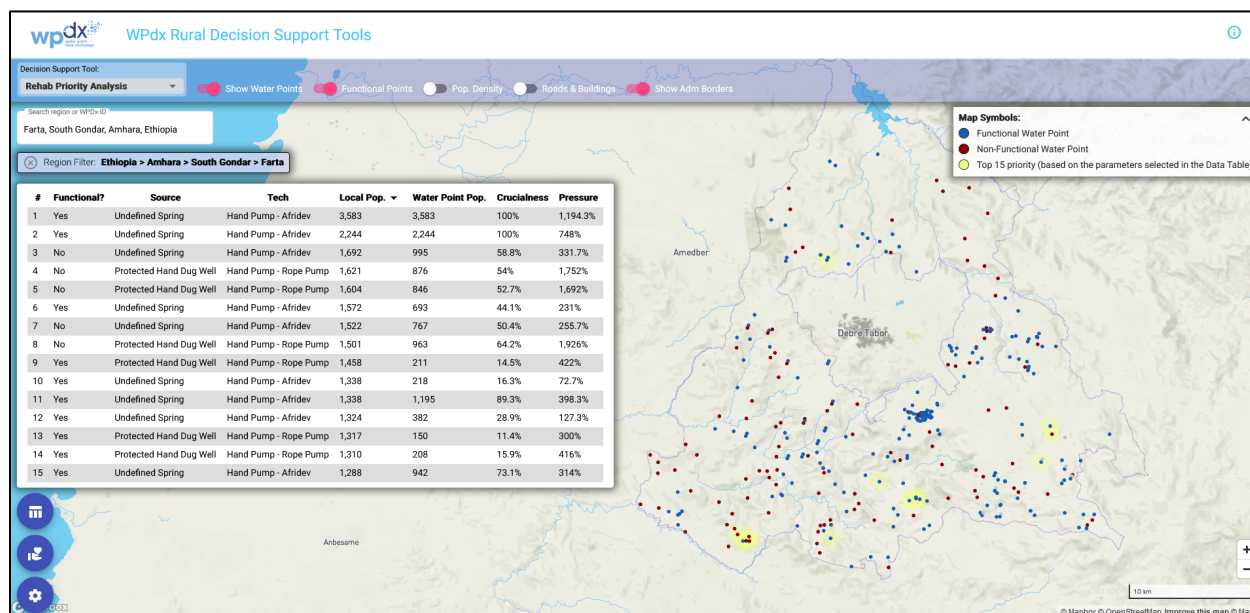


4. In the Parameter of Interest dropdown menu, , note that there are three ways to view the available data. Click through each option to see how the visualization changes depending on which parameter you select:
  - a. Rural Pop with Basic Access – population living within 1km of a working water point within the limits of the usage capacity for that point. \*See Example
  - b. Rural Pop without Basic Access – population living within 1km of a non-functional water point plus population over the usage capacity for that point.
  - c. Uncharted Rural Pop – population living outside of 1km of a functional or non-functional water point. This population could be without services or could be related to a data gap.
5. Zoom into the Bahir Dar area. Toggle on/off the “Coverage Summary” pie charts to see a summary of the three parameters for each administrative division shown on the map. These pie charts offer a quick way to view and compare which areas have access to working services.
6. Click on the Farta woreda. A pop-up box will appear on the right-hand side of the screen which provides an overview of total water points, functional water points, total population, rural population, and access figures.
7. View the summary charts which provide an overview of the distributions for Install Year, Water Point Source, Water Point Tech and Water Point Management.
8. Note that at the top of the pop-up box, the relevant larger administrative divisions are listed: [Ethiopia](#) > [Amhara](#) > [South Gondar](#) > [Farta](#). Click on each one to view the summary statistics for that administrative division. Then select ‘Close’ to close this window.
9. Data can be downloaded by clicking on the settings button  and selecting Download Data > Admin Region & Data Quality Analysis. This is the same file as you downloaded for the Data Quality Analysis. The results from these two tools are grouped together as both provide administrative division level summaries.
10. The downloaded file will include the results from the Administrative Region Analysis including: total population, urban population, rural population, rural population with and without access to known services, uncharted population, percentages of rural population with and without access to known services and uncharted population, and numbers of functional and non-functional points.
11. The Administrative Region Analysis can be used to prioritize regions, zones and/or woredas for resource (funding, personnel, etc.) allocation based on current service levels.

#### **d. Rehabilitation Priority Analysis**

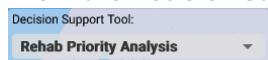
*This section will guide you through using the Rehabilitation Priority Analysis Tool. Points are prioritized based on the number of people who would have access if the point were made functional again. This tool can be used to develop workplans including specific points which should be prioritized for rehabilitation. It can also be used to identify areas which may require additional attention due to high concentrations of points needing rehabilitation/repair.*

[Link to video clip demo on Rehabilitation Priority Analysis](#)




1. Let's zoom in to the Farta woreda to explore the next WPdx decision support tools. Enter Farta in the search box and select from the dropdown list.

2. From the Decision Support Tool dropdown menu, select **Rehab Priority Analysis**.





3. Make sure that 'Show Water Points' is on in the top navigation bar. Toggle on/off 'Functional Points' depending on user preferences.

4. Click the  button in the bottom left corner to bring up the rehab priority table. This table will show the top 15 recommended points for rehabilitation based on the potential population which could be served if this point was made functional. Note you can rank the points using two population methods:
  - a. Local pop – number of people living within 1km. This can result in double counting if there are multiple water points within 1km of a population center.



- b. Water point pop – estimated population using a specific water point. WPdx assigns population to each point using a relative distance calculation. This population does not include any double counting.

#	Functional?	Source	Tech	Local Pop.	Water Point Pop.	Would Gain Access ▼	Crucialness	Pressure
1	No	Borehole/Tubewell	Motorized Pump	1,747	1,747	1,748	100%	582.3%
2	No	Protected Well	Hand Pump - Afridev	1,720	1,720	1,708	100%	573.3%
3	No	Protected Well	Hand Pump - Afridev	1,760	1,760	1,708	100%	586.7%
4	No	Protected Well	Hand Pump - Afridev	1,720	1,720	1,695	100%	573.3%
5	No	Protected Well	Hand Pump - Afridev	1,720	1,720	1,695	100%	573.3%
6	No	Protected Well	Hand Pump - Rope	1,788	1,788	1,684	100%	596%
7	No	Protected Well	Hand Pump - Afridev	1,668	1,668	1,578	100%	556%
8	No	Borehole/Tubewell	Hand Pump	1,679	1,664	1,540	99.1%	554.7%
9	No	Protected Well	Hand Pump	5,925	4,089	1,528	69%	1,363%
10	No	Protected Well	Hand Pump - Afridev	1,657	1,657	1,518	100%	552.3%
11	No	Borehole/Tubewell	Public Tapstand	1,790	1,720	1,506	96.1%	573.3%
12	No	Borehole/Tubewell	Public Tapstand	1,575	1,575	1,450	100%	525%
13	No	Protected Well	Hand Pump - Afridev	1,678	1,621	1,373	96.6%	540.3%
14	No	Protected Well	Hand Pump	1,287	1,287	1,133	100%	429%
15	No	Protected Well	Hand Pump - Afridev	1,324	1,324	1,109	100%	441.3%

5. Click on the first entry in the table. You will be taken to a zoomed view of that water point. Click on the point to see additional information about the point. Click through other entries on the table. Note that the table may update to reflect the view on your screen. To reset, you can zoom out or refresh the search bar to go back to the full woreda view.
6. Click the table button  again to hide the table.
7. Now you have zoomed into a high-rehab priority water point. Click the water point to open a side panel with more information about the water source, water tech, functionality, population within 1km, usage capacity, and data source for that point. Note that the type of information included in the side panel will depend on what was included by the uploading organization.
8. Data can be downloaded by clicking on the settings button  and selecting Download Data > Rehab Priority Analysis. Please note that only data visible on the screen will be downloaded, so if you have zoomed into a specific area of interest, only those points will be included and/or if you want the whole area you may need to reset your view.
9. The downloaded file will include the results from the Rehab Priority Analysis including assigned (water point) population, local\_population, rehab\_priority (ranking), crucialness, pressure and usage\_cap. These results are appended to the WPdx+ dataset.
10. The Rehabilitation Priority Analysis can be used to support regional or woreda level work-planning efforts to identify specific water points which should be prioritized for rehabilitation in the coming year.

**\*\* More advanced options are available within the Rehabilitation Priority Tool if you are interested in exploring the 'crucialness' - the percent of the local population being served by a specific point and the 'pressure' - the ratio of users to usage capacity based on technical**

recommendations. These metrics provide more insight on service quality and can be evaluated for both functional and non-functional points to for example, show areas where populations are 100% reliant on a single point or highlight areas where the population exceeds the recommended usage capacities for a specific technology. Users would need to toggle on ‘View Functional Points’ in the navigation bar to review and download these analyses for both functional and non-functional points.

- **Crucialness** (0-100%) is the percentage of users assigned to a specific water point (water point population) to the total local population within a 1km radius of the water point. Crucialness provides a measure of water system redundancy available to a population. For example, if there is only 1 water point within a 1km radius, the water point crucialness score is 100%, meaning that there are no nearby alternatives for that population.
- **Pressure** (0-100%) is calculated based on the ratio of the number of people assigned to that water point over the theoretical maximum population which can be served based on the technology. If a point is serving less than the recommended maximum, the pressure score will be less than 100% (i.e.,  $250/500 = 0.5$ ). If a point is serving more than the recommended maximum, the pressure score will be over 100% (i.e.,  $750/500 = 150\%$ ). See Key Considerations section for a more detailed description of the figures used for maximum capacities.

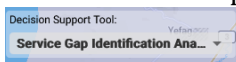
#### e. **Service Gap (New Construction) Analysis**

*This section will guide you through the steps to use the Service Gap (New Construction) Analysis Tool. The results from this tool will vary depending on the completeness of the data for a specific area of interest. If the data is comprehensive, the results will identify population centers which do not have access to basic services. These areas should be evaluated to determine what services are most appropriate for the given population. If the data is relatively incomplete, the results will identify both population centers lacking access to basic services and data gaps for locations where services may exist but data is not available in the WPdx dataset.*

[Link to video clip demo for Service Gap \(New Construction\) Analysis](#)

1. Let's continue analyzing data from Farta. From the Decision Support Tool dropdown menu,




select **Service Gap Identification Analysis**.



2. Check that you have used the region filter to view only water points in Farta.



3. From the top navigation bar, toggle on functional points to view functional water points, non-functional water points and the service gap locations.
4. From the top navigation bar, select how many potential sites you would like to see. Options include top 50, top 100 or all sites.
5. On the map, orange circles show potential locations for new service installations and the population within 1km of these sites. The identified locations focus on populations which are not within 1km of an existing functional or non-functional service.

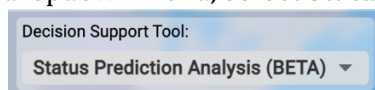
6. Click the  button in the bottom left corner to bring up the service gap/new construction priority table. This list shows the GPS coordinates and the population within 1km for the top 15 recommended locations.
7. Click on the first entry in the table. You will be taken to a zoomed view of that water point. Click on the point to see additional information about the point. Click through other entries on the table. Note that the table updates to reflect the view on your screen. To reset, you can zoom out of hit return in the search bar to go back to the full woreda view.
8. Click the table button  again to hide the table.
9. Data can be downloaded by clicking on the settings button  and selecting Download Data > Service Gap/New Construction Analysis. Please note that only data visible on the screen will be downloaded, so if you have zoomed into a specific area of interest, only those points will be included and/or if you want the whole area you may need to reset your view.
10. The downloaded file will include the results from the service gap identification analysis including the latitude and longitude and the population living within 1km of the identified location.
11. The Service Gap Identification Analysis can be used to support regional or woreda level work-planning efforts by identifying optimal potential locations for new service installation.

## f. Status Prediction Analysis Tool (BETA)

*This section will guide you through the steps to use the Status Prediction Analysis Tool. The Status Prediction Analysis tool can be used to highlight areas which may need additional resource allocation for preventative maintenance and/or increased monitoring efforts to sustain existing services. This tool remains in beta status as we continue to work with our partner DataRobot on testing and improving the tool. We will share updates on the tool on the WPdx news site:*

[www.waterpointdata.org/news](http://www.waterpointdata.org/news)

1. Let's continue analyzing data from Farta, Ethiopia. From the Decision Support Tool dropdown menu, **select Status Prediction Analysis (BETA)**.



2. Check that you have used the region filter to view only water points in Farta.

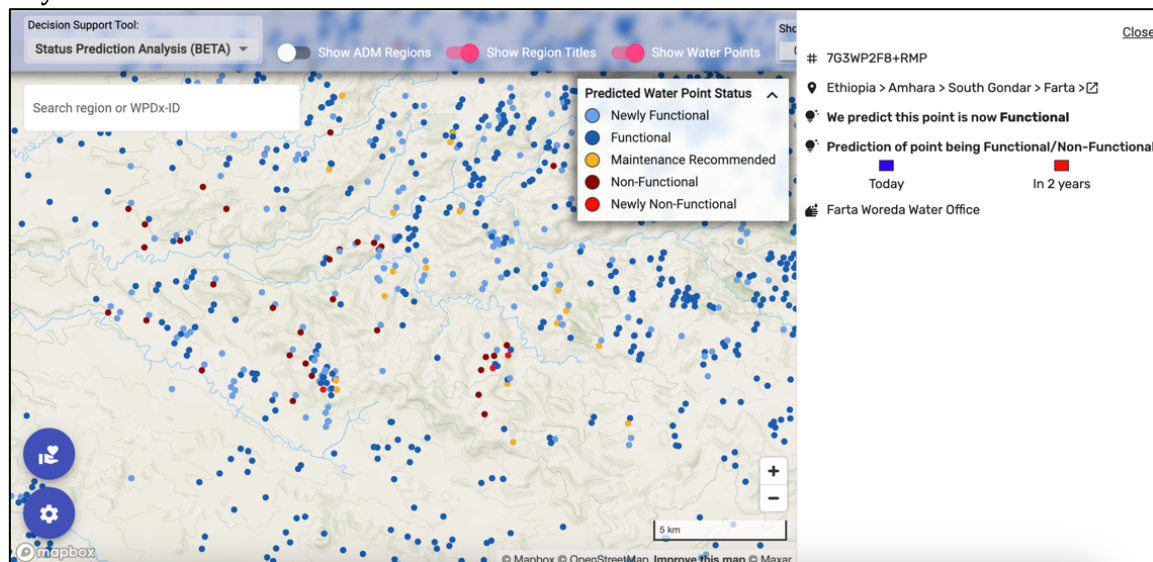


3. Make sure that 'Show Water Points' is on in the top navigation bar. Toggle on/off 'Show ADM Regions' and 'Show Region Titles' depending on user preferences.



4. The Status Prediction Analysis categorizes water points as Newly Functional, Functional, Need Maintenance, Non-Functional, or Newly Non-Functional. Points labeled "Newly Functional" or "Newly Non-Functional" are predicted to have changed status between their most recent report date and today.

- Click on one of the dots representing a water point. A pop-up window will appear on the right-hand side of the screen providing details about the point, including the predicted water point status today and the predicted status in 2 years.
- For example, let's click on a yellow point, labeled "Maintenance Recommended." Points labeled "Maintenance Recommended" are predicted to change status within the next two years.

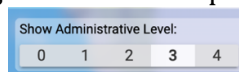


- Next, we will examine the Status Prediction Analysis at the administrative level. Toggle on "Show ADM Regions."
- First, clear the region filter, then create a new region filter that includes all administrative regions in Ethiopia by typing "Ethiopia" into the Search box. Your region filter should look like this.

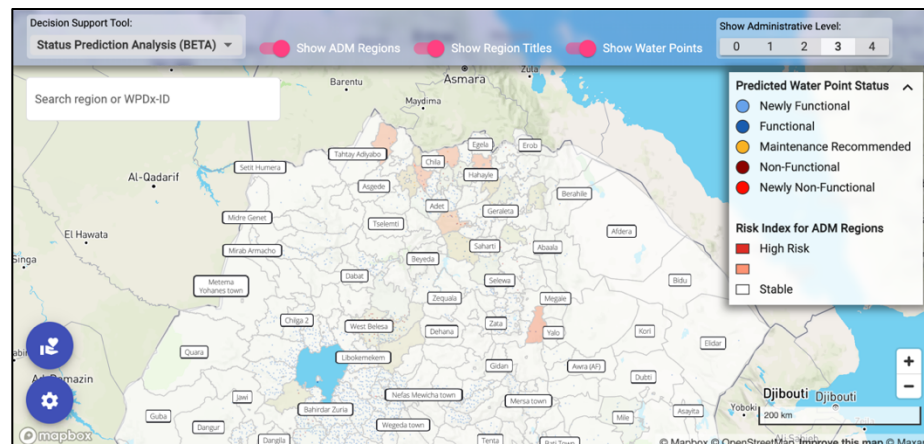
Region Filter: Ethiopia

- You can switch the level of analysis using the bar at the top of the screen. For this

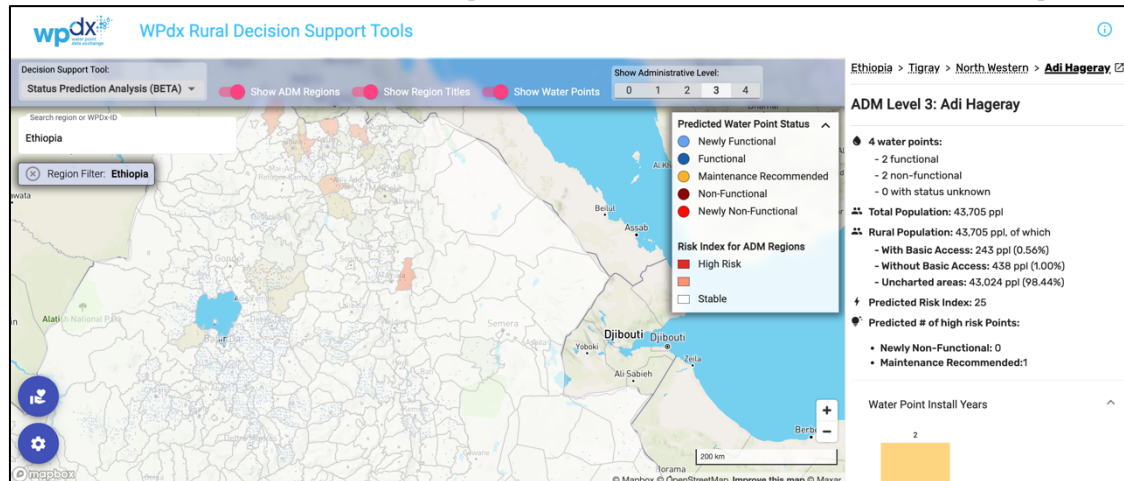
demonstration, we'll look at ADM level 3.




- Administrative regions are categorized on a scale between stable and high risk. Stable administrative regions are pictured in white and higher risk administrative regions are darker red.
- Pictured here are the Risk Index values for Adm3 regions in the northern part of Ethiopia.



- Click any administrative division to open a side panel with information about the number of functional and non-functional water points and the Predicted Risk Index. The side panel



provides a Predicted Risk Index value, which is the number of high risk points over the total number of water points multiplied by 100. It also provides a summary of the total high risk points, broken down by “Newly Non-Functional” and “Maintenance Recommended”.

- Data can be downloaded by clicking on the settings button  and selecting Download Data > Status Prediction Analysis (BETA). Please note that only data visible on the screen will be downloaded, so if you have zoomed into a specific area of interest, only those points will be included and/or if you want the whole area you may need to reset your view.
- The Status Prediction Analysis Tool can be used to identify water points and administrative regions that are at high risk of needing water point maintenance and/or repairs.
- Additional information about the predictive models can be found in [this blog post](#).

## Key Considerations:

- All WPdx analyses are based only on data shared with the platform. A review of available datasets should be completed before utilizing tools to support decision making. Results should be combined with other analyses and understanding.
- The tools available at <https://tools.waterpointdata.org> utilize all data shared with the platforms. Organizations interested in customizing datasets or analyses should reach out to [info@waterpointdata.org](mailto:info@waterpointdata.org) to explore potential collaborations.
- The results from the tools can be downloaded without having to click through each tool by filtering to the region of interest, clicking on the gear icon and selecting ‘Download Data.’

## Maximum Capacities:

The following recommended maximum values (extended from [Sphere Guidelines](#) and [Yu et al. \(2017\)](#)) are currently in use:

- 50 people per rainwater catchment system
- 250 people per tap [tapstand, kiosk]
- 300 people per protected spring



- 300 people per hand pump [most hand pumps]
- 1000 people per mechanized (powered) well

*Estimating Population with/without Basic Access example:*

- 350 people live within 1km of a functional water point which is a borehole equipped with a hand pump. The usage capacity for hand pumps is 300 people. For this water point:
  - 300 people would be considered as having basic access
  - 50 people would be considered as not having basic access