

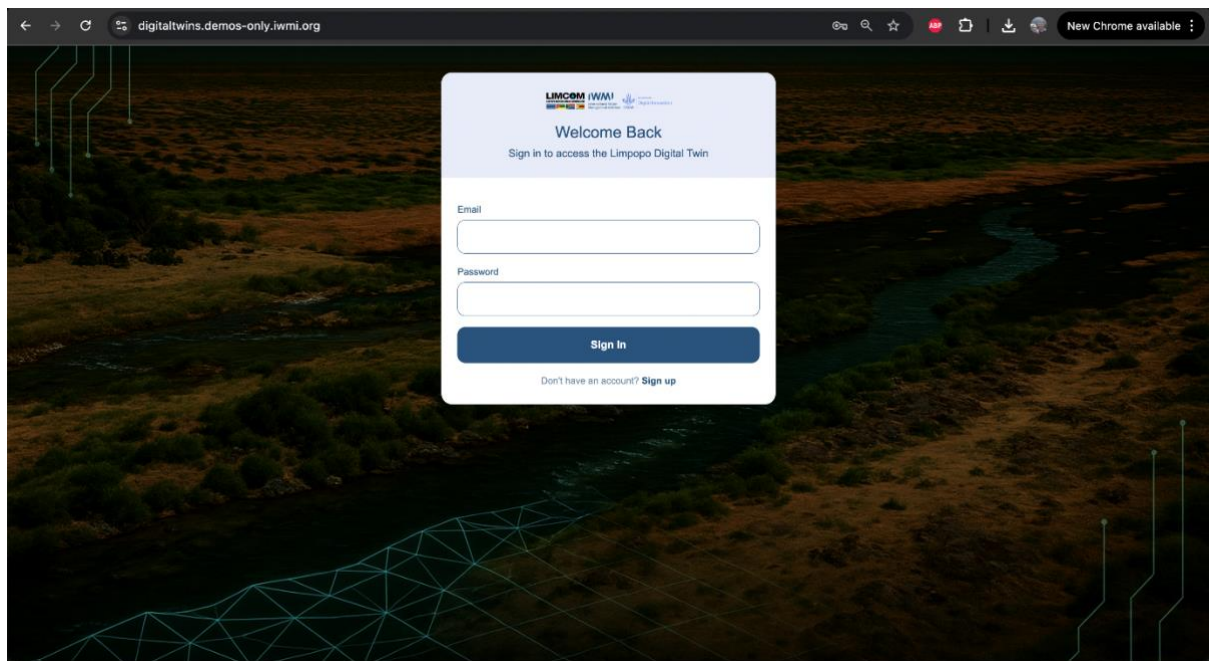
Tutorial 1: Visualize an Irrigation Scheme with the LRB DT

Website

<https://digitaltwins.demos-only.iwmi.org/>

Step 1: Access the Web App

1. Open your browser and go to: https://digitaltwins.demos-only.iwmi.org
2. Wait for the application to load. You will see a login page.



Sept 2: Register and Login

1. Click on the sign-up link (else if already registered enter your email and password).
2. Fill in your details and register (login once completed).

LIMCOM IWM Integrated Water Management Digital Innovation

Create an Account

Fill in to register

First Name

Last Name

Email

Password

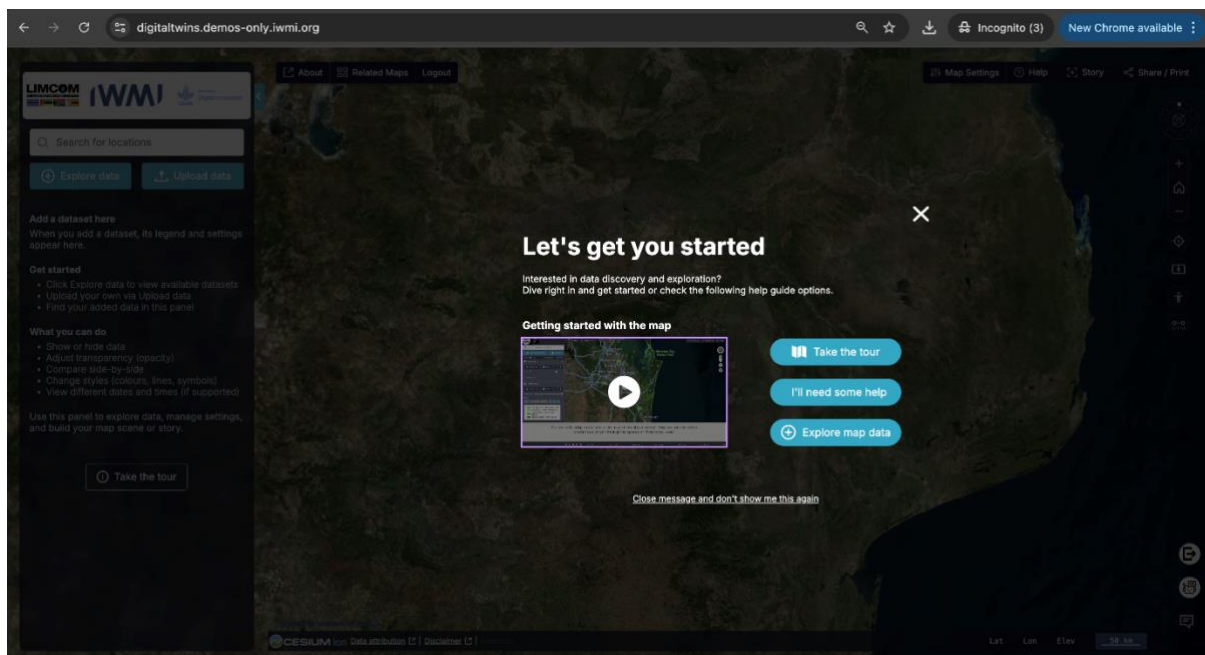
Organization

Usage Purpose
 Select usage purpose ▼

Register

Already have an account? [Sign in](#)

✓ Step 3: Select Explore map data or take the tour



✓ Step 4: Locate Your Area of Interest within the Limpopo River Basin

1. Use the Search Bar:

- In the top left corner below the logo of the DT app, click inside the search box with the placeholder text “Search for locations”.

- Type in the name of your region, district, or the location (in geographic coordinates (e.g., 25.2°S, 29.4°E)) of an irrigation scheme.

2. Pan and Zoom:

- Use your mouse or trackpad to move around the map.
- Zoom in on your area of interest for a clearer view.

✓ Step 5: Activate the “Irrigated Mapping” Layer

1. Click “**Explore Data**” (usually left sidebar).

2. Browse Categories:

- Look for a category like “**Irrigated Mapping**” within **Land Cover and Land Use** folder, which is within the **Natural Basin Characteristic** folder.
- If you don’t see it immediately, try using the filter/search bar by typing “**Irrigated Mapping**”.

3. Enable the Layer:

- Click the checkbox next to the **Irrigated Mapping** layer.
- The map should now display a map representing irrigated fields.

The screenshot shows the 'Data Catalogue' interface. At the top, there's a 'Data' tab and a 'My Data' tab. Below the tabs is a search bar labeled 'Search the catalogue'. On the left, a list of categories is shown, including 'Natural Basin Characteristic', 'Socio-Economic Profile', 'Water Resources', 'Citizen Science', 'Water Use Monitoring and Analysis', 'Ecosystems', 'Satellite Images', and 'Rolling Monthly GeoMAD (Sentinel-2)'. The 'Rolling Monthly GeoMAD (Sentinel-2)' category is highlighted in blue. To the right of the list is a map preview showing a satellite image of a landscape. Below the map preview, the title 'Rolling Monthly GeoMAD (Sentinel-2)' is displayed, followed by a description: 'Please contact the provider of this data for more information, including information about usage rights and constraints.' Below the description, there's a 'Description' section that states: 'Digital Earth Africa (DE Africa) offers free access to the Rolling GeoMAD product, a monthly composite of Sentinel-2 data at 10 m resolution. Rolling GeoMAD creates high-quality images by combining multiple observations to reduce noise like clouds and haze. It uses the geomedian technique to preserve spectral band relationships, enabling further analysis such as NDVI calculation. This product is ideal for characterizing seasonal changes across African landscapes.' Below the description, there's a 'Web Map Service Layer Description' section that states: 'Individual remote sensing images can be affected by noisy data, such as clouds, cloud shadows, and haze. To produce cleaner images that can be compared more easily across time, we can create 'summary' images or 'composites' that combine multiple images into one image to reveal the median or 'typical' appearance of the landscape for a certain time period.'



✓ Step 4: Explore Layer Information

1. Click on a Feature:

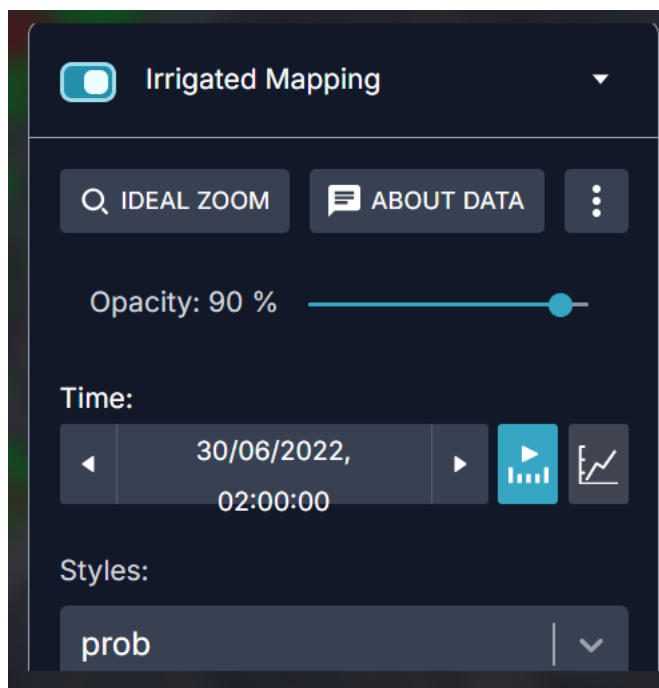
- Click directly on a scheme field on the map.
- A popup or sidebar will display metadata like:

Feature Information			
Irrigated Mapping - Site Data			
	time	2025-05-01 00:00:00 UTC	
	map	1	
data	bands	prob	0.9560405015945435
		filtered	1
	band_derived	prob	0.9560405015945435
lon	29.400873184203295		
lat	-25.201912423591192		
	0	2019-06-16	
	1	2019-07-31	
	2	2019-08-16	
	3	2019-09-16	

You can notice the value of each type of measurement of the irrigated area data.

2. Adjust Layer Settings (Optional):

- Look just below the layer name in the sidebar panel.
- You can change:
 - **Opacity**
 - **Time filtering**
 - **Legend (or Styles) display**



✅ Step 5: Add Supporting Layers (Optional)

To enhance your understanding of irrigation dynamics, you can add supporting data:

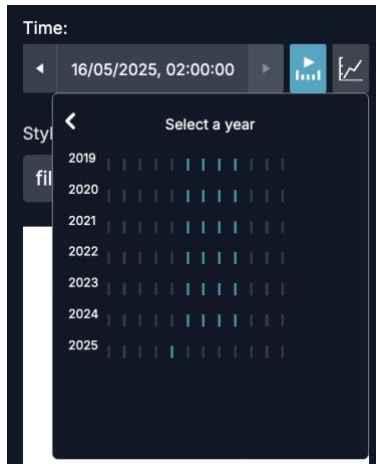
- **Rainfall anomalies**
- **Land Use**
- **Reservoir Forecast Sites**
- **Rolling Monthly GeoMAD (Sentinel-2)**

Repeat the same process as in Step 5 to activate these layers.

✅ Step 6: Compare Over Time (if supported)

The **Irrigated Mapping** layer is time-enabled

1. Click the **timeline** control at the bottom of the screen.
2. Select a **date range** or animate through time to see changes in the scheme's coverage or water status.



✓ Step 7: Export or Share Your View

1. **Take a Screenshot:** Use your system's snipping tool or the map's built-in print/export tool.
2. **Share the Map View:**
 - Click the **Share / Print** icon (top right).
 - Copy the generated link to share your custom view with others.



💡 Tips

- **Use the Legend** to interpret the color codes and symbology for irrigation-related layers.
- If performance is slow, turn off unneeded layers or reduce zoom.
- For deeper analysis, consider exporting data or using the data catalogue download options (if enabled).

🔧 Troubleshooting

- **If a layer doesn't appear, try:**
 - Refreshing the page
 - Zooming to the correct scale level
 - Checking if the layer has sub-options or filters

Tutorial 2: Use WPS to Extract Time Series of Irrigated Areas & Water Use

What is WPS?

Web Processing Service (WPS) allows spatial data processing over the web. IWMI's backend services supports WPS through PyWPS, providing access to analytics like irrigated area and water use trends.

Step 1: Choose a WPS-Enabled Layer or Tool

The LRB DT has WPS linked to **Irrigated Mapping** layer.

1. Open the Data Catalogue again.
2. Look for the folder “Water Use Monitoring and Analysis”. Read the description of the folder.
3. In this folder, you will find a WPS-enabled layer called “**Water Use Time-series (Irrigated Areas) (Polygon)**”, click it. Read again the description of the layer to learn how this layer was built and how to use.

The screenshot shows the 'Data Catalogue' interface. At the top, there's a dark header with 'Data Catalogue' and a 'Done' button. Below the header, there are two tabs: 'Data' and 'My Data'. The main content area is divided into a left sidebar and a right panel. The sidebar contains a search bar and a list of categories: 'Climate', 'Socio-Economic Profile', 'Water Resources', 'Citizen Science', 'Water Use Monitoring and Analysis' (which is expanded), 'Ecosystems', and 'Satellite Images'. Under 'Water Use Monitoring and Analysis', the 'Water Use Time-series (Irrigated Areas) (Polygon)' layer is highlighted. The right panel displays the title 'Water Use Time-series (Irrigated Areas) (Polygon)' and a detailed description: 'This tool estimates water consumption from irrigated agriculture within user-defined polygons in the Limpopo River Basin by integrating satellite-derived irrigated area masks and WaPOR evapotranspiration (ET) data. It was developed by transforming the original Colab notebook into a server-side WPS process, embedded in the Limpopo Digital Twin. The implementation enables users to draw custom polygons and receive analytical outputs in real time.' Below the description is a 'Workflow Summary' section with a 'Run Analysis' button. At the bottom, there's a breadcrumb trail: 'Water Use Monitoring and Analysis > Water Use Time-series (Irrigated Areas) (Polygon)'.

Data Catalogue

Done

Data My Data

Search the catalogue

Climate

Socio-Economic Profile

Water Resources

Citizen Science

Water Use Monitoring and Analysis

Water Use Time-series (Irrigated Areas) (Polygon)

Ecosystems

Satellite Images

Water Use Time-series (Irrigated Areas) (Polygon)

This tool estimates water consumption from irrigated agriculture within user-defined polygons in the Limpopo River Basin by integrating satellite-derived irrigated area masks and WaPOR evapotranspiration (ET) data. It was developed by transforming the original [Colab notebook](#) into a server-side WPS process, embedded in the Limpopo Digital Twin. The implementation enables users to draw custom polygons and receive analytical outputs in real time.

Workflow Summary:

Search the indicated area, draw a polygon on the map, and click the 'Run Analysis' button.

Run Analysis

Water Use Monitoring and Analysis > Water Use Time-series (Irrigated Areas) (Polygon)

4. To use the Water Use Time-series (Irrigated Areas) (Polygon) tool, follow the steps below

- Click the “Polygon” button

DataMy Data

Q Search the catalogue

Climate

Socio-Economic Profile

Water Resources

Citizen Science

Water Use Monitoring and Analysis

Water Use Time-series (Irrigated Areas) (Polygon)

Ecosystems

Satellite Images

For methodology details, see the [official method paper](#)

Draw a polygon (required)

Polygon drawn by the user in TerriaJS.

Select Location

Point (lat/lon)

Polygon

Existing Polygon

Nothing has been selected, please use the buttons above to make a selection.


Run Analysis

Water Use Monitoring and Analysis > Water Use Time-series (Irrigated Areas) (Polygon)

- Draw your Area of Interest on the map. Click “Done” when you are done drawing. It should take you back to the **the Water Use Time-series (Irrigated Areas) (Polygon)** layer.
- Click “**Run Analysis**” and wait for results.

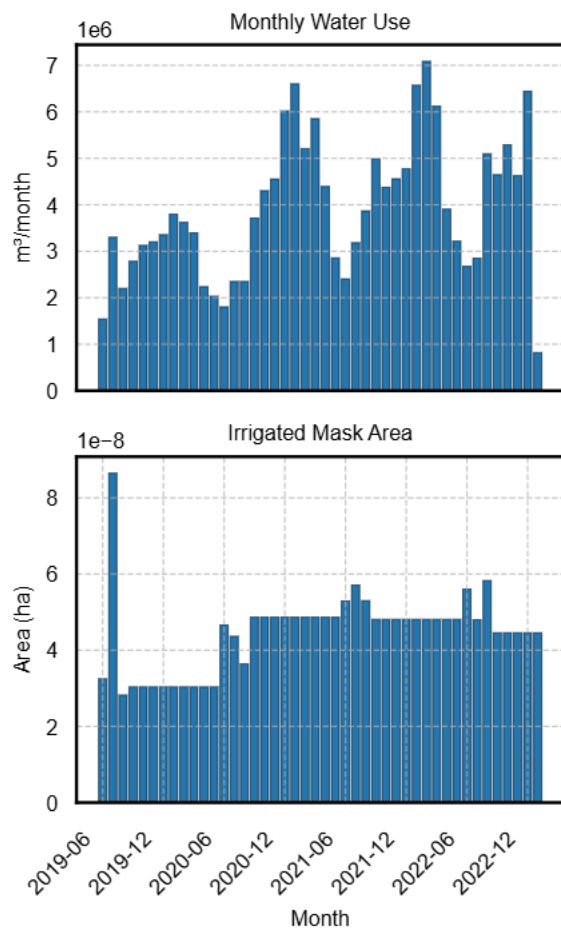
Step 2: View and Download Results

Results will appear as:

-  Charts embedded in the workbench(e.g., bar graph of area irrigated each season)



▼ Monthly ET-Based Irrigation Water Use Chart



▼ Monthly ET-Based Irrigation Water Use Table