WRMIS User Manual

GIS

Development of Water Resources Management Information System (WRMIS) and Decision Support System (DSS) for Efficient Irrigation Water Management in Punjab

Version 1.0

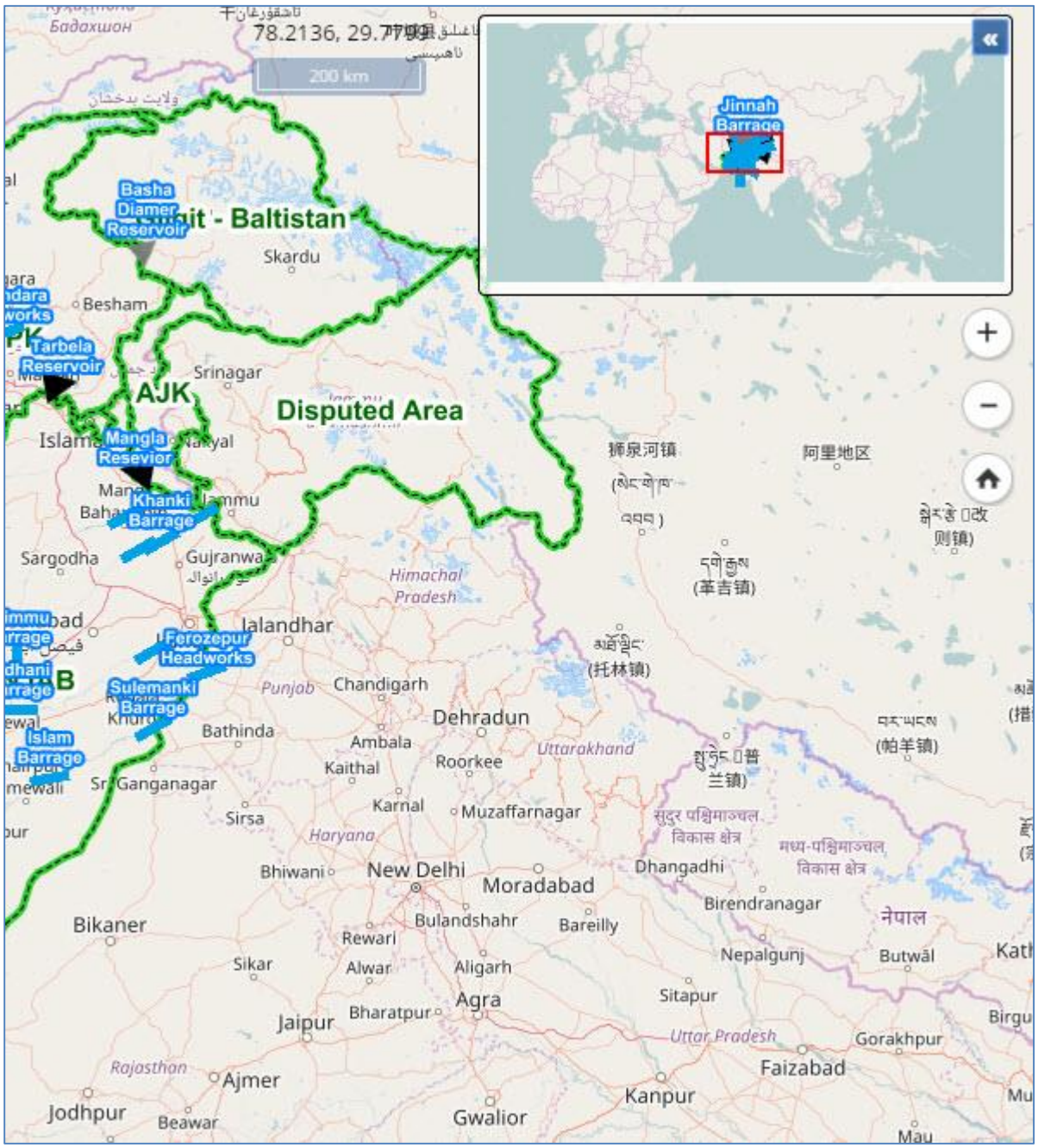
NESPAK

23-Aug-16

Revision History

Version	Date	By	Summary of Changes
1.0	23-Aug-16	NESPAK	Initial Draft

Table of Contents



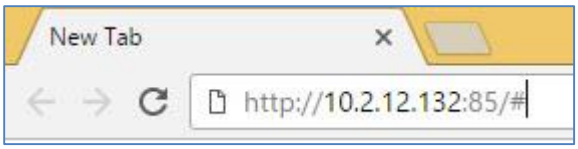
1. WRMIS Web GIS Application Functionality

WRMIS Web GIS Application Functionality covers the following detail,

- Site URL
- User Interface

1.1 SITE URL

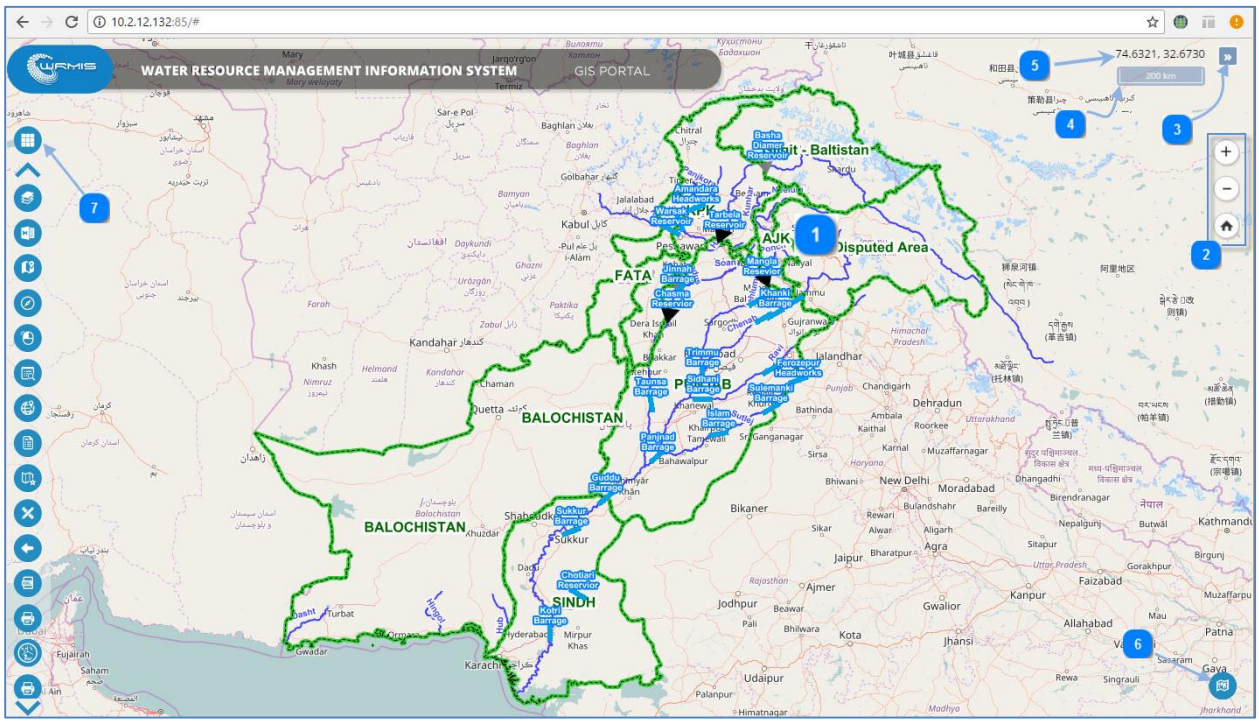
Type "**http://10.2.12.132:85/#"** in web browser to access the application. This application runs in all web browsers. Mozilla Firefox and Google Chrome are preferred web browsers for this application.



1.2 USER INTERFACE

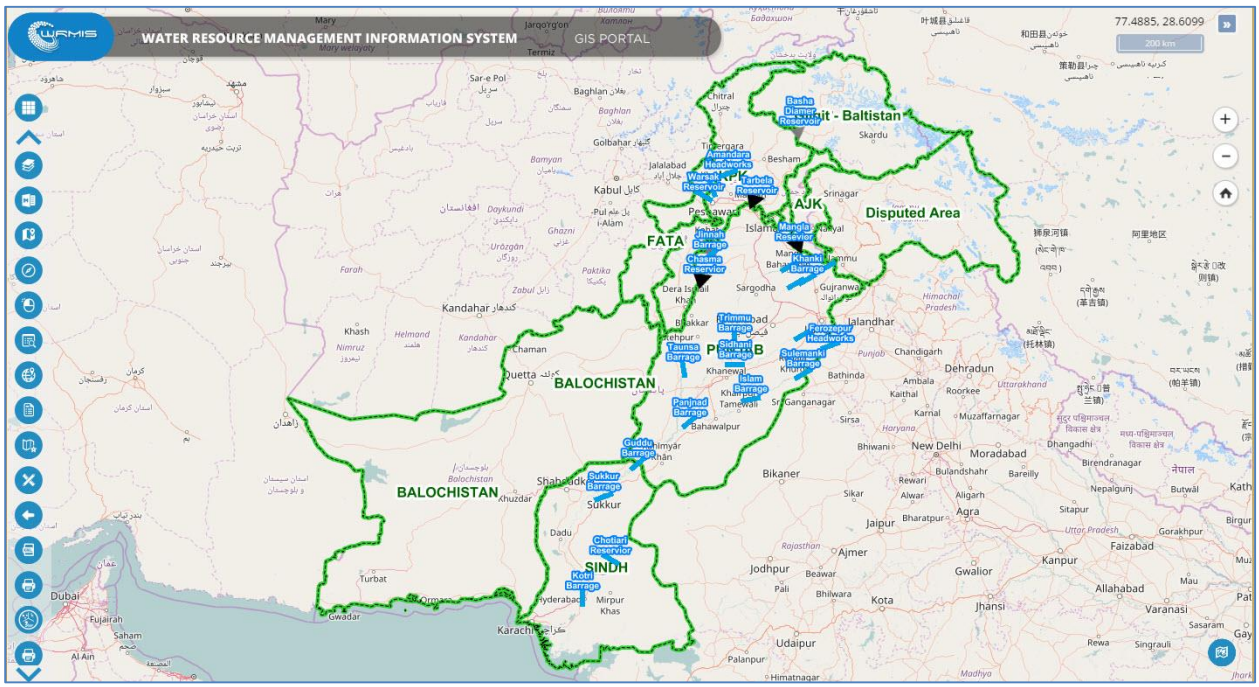
By typing in the URL address mentioned earlier in the application will appear before the end user. Numbers marked on the interface are,

1. Map
2. Navigation
3. Overview Map
4. Map Scale
5. Map Coordinates
6. Base Maps
7. Tools



1.2.1 Map

Map is scale dependent. At initial extent only Province boundary, Rivers and Dam, Barrages and Head works will visible overlaid on base maps. As map zoom level will increase others layers if are checked (selected) in Table of Contents (TOC) Will visible on map at their respective scales. TOC is available in Tools.



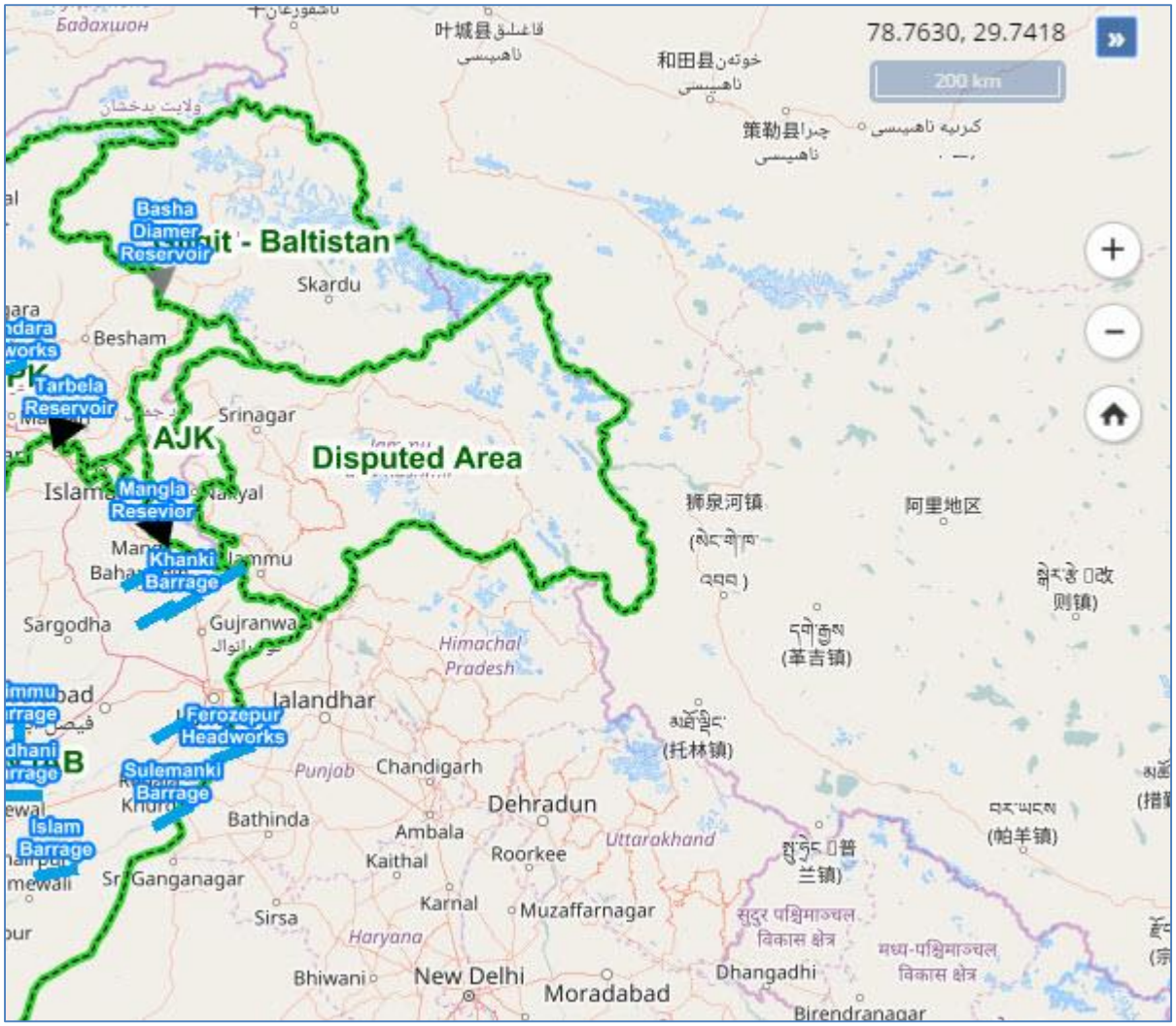
1.3 Navigation

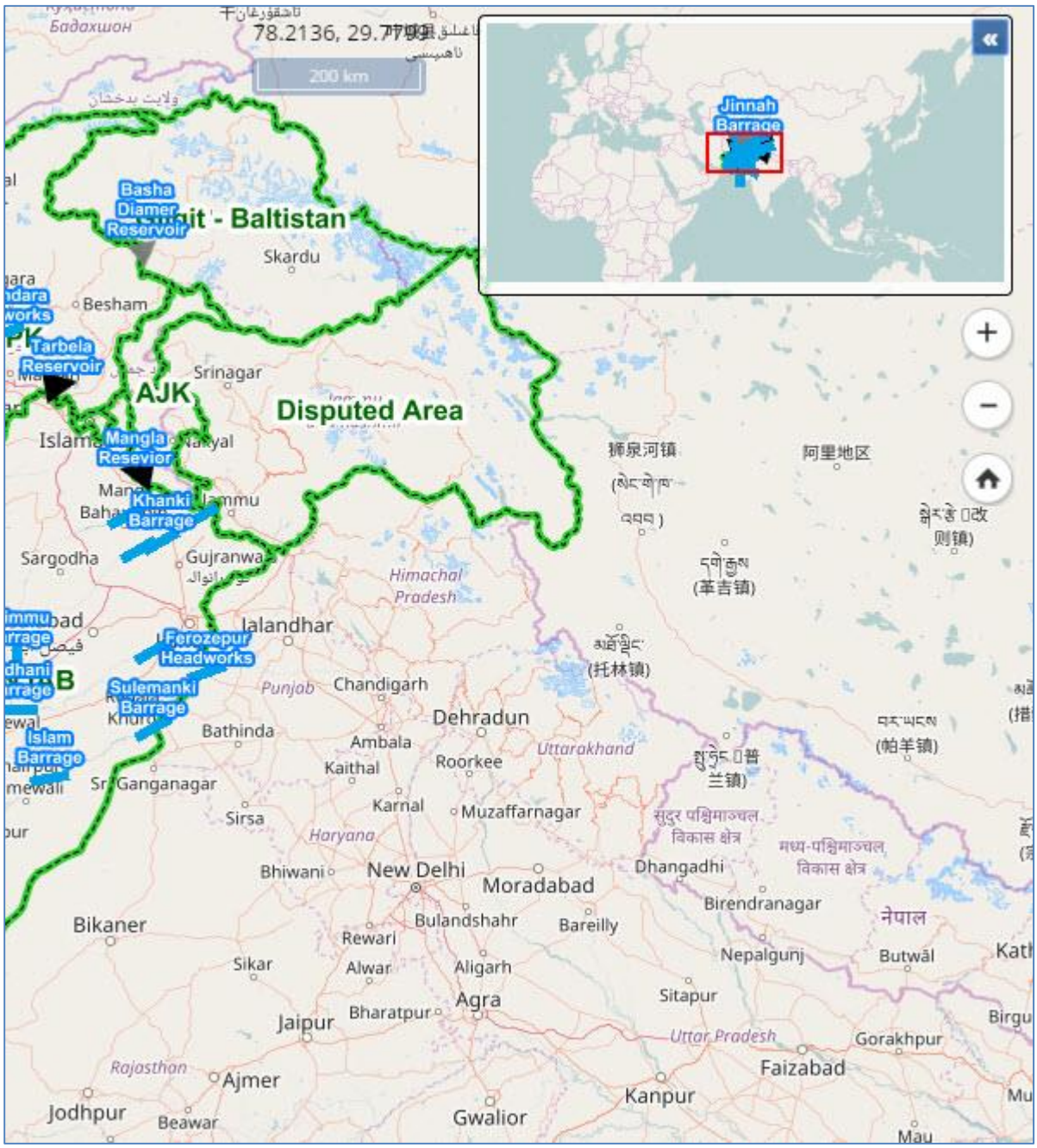
The Navigation widget provides a comprehensive set of map navigation controls. It gives end users a better map navigation user experience. It includes Zoom In, Zoom Out and Zoom to Punjab tools that end users expect from this Web mapping application. It is located on the right side of the application and appears on top of the map display. It becomes highlighted when the cursor is hovering over tool.

1.4 Overview Map

The Overview Map tool adds an overview map to the application User Interface. It shows the current spatial extent of the map display as a black rectangle (i.e. extent rectangle)

relative to the entire spatial extent of the base map service. It is located in the upper right corner of the UI and is minimized by default, appearing to be hidden. It can be easily maximized by clicking on the expand » arrow Clicking on the minimize « arrow will hide the tool.



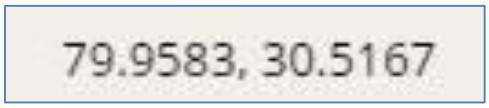


1.5 Map Scale

Map scale is shown in the upper right corner of the application. Scale is directly connected with the extents of the map.

1.6 Map Coordinate

Coordinates is shown above the map scale bar at upper right corner of the application. It displays the current coordinate of mouse cursor.



1.7 Base Maps

At right bottom of the application, the user will find the icon  which provides access to several base maps. These background layers are tiled map services provided by Google, ESRI and OSM. To change between these backgrounds, click the icon, then mouse over on desire type (Google or ESRI or OSM), then select the base map. Unlike the Theme layers, these maps are either turned on or off (e.g. two cannot be completely displayed simultaneously).

1.8 Tools

Tools tray contains the following tools;

1. Layers
2. Map Legends
3. Map Co-ordinates
4. Map Scale
5. On-Click Identification
6. Search By Attribute
7. Search By Location
8. Feature Query Builder
9. Map Bookmarks
10. Draw & Measure
11. Swipe/Spotlight Layer
12. Adding KML Layer on Map
13. Print Map

14. Irrigation Network
15. Water Theft
16. Daily Data
17. Reports

1.2.7.1 Layers

This module is divided into seven groups. Each group has layers information those are shown on map. Each group provides an interface to visualize layer legend and also has option to change the layer transparency and Zoom level to particular layer. User can easily set layer visibility on map using this module.

Business User:

Any user can access “Layers Module” who has access to open the web GIS application.

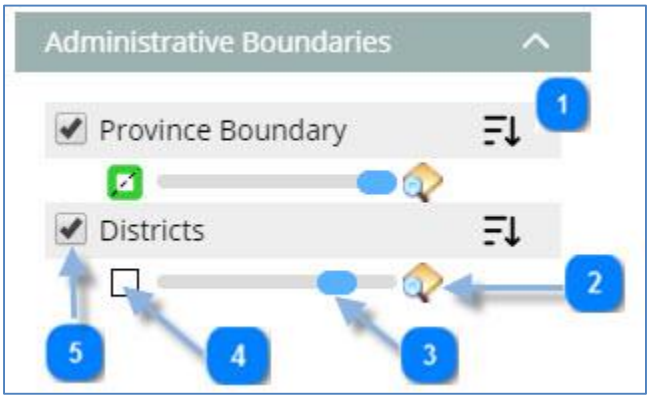
Pre-Requisite: Web GIS application should open.
How to Access: Main Menu -> Layers

User will drag mouse on main menu and then click on Layers. Layers window will open.

Administrative Boundaries

How to Access: Layers -> Administrative Boundaries

User will click on “Administrative Boundaries” to view the group’s Layer name and their related controls.



1. Click on Toggle button to Expand or Collapse the related controls of specific layer.

2.

- Click on “Zoom to Layer” button.
- Specific layer will zoom at map extent on map.

3.

- Drag “Transparency Control” button.
- Transparency of the specific Layer will be set.

4. It will show the layer legend.

5.

- Check the checkbox.
- System will visible the layer on the map.
- Uncheck the checkbox.
- System will invisible the layer on the map.

Note: Same controls from Number 1 to 5 are associated with each layer in all seven groups.

1.2.7.2 Map Legends

A legend conveys the meaning of the symbols used to represent features on the map to a map reader. Legends consist of map symbols with labels containing explanatory text. The Legend widget provides a dynamic legend and automatically updates if the visibility of a layer changes. The legend has the information of all symbol classes of different layers (visible) used in this application.

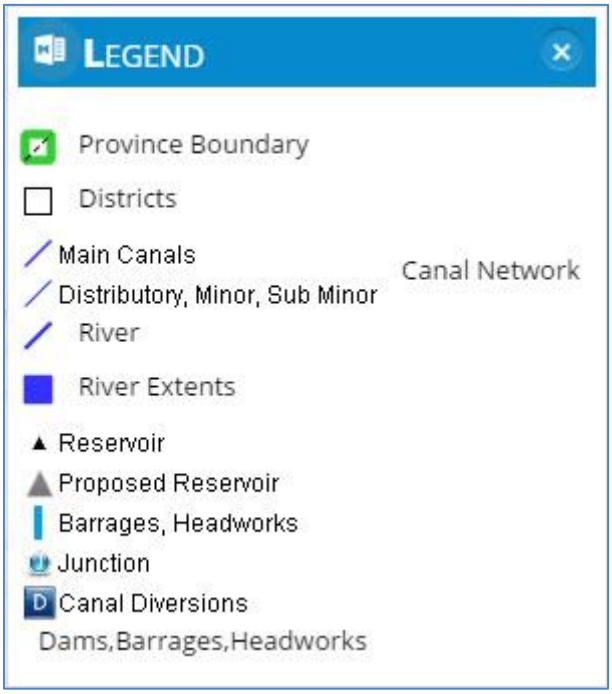
Business User:

Any user can access “Map Legends” module who has access to open the web GIS application.

Pre-Requisite: Web GIS application should open.
How to Access: Main Menu -> Map Legends

User will drag mouse on main menu and then click on Map Legends. Map Legends window will open.

As the zoom level increases the number of visible layers increased and the number of legend classes displayed in the legend widget increases.



1.2.7.3 Map Coordinates

Map coordinates module facilitates the user to locate the specific location on the basis of longitude and Latitude. Same module is use to play with the extent of the map.

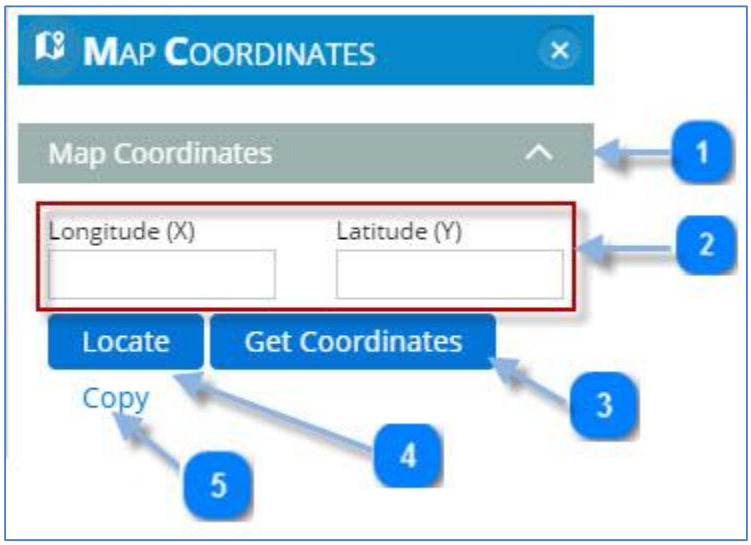
Business User:

Any user can access “Map Coordinates” module who has access to open the web GIS application.

Pre-Requisite: Web GIS application should open.
How to Access: Main Menu -> Map Coordinates

User will drag mouse on main menu and then click on Map Coordinates. Map Coordinates window will open.

Map Coordinates



1 Click on accordion of Map Coordinates to Expand and Collapse the related controls.

2 Enter Longitude (X) and Latitude (Y) **OR** Longitude (X) and Latitude (Y) will be filled by system.

3

- Click on map.
- Click on Get Coordinates button.
- System will get the Longitude (X) and Latitude (Y) at map click location and fill or update the Longitude (X) and Latitude (Y) text boxes.

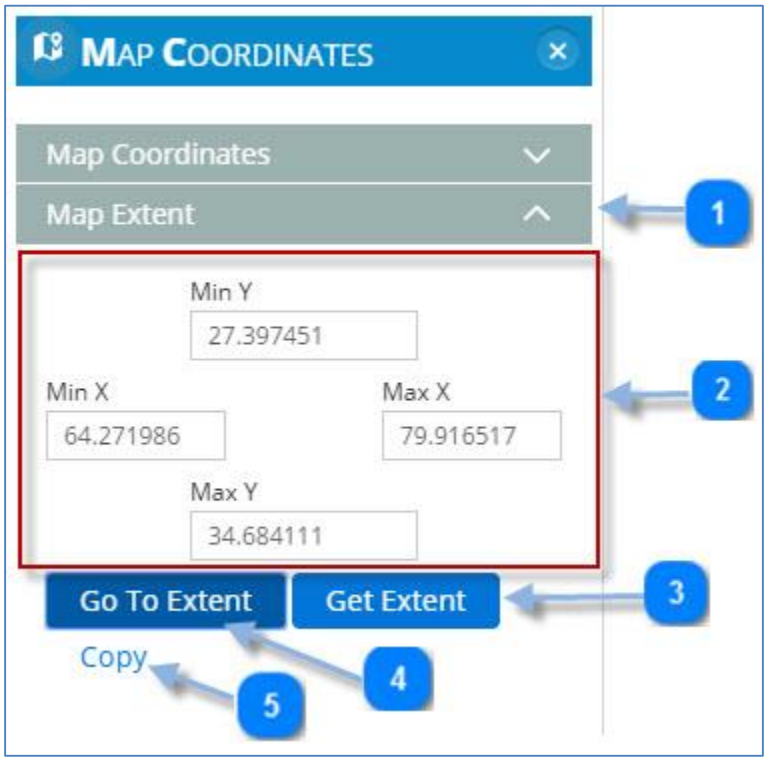
4

- Click on Locate button.
- System will change the extent of the map according to provided Longitude (X) and Latitude (Y).

5

- Click on Copy button.
- System will copy the Longitude (X) and Latitude (Y) from text boxes and save into clipboard.

Map Extent



1 Click on accordion of Map Extent to Expand and Collapse the related controls.

2 Enter Extent values in all four text boxes **OR** Text boxes will be filled by system.

3

- Click on map.
- Click on Get Coordinates button.
- System will get the Extent of the map and fill or update the Extent text boxes accordingly.

4

- Click on Go To Extent button.
- System will change the extent of the map according to provided values.

5

- Click on Copy button.
- System will copy the Extent values from text boxes and save into clipboard.

1.2.7.4 Map Scale

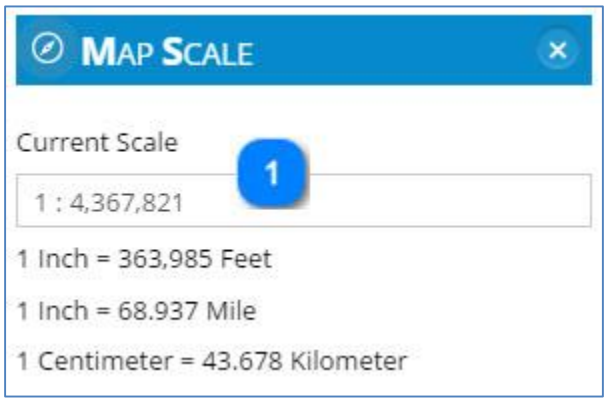
Map scale shows the scale for the current extent of the map. Scale of the map can be view in different units like Feet, miles etc. User can change the scale of the map by typing the scale value in SCALE text field.

Business User:

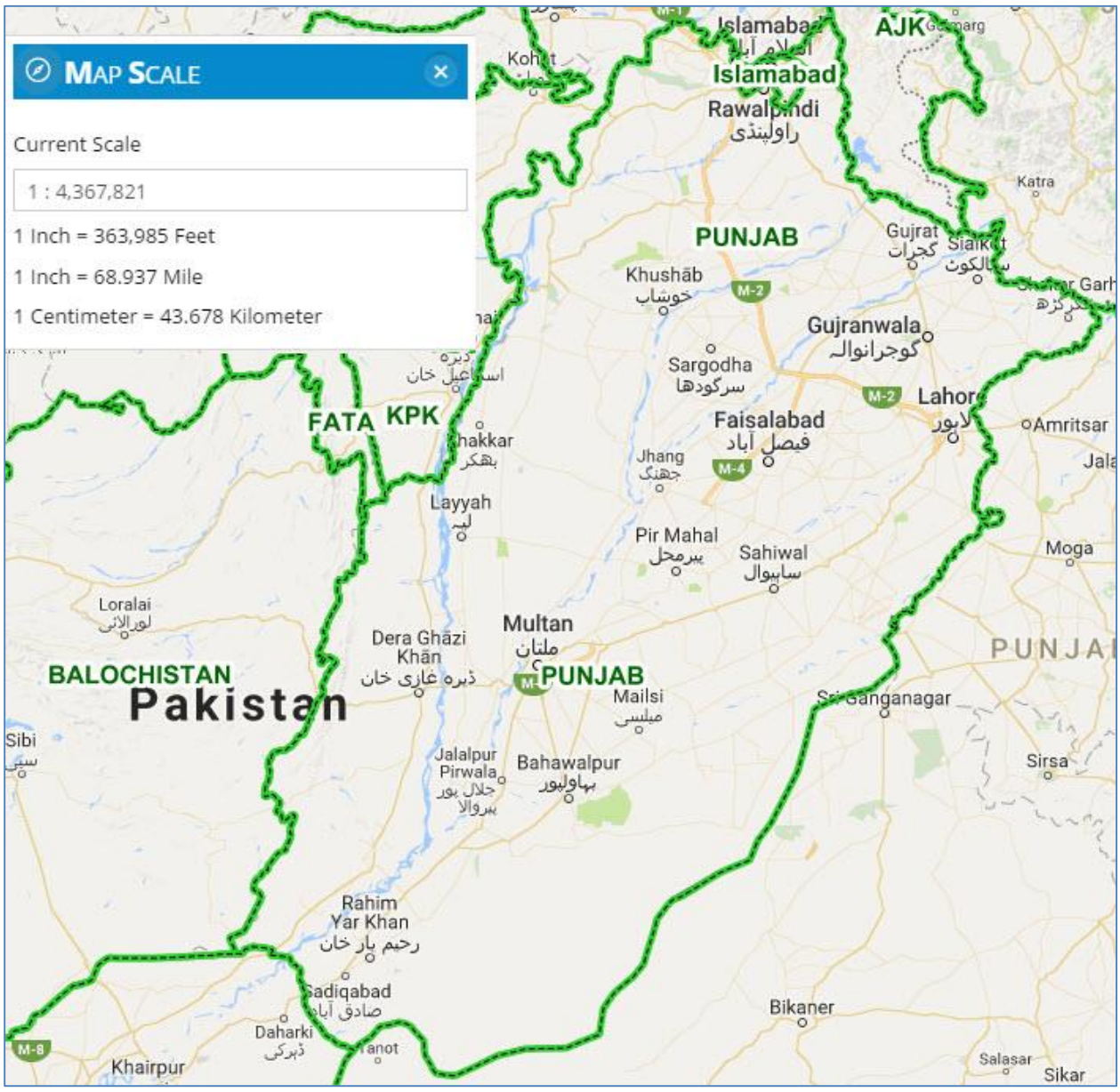
Any user can access “Map Scale” module who has access to open the web GIS application.

Pre-Requisite: Web GIS application should open.
How to Access: Main Menu -> Map Scale

User will drag mouse on main menu, then click on Map Scale. Map Scale window will open. By default it will show the current map scale into SCALE text box.



Map showing the scale for the extent of Punjab. As we zoom in or zoom out the map the scale of the map changes.



1

Change Map Scale

- Click into text box.
- Enter desire scale value.
- Press Enter key.
- System will change the scale of the Map.

Get Current Map Scale

- Change map zoom using Zoom in or Zoom out button  or Change map zoom using mouse wheel.
- “Current Scale” textbox value will be change accordingly.

Copy Current Scale

- Click into text box.
- System will select the current scale value.
- Press Ctrl+c or open context menu using right click on selected text then select copy option.
- System will copy the value into clipboard.

1.2.7.5 OnClick Identification

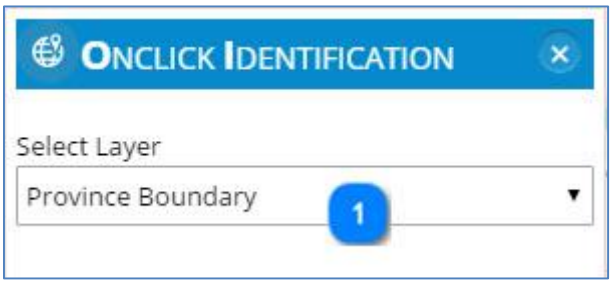
OnClick Identification widget is use to identifying the attributes information of the layers those are available on the map.

Business User:

Any user can access “OnClick Identification” module who has access to open the web GIS application.

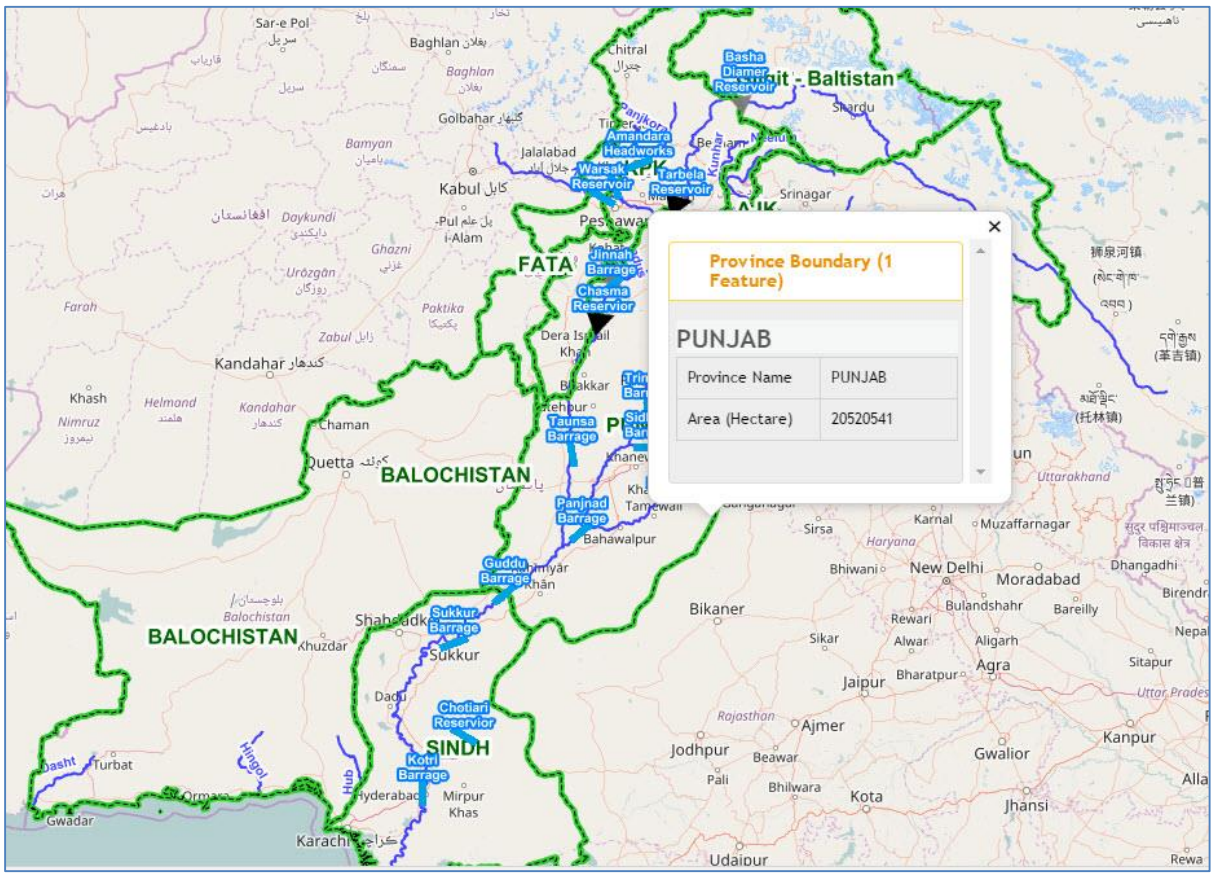
Pre-Requisite: Web GIS application should open.
How to Access: Main Menu -> OnClick Identification

User will drag mouse on main menu and then click on OnClick Identification. OnClick Identification window will open.



1

- Select Layer from ‘Select Layer ’ dropdown.
- Click on selected layer on map.
- System will show attribute information window.
- Click on non-selected layer, system will not open the attribute information window.



1.2.7.6 Search By Attribute

'Search by Attribute' widget is use to search the spatial feature(s) using their attribute information.

Business User:

Any user can access "Search By Attribute" widget who has access to open the web GIS application.

Pre-Requisite: Web GIS application should open.

How to Access: Main Menu -> Search By Attribute

User will drag mouse on main menu and then click on ‘Search By Attribute’. ‘Search By Attribute’ window will open.

1

Select Layer from ‘Select Layer ’ dropdown e.g. Province Boundary.

2

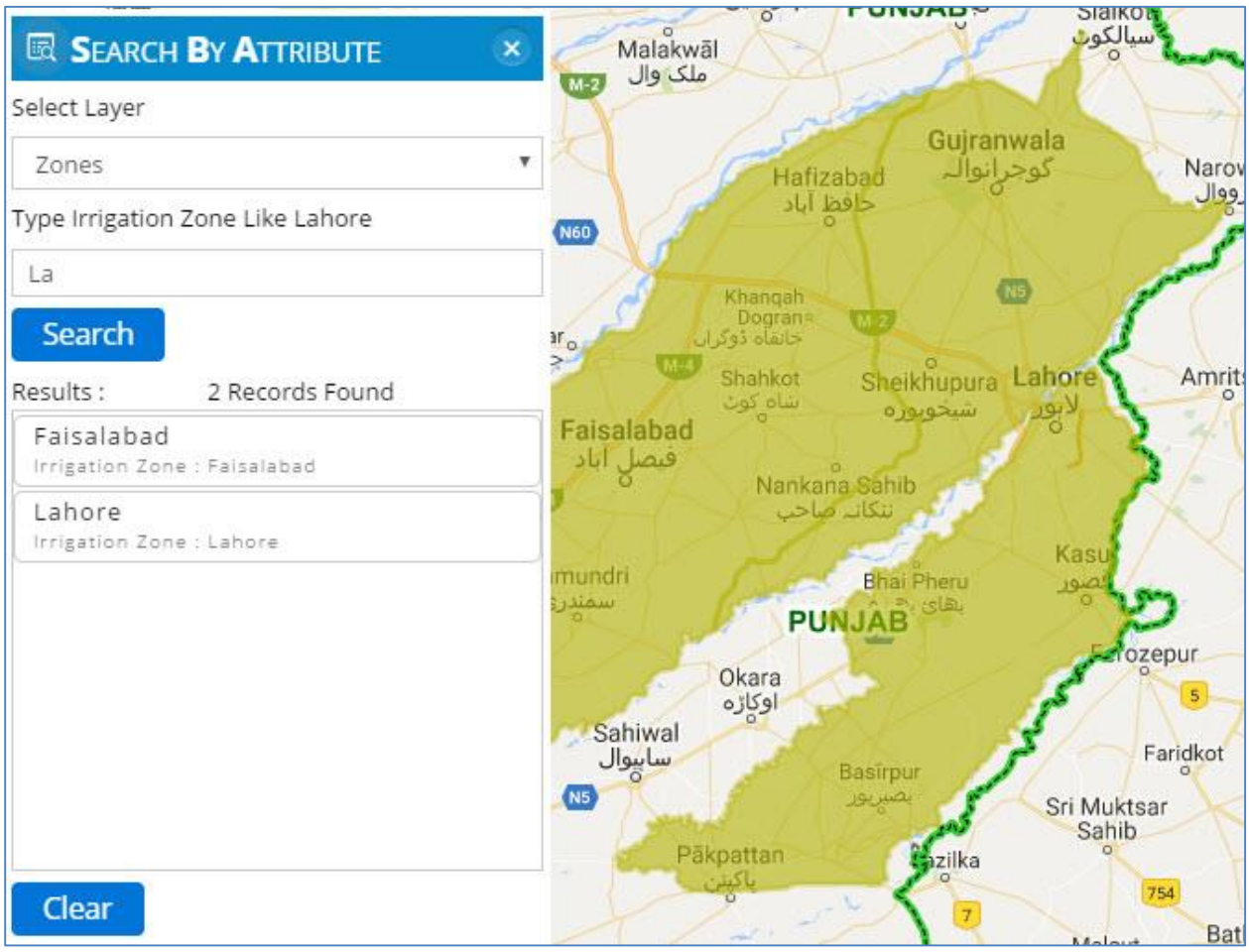
Type Province Name e.g. PUNJAB or PUN

3

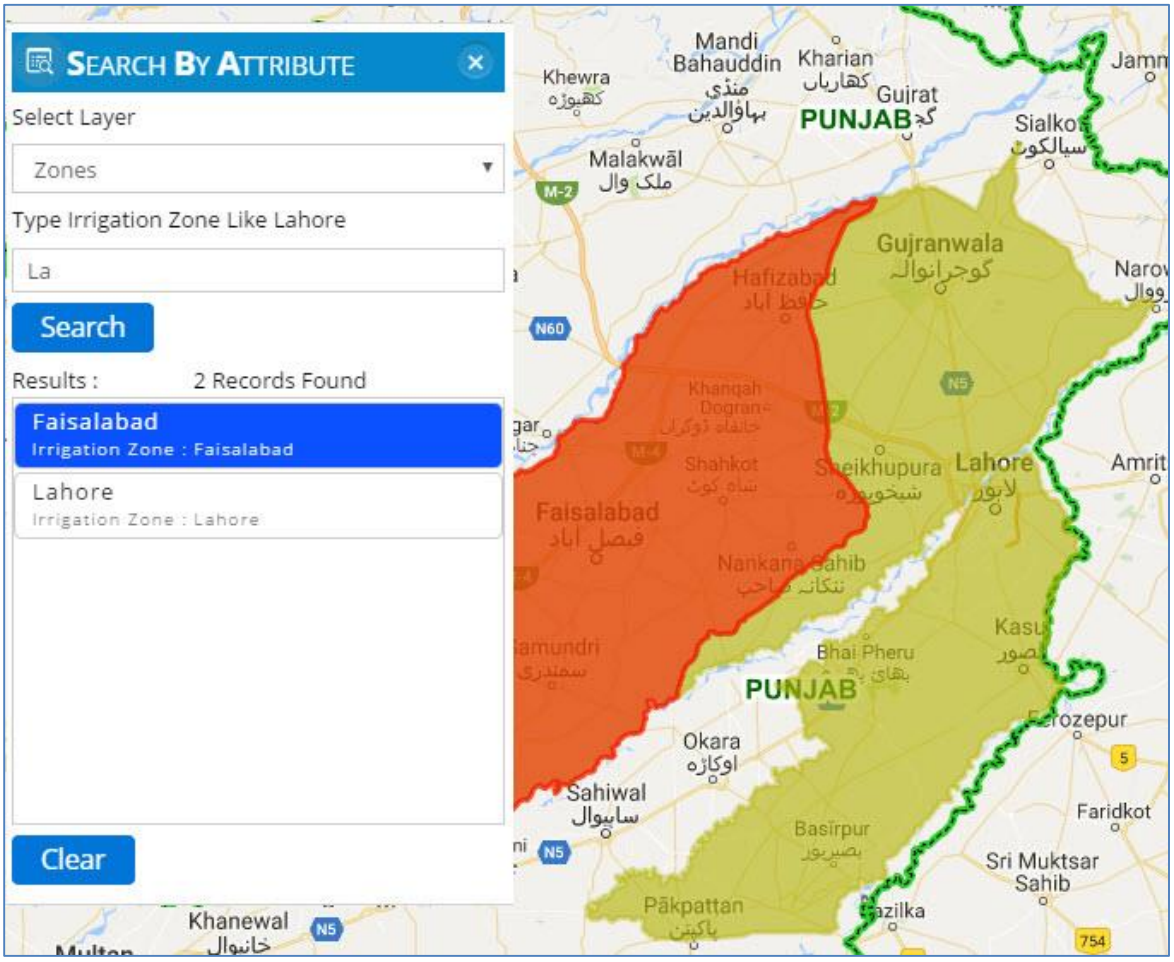
Click on ‘Search’ button.

4

- System will show the record(s) in ‘Results’ window and highlight them on the map with *Wild Willow* color.



User can further select the single record with mouse click. System will highlight the feature on the map with *Pizazz* color.



5

Clear button will clear the following controls.

- Type Province Name textbox.
- Results window.
- Selected Feature(s) on Map.

1.2.7.7 Select By Location

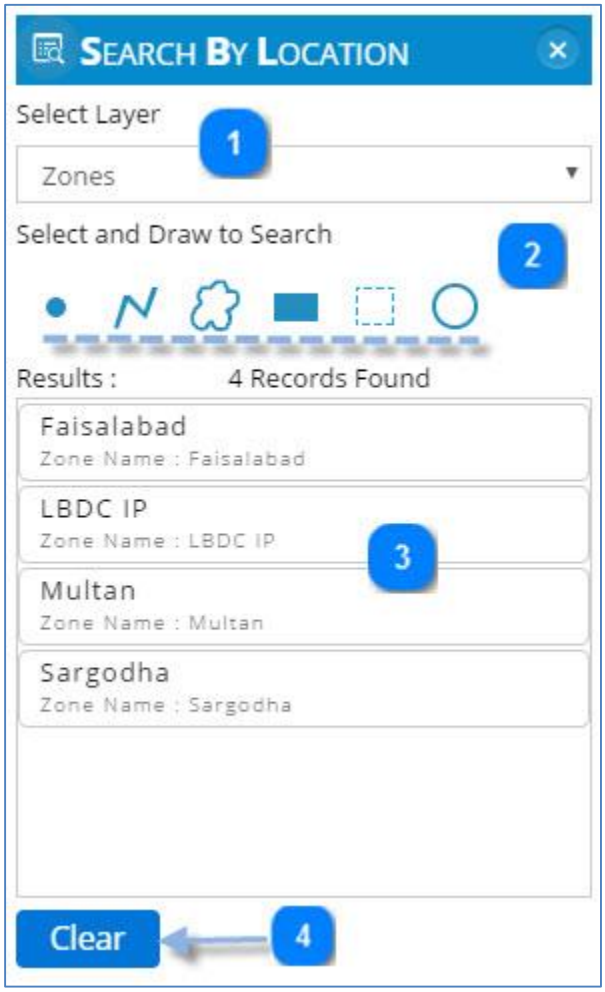
'Search by Location' widget is use to search the feature(s) on a specific layer using different drawing shapes like Point, Line, Box, Circle etc.

Business User:

Any user can access “Search By Location” widget who has access to open the web GIS application.

Pre-Requisite: Web GIS application should open.
How to Access: Main Menu -> Search By Location

User will drag mouse on main menu and then click on ‘Search By Location. ‘Search By Location’ window will open.

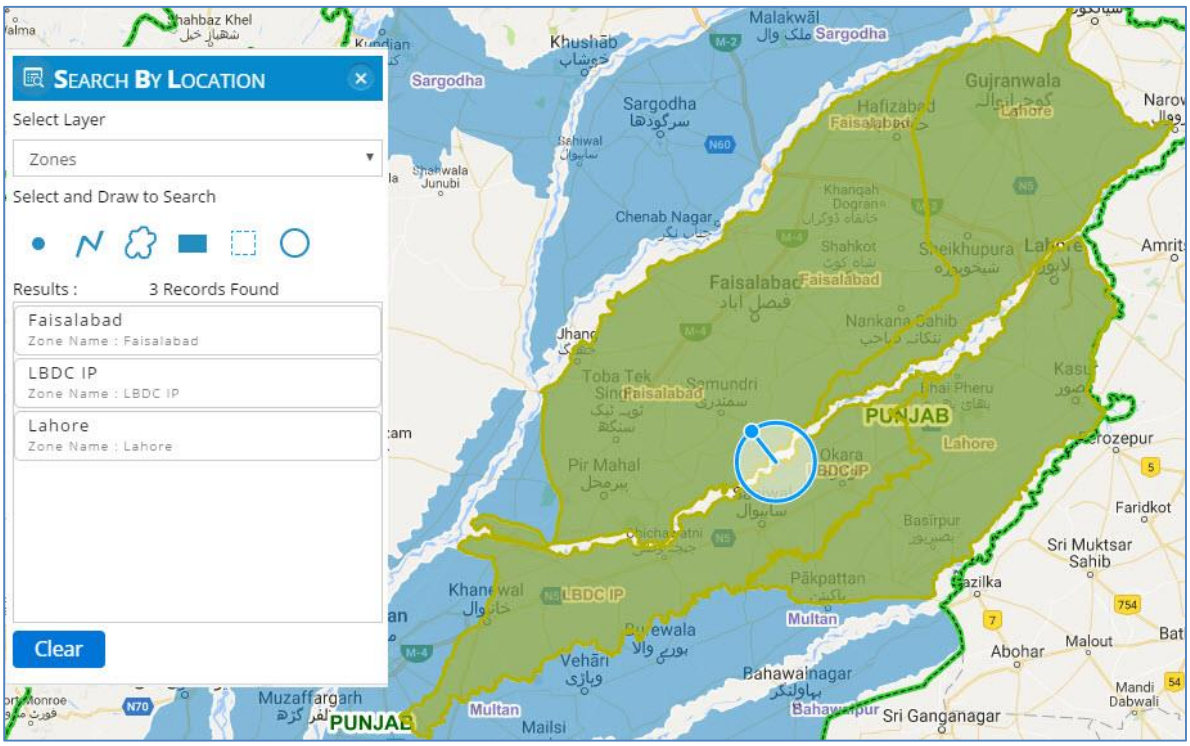


1

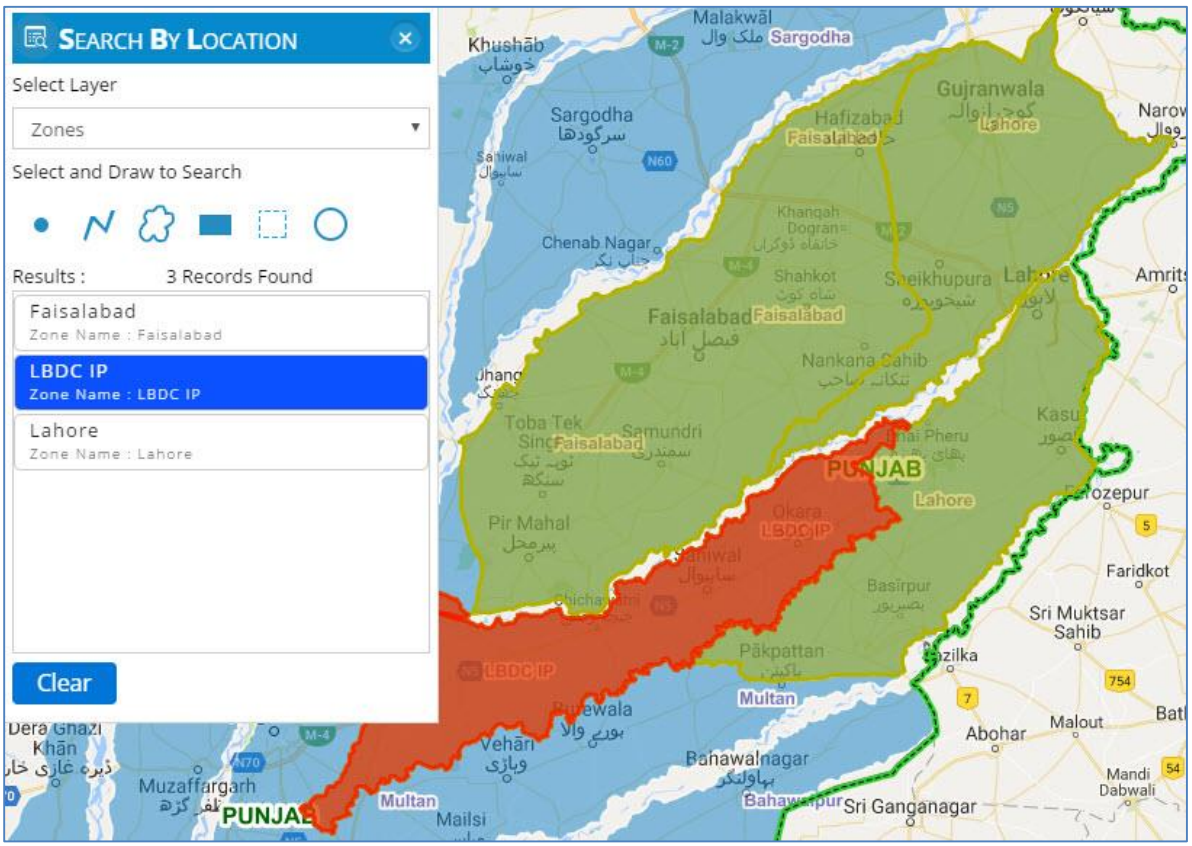
Select Layer from 'Select Layer ' dropdown e.g Province Boundary.

2

- Select tool e.g Circle and draw on map.
- System will highlight the features under the drawing on the selected layer with *Wild Willow* color.



- User can further select the single record with mouse click. System will highlight the feature on the map with *Pizazz* color.



3

- System will show the record(s) in ‘Results’ window
- User can further select the single record with mouse click and that record will highlight on the map.

4

Clear button will clear the following controls.

- Type Province Name textbox.
- Unselect the selected tool and select the default mouse pointer.
- Selected Feature(s) on Map

1.2.7.8 Feature Query Builder

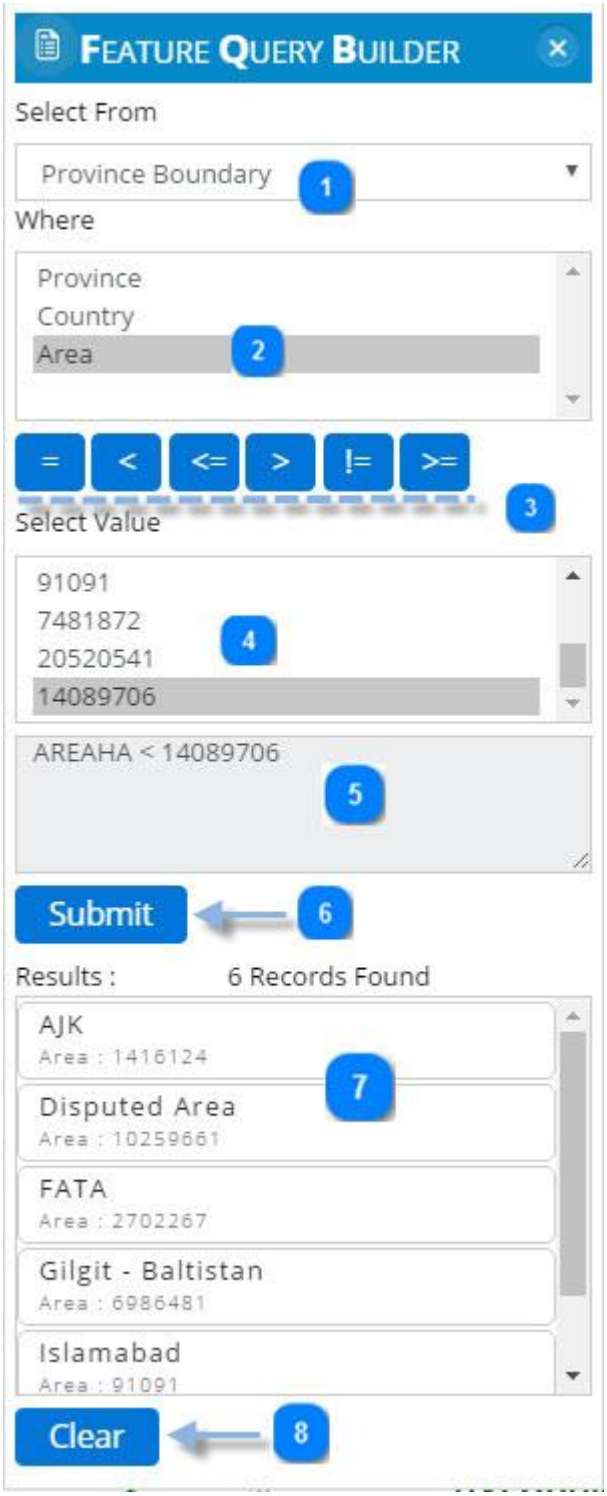
In “Feature Query Builder” widget, user can build custom query to search the feature(s) on the map.

Business User:

Any user can access “Feature Query Builder” widget who has access to open the web GIS application.

Pre-Requisite: Web GIS application should open.
How to Access: Main Menu -> Feature Query Builder.

User will drag mouse on main menu and then click on “Feature Query Builder”. “Feature Query Builder” window will open.



1

- Select Layer from ‘Select Layer ’ dropdown e.g Province Boundary.
- System will update the “Where” window with selected layer’s attributes.

2

- User will select the required attribute e.g Province.
- System will display the attribute name in “Query” window.
- System will update the “Select Value” window with selected attribute’s value.

3

- User will select required arithmetic operator.
- System will append the operator with attribute name in “Query” window.

4

- User will select the required value.
- System will append the value in “Query” window.

5

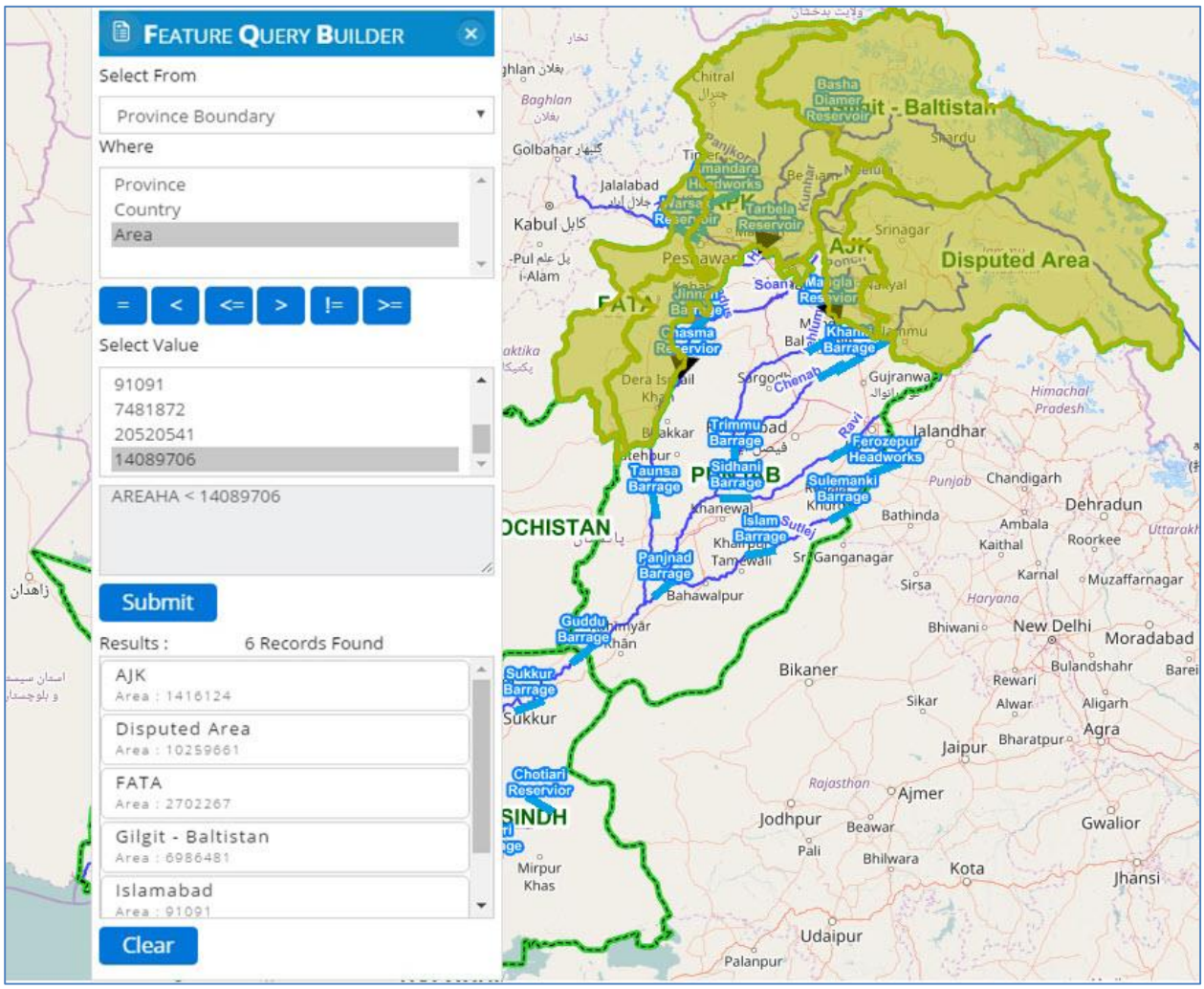
System will show complete WHERE clause.

6

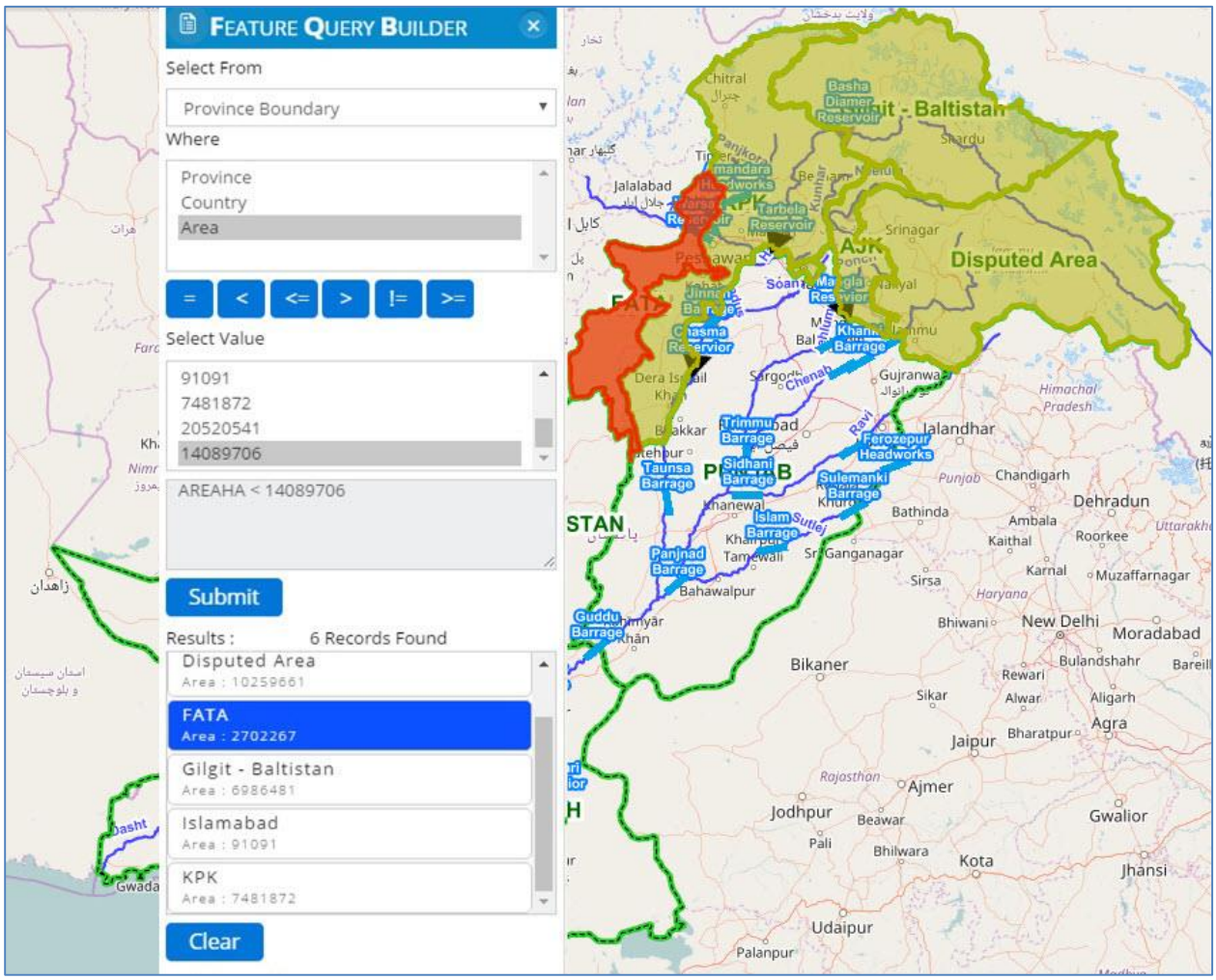
User will press “Submit” button.

7

- System will show the record(s) in ‘Results’ window and highlight them on the map with *Wild Willow* color.



- User can further select the single record with mouse click and that record will highlight on the map with *Pizazz* color.



8

Clear button will clear the following controls.

- Type Province Name textbox.
- Results window.
- Selected Feature(s) on Map.

1.2.7.9 BookMarks

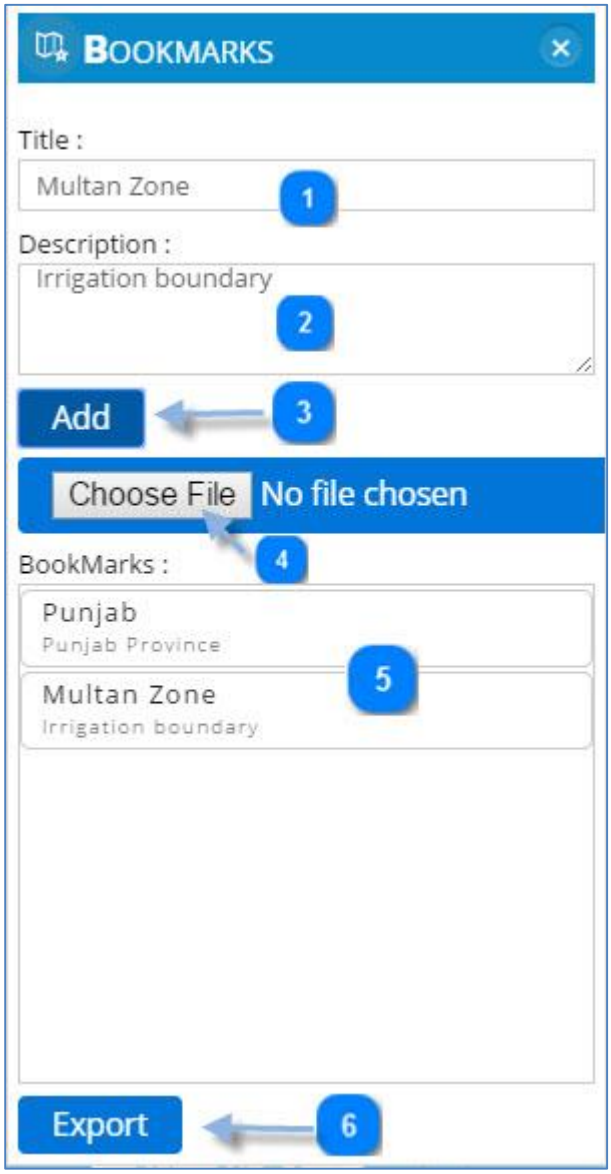
The Bookmark widget stores a collection of map view extents in the application. It also enable users to create and add their own spatial bookmarks.

Business User:

Any user can access “BookMarks” widget who has access to open the web GIS application.

Pre-Requisite: Web GIS application should open.
How to Access: Main Menu -> BookMarks.

User will drag mouse on main menu and then click on “BookMarks”. “BookMarks” window will open.



1

Add the name for the bookmark in <Title> textbox to save.

2

Add the description for the bookmark in <Description> textbox.

3

- Press <Add> button.
- Spatial bookmarks created by users appear at the bottom of the bookmark list in the order they are created.

4

- Press <Choose File> button.
- <Open file> dialog will open.
- Chose XML file and Click on <Open> button.
- System will add the file and update the <BookMarks> list.
- System will also display the file name in place of <No file chosen>.

5

- System shows all bookmark(s) in <BookMarks> list.
- Click on any bookmark.
- System will move the map on particular geographic location using saved extent.

6

- Press <Export> button.
- System will start downloading the file and save it in default downloads folder with .xml file extension.

1.2.7.10 Draw & Measure

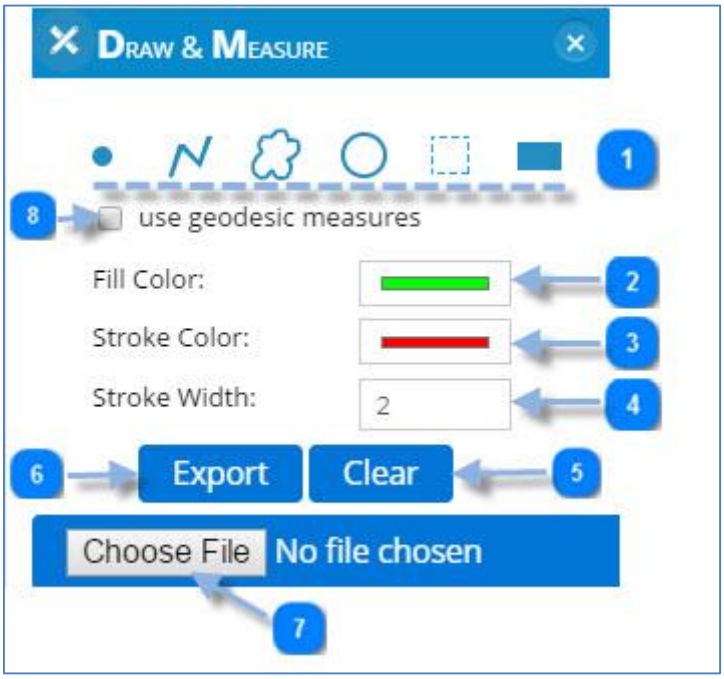
The Draw & Measure widget enables end users to draw simple graphics and text onto the map display. It provides basic "sketching and redlining" functionality for the application. It also provides some measurement capability, by displaying measurement values (if activated) for drawn features: lengths for lines, and areas and perimeters for polygons.

Business User:

Any user can access “Draw & Measure” widget who has access to open the web GIS application.

Pre-Requisite: Web GIS application should open.
How to Access: Main Menu -> Draw & Measure.

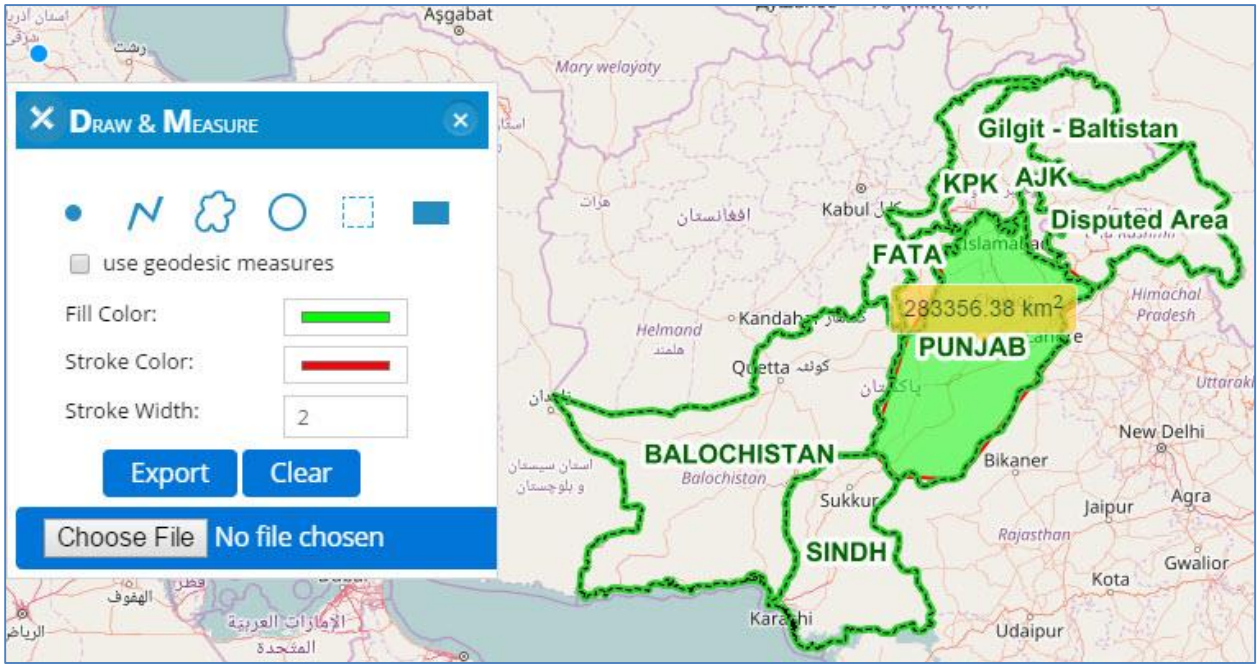
User will drag mouse on main menu and then click on “Draw & Measure”. “Draw & Measure” window will open.



1

- Select a feature creation tool by clicking on it for measurement.
- System will select the tool.
- Click on the map and define the feature extent. A single-click will finish the feature.
- System will draw shape on the map and automatically labels its area on the shape.

- User can draw multiple shapes using same procedures.



2

- Click on Fill Color.
- Color selection window will open.
- Select Color or enter RGB color value.
- Click <Ok> button.
- System will update the color.
- Click <Cancel> to retain the previous selection.

3

- Click on Stroke Color.
- Color selection window will open.
- Select Color or enter RGB color value.
- Click <Ok> button.

- System will update the color.
- Click <Cancel> to retain the previous selection.

4

- Write Stroke Width value in <Stroke Width> textbox.

5

- Press <clear> button.
- System will clear all the shapes drawn on map.

6

- Press <Export> button.
- System will save the shapes in default download folder in json format.

7

- Press <Choose File> button.
- <Open file> dialog will open.
- Chose json file and Click on <Open> button.
- System will add the file.
- System will automatically redraw the shapes on the map.
- System will also display the file name in place of <No file chosen>.

8

- Select checkbox.
- Draw shape after selection of feature creation tool.
- System will draw shape on map and show its geodesic measurements.

1.2.7.11 Swipe/Spotlight Layer

The “Swipe/Spotlight Layer” tool is used to interactively reveal layers beneath the layer being swiped. This tool makes it easy to see what is underneath a particular layer without having to turn it off in the table of contents.

Business User:

Any user can access “Swipe/Spotlight Layer” widget who has access to open the web GIS application.

Pre-Requisite: Web GIS application should open.
How to Access: Main Menu -> Swipe/Spotlight Layer.

User will drag mouse on main menu and then click on “Swipe/Spotlight Layer”. “Swipe/Spotlight Layer.” window will open.

1

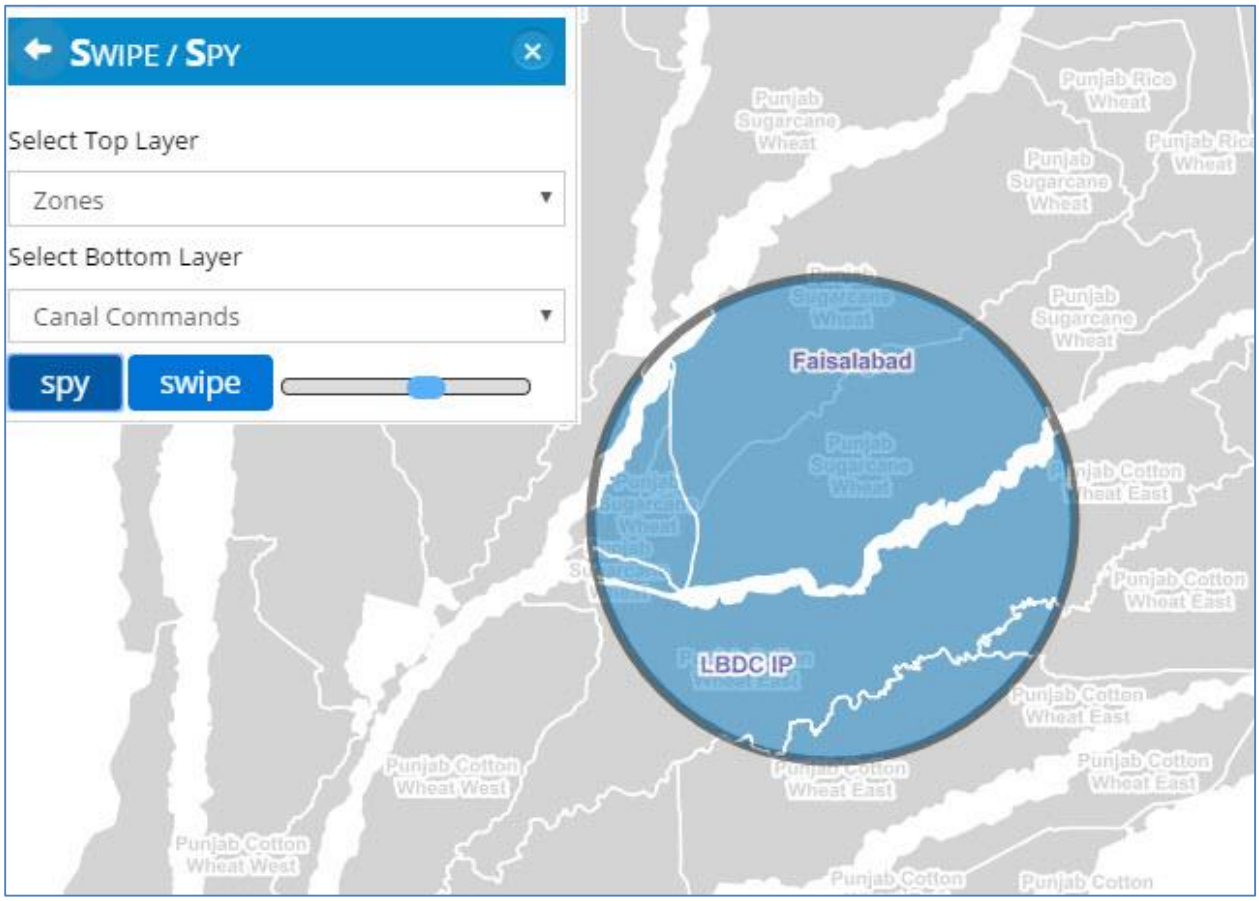
- Select layer from the <Select Top Layer> dropdown.
- System will automatically turn all other layers off in the map.
- Turn selected layer on in the table of contents, if it is off.

2

- Select layer from the <Select Bottom Layer> dropdown.
- Turn selected layer on in the table of contents, if it is off.

3

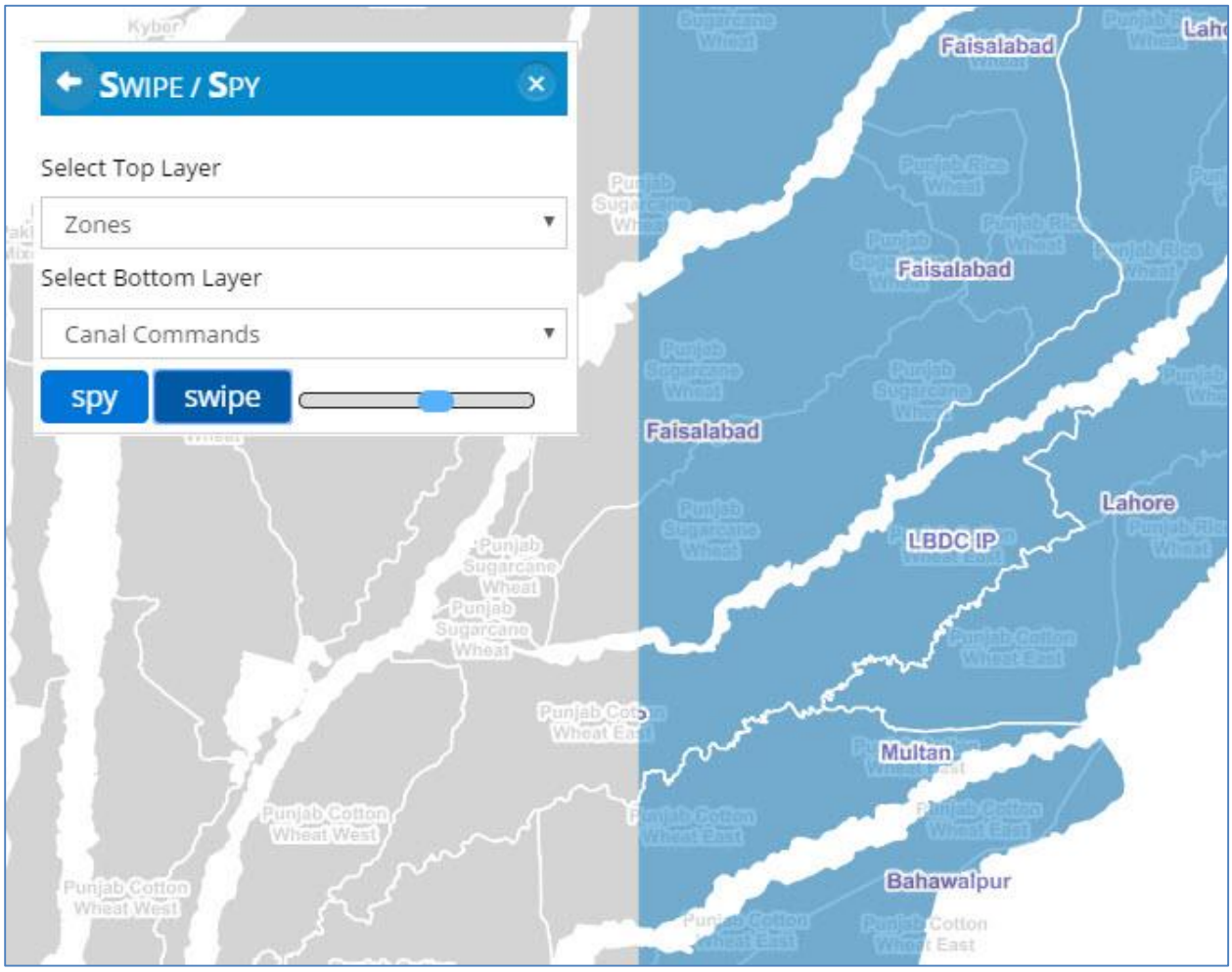
- Click on <Spy> button.
- System will activate the spy tool.
- Click on map, spy tool allows you to see through a circular "cut out" of one map layer onto any layers below.



4

- Click on <Swipe> button.
- System will activate the swipe slider.

- Drag slider left right directions to compare two layers side-by-side, by selectively masking the top-most of the two layers.



1.2.7.12 Adding KML Layer on Map

The “Adding KML Layer on Map” tool facilitates the user to add KML layer on map.

Business User:

Any user can access “Adding KML Layer on Map” widget who has access to open the web GIS application.

Pre-Requisite: Web GIS application should open.
How to Access: Main Menu -> Adding KML Layer on Map.

User will drag mouse on main menu and then click on “Adding KML Layer on Map”. “Adding KML Layer on Map” window will open.

1

- Pick file from local drive.
- Drag and Drop selected KML file on map.
- System will add the KML file on the map on temporary basis.
- File will remove when current session will ends up.

1.2.7.13 Print Map

++

1.2.7.14 Irrigation Network

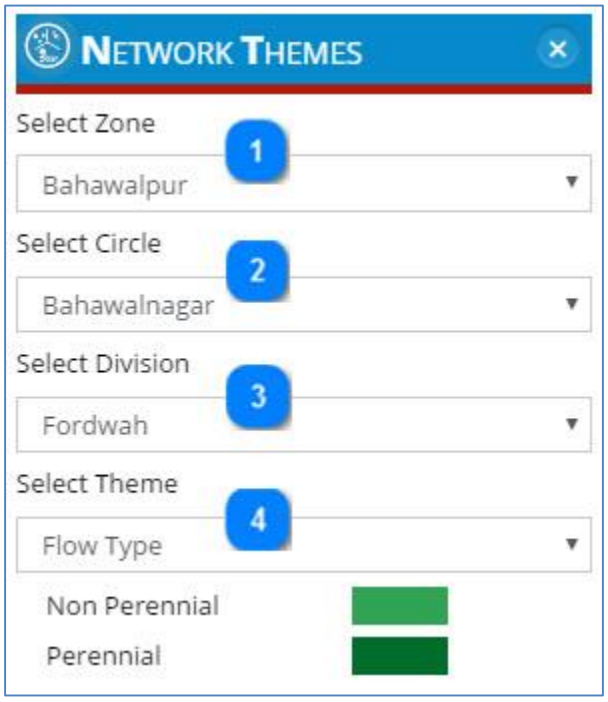
The “Irrigation Network” tool is used to visualize the irrigation network on the basis of different themes.

Business User:

Any user can access “Irrigation Network” widget who has access to open the web GIS application.

Pre-Requisite: Web GIS application should open.
How to Access: Main Menu -> Irrigation Network.

User will drag mouse on main menu and then click on “Irrigation Network”. “Irrigation Network” widget will open.



1

- Select zone from the <Select Zone> dropdown.
- System will update the map extent according to selected zone.
- On selection of zone, relevant circles are populated in the circle dropdown.

2

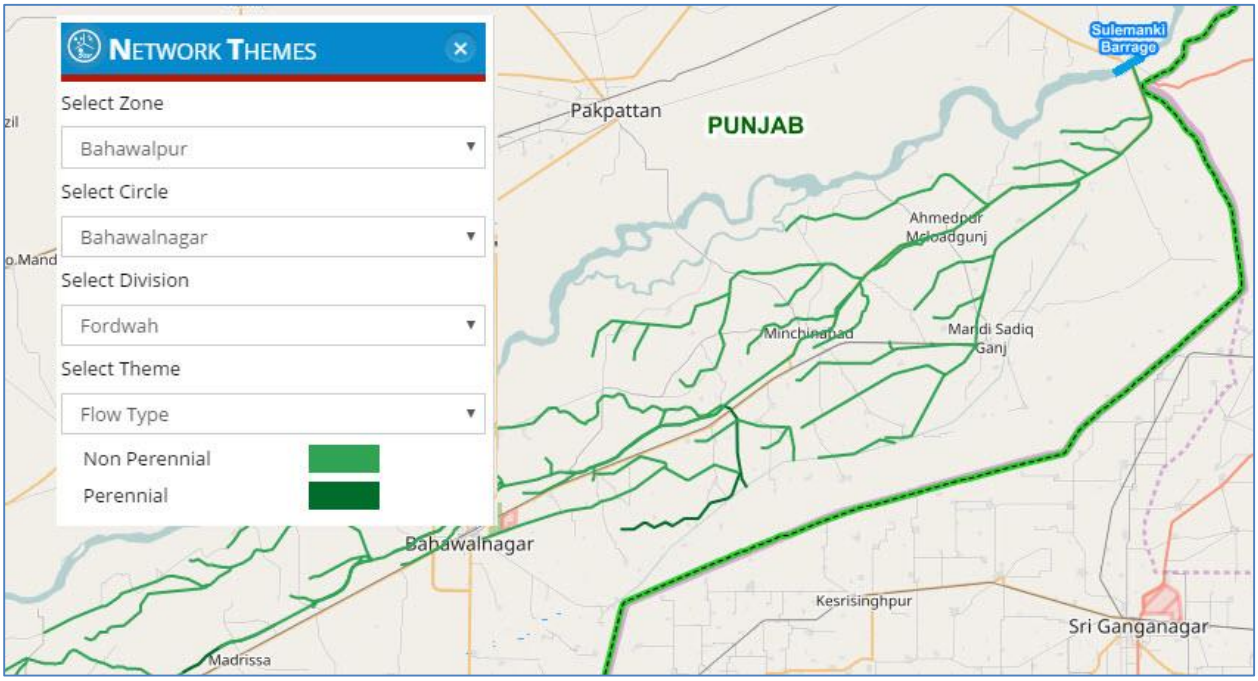
- Select circle from the <Select Circle> dropdown.
- System will update the map extent according to selected circle.
- On selection of circle, relevant divisions are populated in the division dropdown.

3

- Select division from the <Select Division> dropdown.
- System will update the map extent according to selected division.
- System will populate the themes in the theme dropdown.

4

- Select theme from the <Select Theme> dropdown.
- System will apply the theme on selected division's irrigation network and relevant legend will be shown under the theme dropdown.



1.2.7.15 Water Theft

The “Water Theft” tool is used to view the theft location on map.

Business User:

Any user can access “Water Theft” widget who has access to open the web GIS application.

Pre-Requisite: Web GIS application should open.
How to Access: Main Menu -> Water Theft.

User will drag mouse on main menu and then click on “Water Theft”. “Water Theft” widget will open.

1

- Select zone, other than value ‘All’, from the <Select Zone> dropdown.
- System will update the map extent according to selected zone.
- On selection of zone, circles dropdown will enable and relevant circles are populated in the circle dropdown.
- If user will select value ‘All’ from the <Select Zone> dropdown, circle dropdown will disable.

2

- Select circle, other than value ‘All’, from the <Select Circle> dropdown.
- System will update the map extent according to selected circle.
- On selection of circle, division dropdown will enable and relevant divisions are populated in the division dropdown.
- If user will select value ‘All’ from the <Select Circle> dropdown, division dropdown will disable.

3

- Select division, other than value ‘All’, from the <Select Division> dropdown.
- System will update the map extent according to selected division.
- On selection of division, channel dropdown will enable and relevant channels are populated in the channel dropdown.
- If user will select value ‘All’ from the <Select Circle> dropdown, channel dropdown will disable.

4

- Select channel from the <Select Channel> dropdown.
- System will update the map extent according to selected channel.

5

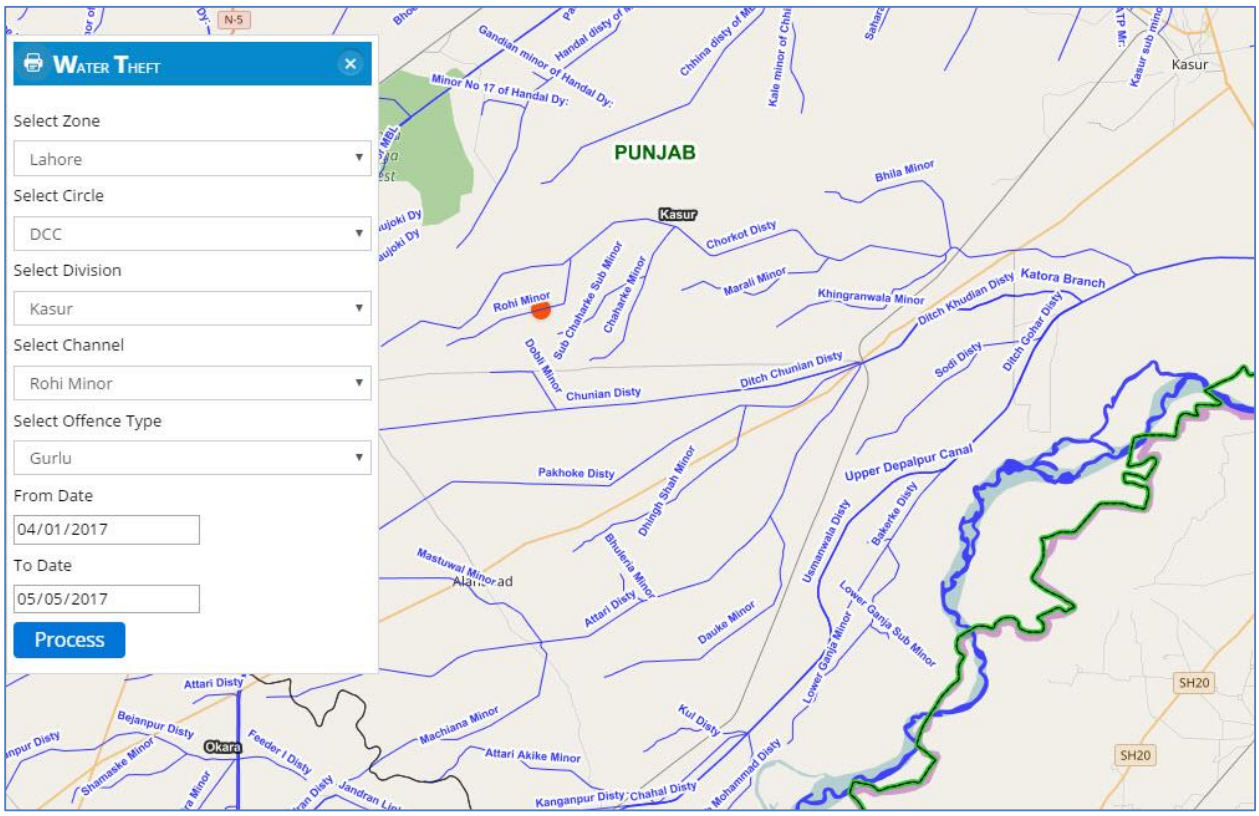
Select start date from the <Select Start Date> dropdown.

6

Select end date from the <Select End Date> dropdown.

7

- Press <Process> button.
- System will retrieve the water theft(s) with their location from the DB and display on map.



On widget load system will automatically retrieve all offences of last seven (7) days.

1.2.7.16 Daily Data

The “Daily Data” tool is use to present Inflow, Outflow, Reservoir level and Discharges in graphical form. Such data can be view in specific date range as well as to compare data in multiple years.

Business User:

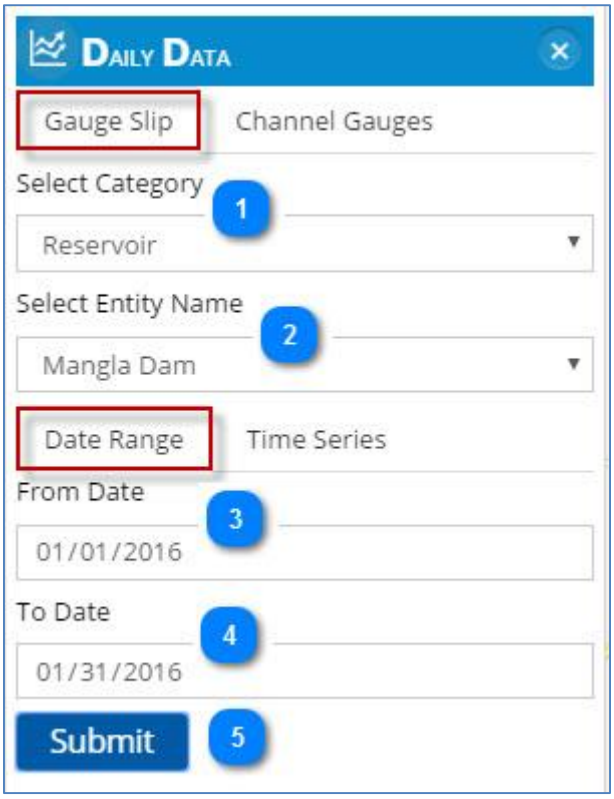
Any user can access “Daily Data” widget who has access to open the web GIS application.

Pre-Requisite: Web GIS application should open.
How to Access: Main Menu -> Daily Data.

User will drag mouse on main menu and then click on “Daily Data”. “Daily Data” widget will open.

Gauge Slip

In “Gauge Slip”, user can view data on the basis of Date Range or Time series. To view data in particular Date Range, user needs to select “Date Range” tab. Time series tab facilitate the use to compare data in multiple years.



Date Range

1

- Select category from the <Select Category> dropdown.

- On selection of category, relevant Entity Names will populate in the entity names dropdown.

2

- Select Entity from the <Select Entity Name> dropdown.
- System will update the map extent according to selected entity name.

3

Select from date from the <From Date> dropdown.

4

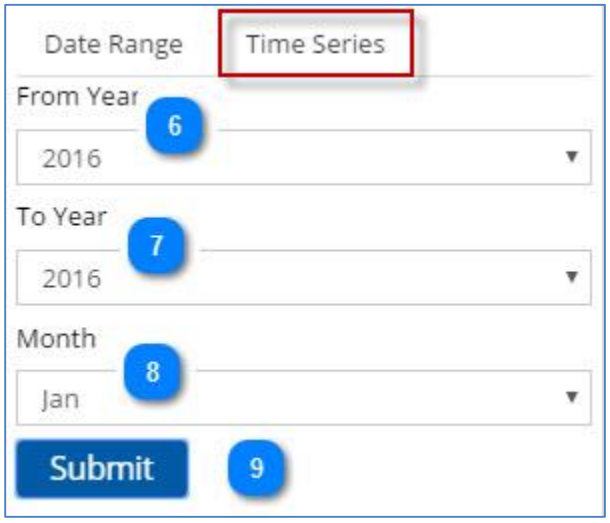
Select to date from the <To Date> dropdown.

5

- Press <Process> button.
- System will retrieve the Inflow, outflow and Reservoir level from the DB and display in form of graph in separate window.

Time Series

Select category and entity name from respective dropdowns and then select <Time Series> tab.



6

Select year from <From Year> dropdown.

7

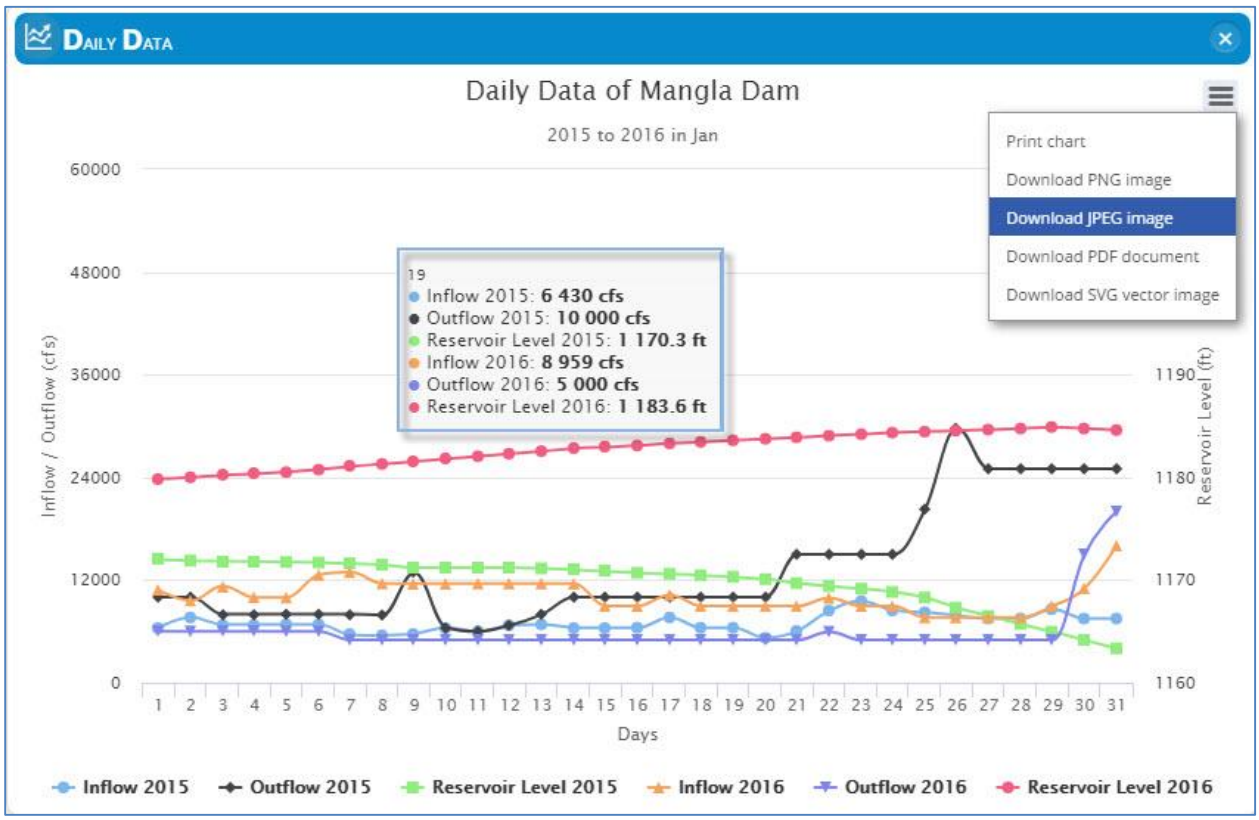
Select year from <To Year> dropdown.

8

Select month from <Month> dropdown.

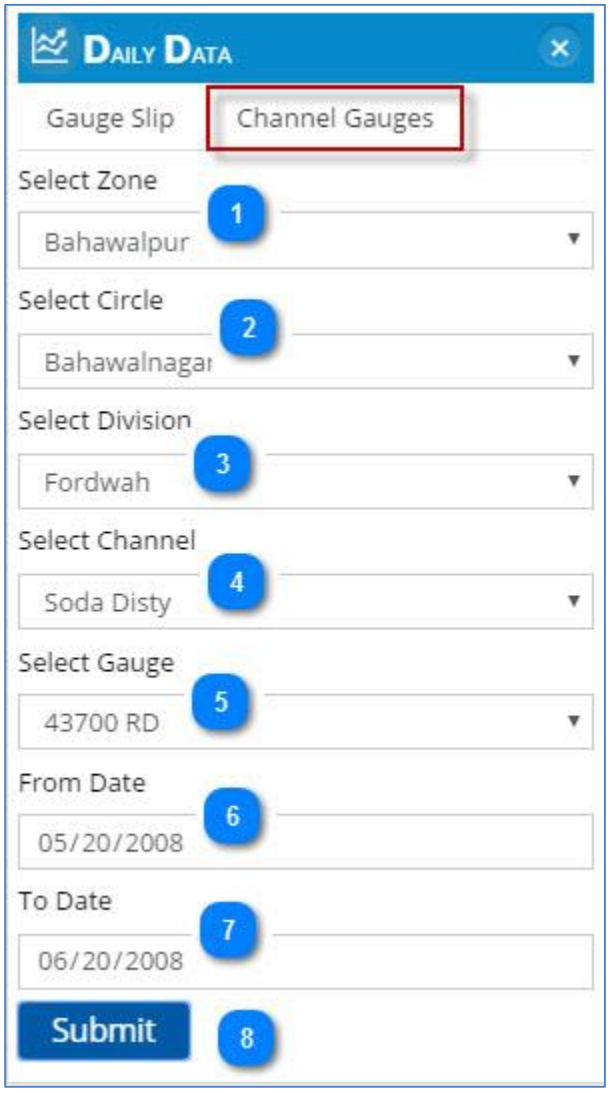
9

- Press <Process> button.
- System will retrieve the Inflow, outflow and Reservoir level from the DB and display in the form of graph in separate window.



Channel Gauges

In “Channel Gauges”, user can view discharges information on specific channel with in specific Date Range.



Date Range

1

- Select zone from <Select Zone> dropdown.
- On selection of zone, relevant circles will populate in the circles dropdown.
- System will update the map extent according to selected zone.

2

- Select circle from <Select Circle> dropdown.
- On selection of circle, relevant divisions will populate in the circles dropdown.
- System will update the map extent according to selected circle.

3

- Select division from <Select Division> dropdown.
- On selection of division, relevant channels will populate in the channel dropdown.
- System will update the map extent according to selected division.

4

- Select channel from <Select Channel> dropdown.
- On selection of channel, relevant RDs of gauges will populate in the gauge dropdown.
- System will zoom at selected RD.

5

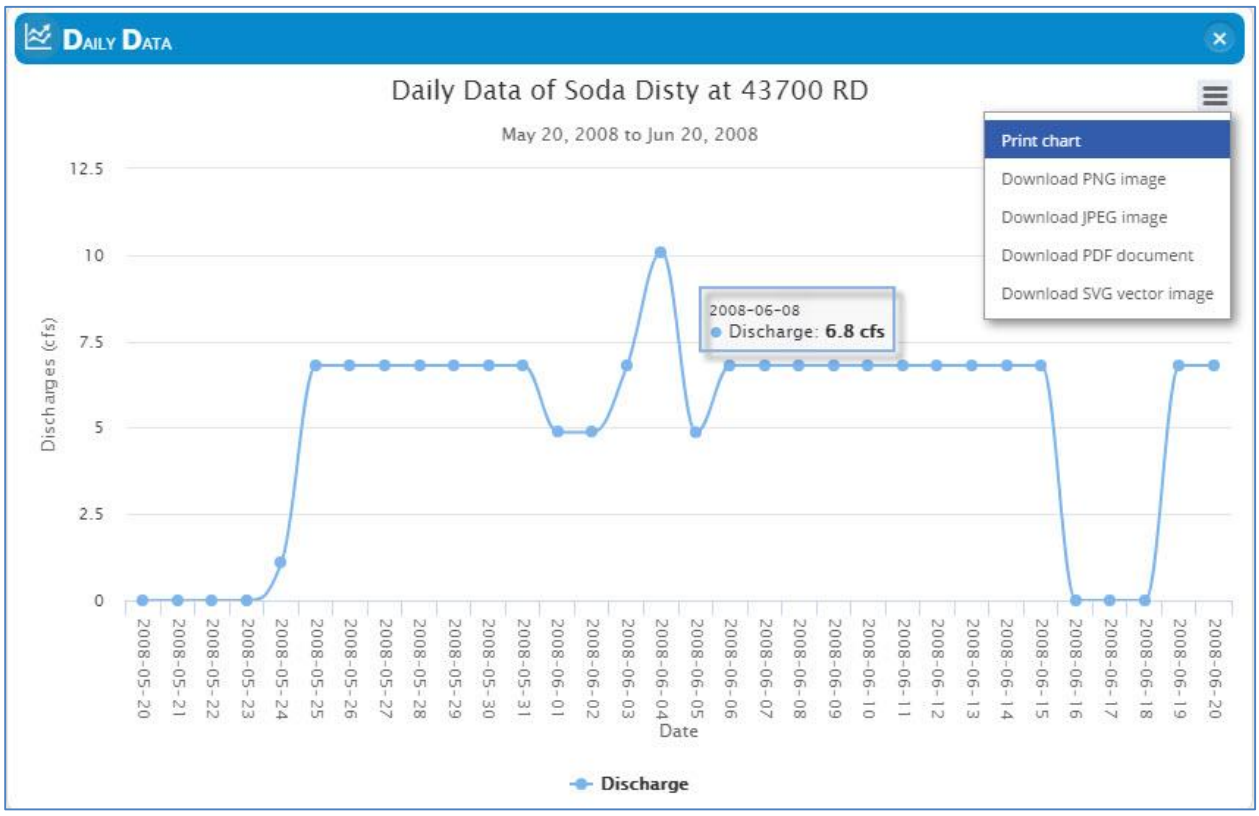
Select date from <From Date> dropdown.

6

Select date from <To Date> dropdown.

7

- Press <Process> button.
- System will retrieve the discharge information from the DB and display in form of graph in separate window.



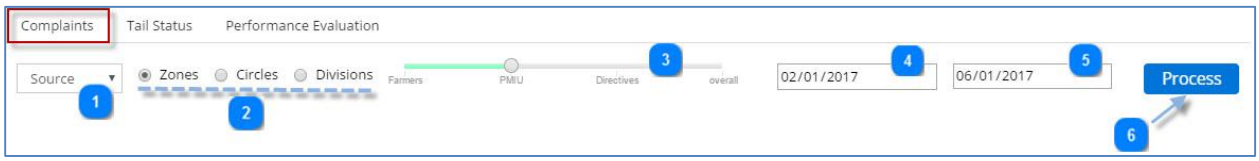
1.2.7.17 Reports

Following reports are available in WEB GIS application.

- Complaints
- Tail Status
- Performance Evaluation

1.2.7.17.1 Complaints

“Complaints” report use to display the complaints locked by the different sources at different irrigation boundaries. And user is also able to view the complaint on the basis of different complaints type.



1

Select category from Category dropdown.

2

Select irrigation boundary level (Zone, Circle or Divisions).

3

Select option from slider.

4

Select date from <From Date> dropdown

5

Select date from <To Date> dropdown.

6

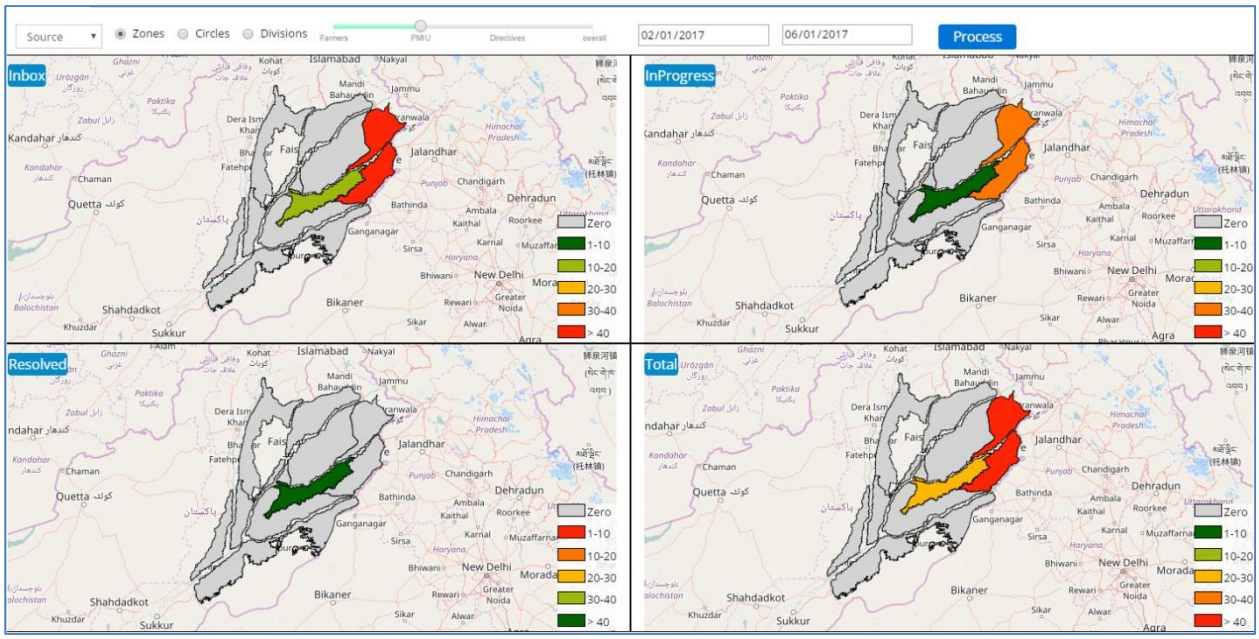
- Press <Process> button.
- System will retrieve the complaint information from the DB and display on the map.

Business User:

Any user can access “Complaints” report who has access to open the web GIS application.

Pre-Requisite: Web GIS application should open.
How to Access: Main Menu -> Reports -> Complaints.

User will click on “Complaints” tab. System will activate the subjected tab.



1.2.7.17.2 Tail Status

The “Tail Status” report is used to check the status of channel’s tail.

Business User:

Any user can access “Tail Status” report who has access to open the web GIS application.

Pre-Requisite: Web GIS application should open.

How to Access: Main Menu -> Reports -> Tail Status.

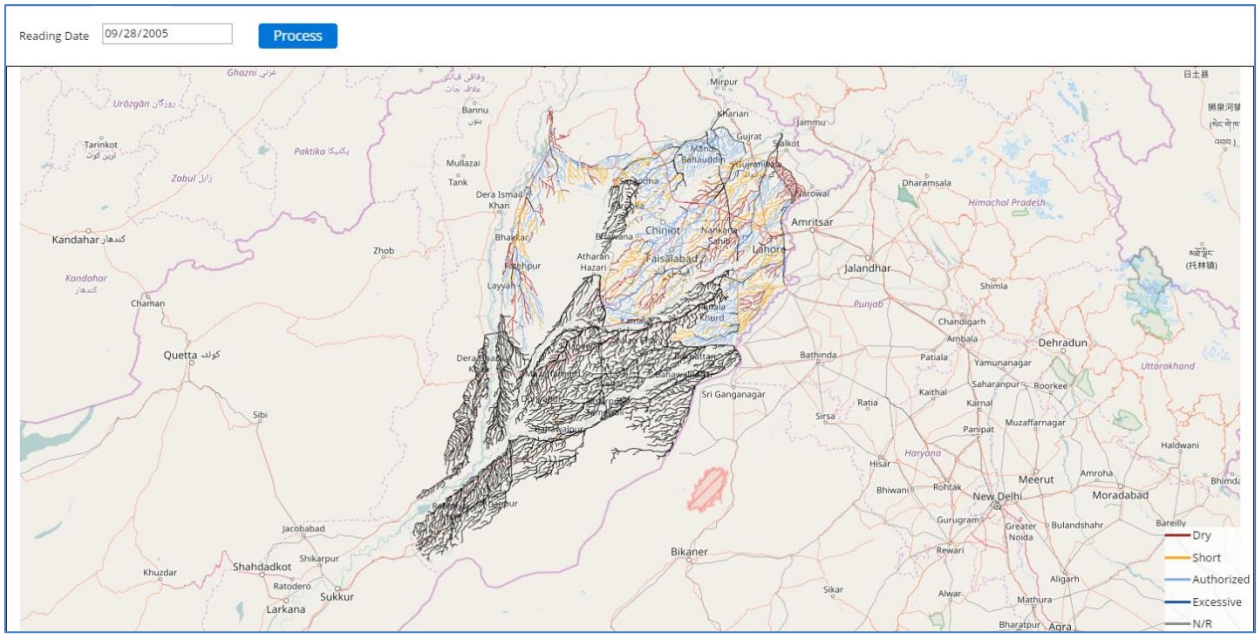
User will click on “Tail Status” tab. System will activate the subjected tab.

1

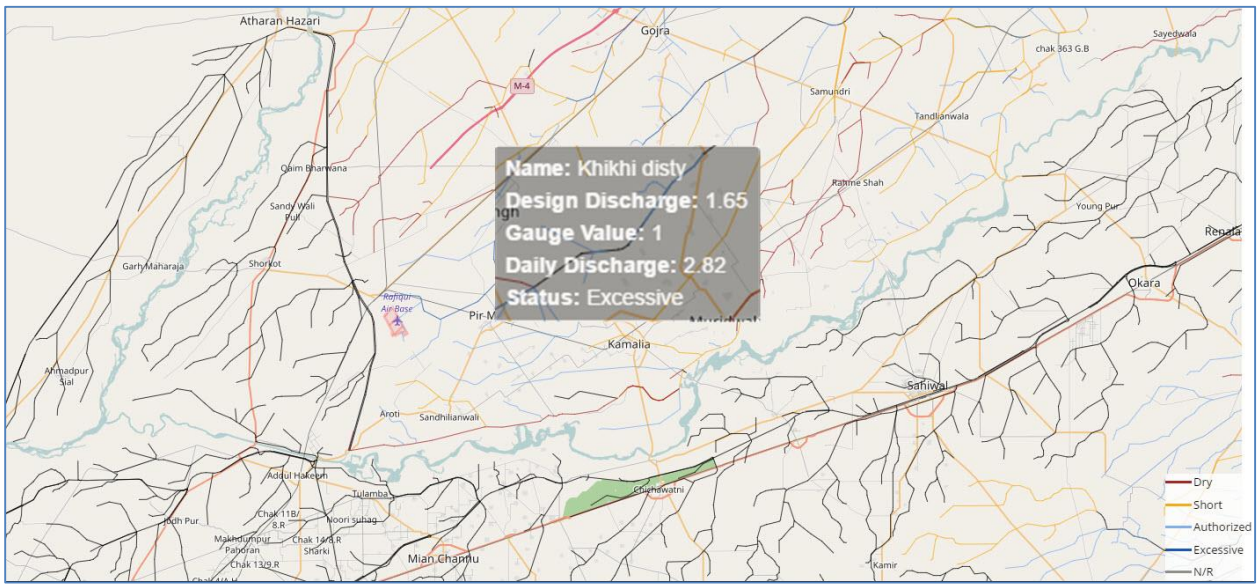
- Select Date from <Reading Date> dropdown.

2

- Click on <Process> button.
- System will get the channel wise Tail Statuses from data base and highlight the channels on the map according to provided legend.

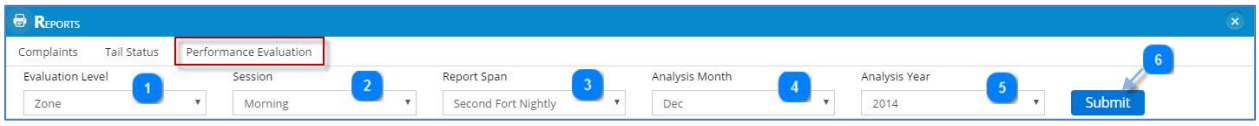


By using mouse hover, user can view the values of specific channel properties like Name, Design Discharge etc.



1.2.7.17.3 Performance Evaluation

The “Performance Evaluation” report is used to calculate the Rank on the basis of performance of evaluation level (Zone, Circle, Divisions).



Business User:

Any user can access “Performance Evaluation” report who has access to open the web GIS application.

Pre-Requisite: Web GIS application should open.
How to Access: Main Menu -> Reports -> Performance Evaluation.

User will click on “Performance Evaluation” tab. System will activate the tab.

1

- Select level from <Evaluation Level> dropdown.

2

- Select Session from <Session> dropdown.

3

- Select span from <Report Span> dropdown.

4

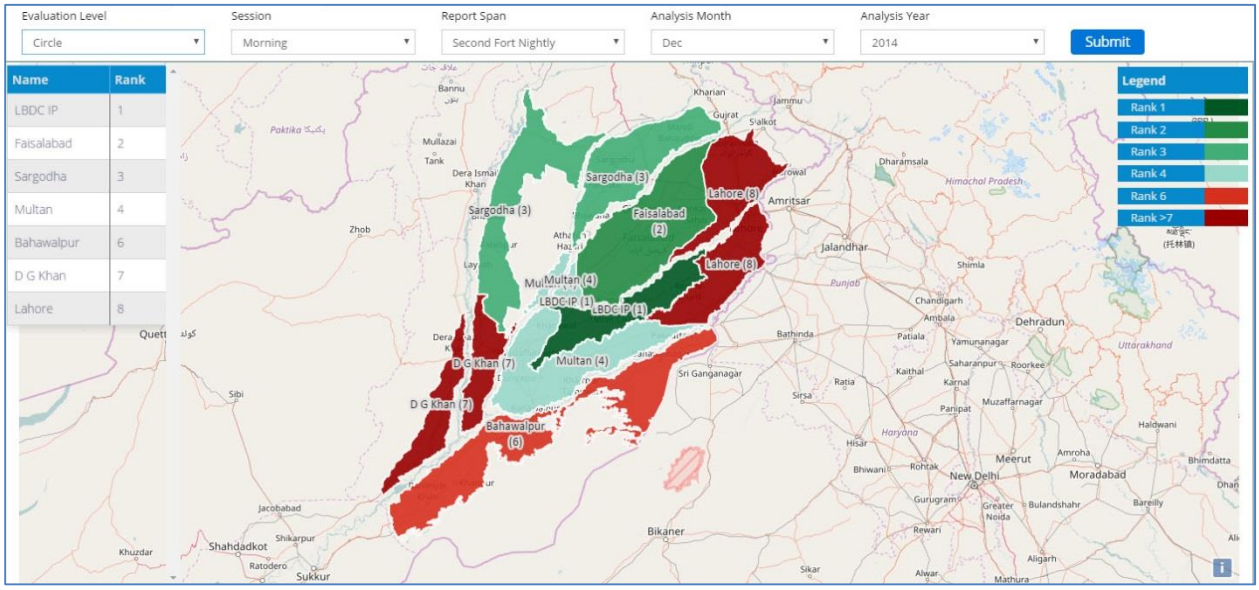
- Select month from <Analysis Month> dropdown.

5

- Select year from <Analysis Year> dropdown.

6

- Click on <Submit> button.
- System will calculate the Ranks on the basis of selected parameters and display in the form of spatial data as well as tabular data.
- System will also show the legend of Ranks.



User can view last six months available Ranks by clicking on specific Zone, Circle or Division.