

User's Manual

DESKTOP BASED GEOGRAPHICAL MANAGEMENT INFORMATION SYSTEM (GMIS 2018)

Submitted to

Irrigation and
Water Resources
Management Project

Department of Irrigation
Jawalakhel, Lalitpur

Prepared by

Water Modeling Solutions Pvt. Ltd.

Gwarko-8, Lalitpur, Nepal

Tel: 01-6214408

Email: info@wms.com.np

Url: www.wms.com.np



DESKTOP BASED GEOGRAPHICAL MANAGEMENT INFORMATION SYSTEM (GMIS 2018)

Development team

- Jayaram Gautam (Team Leader)
- Kunjan Pandey (Database Expert)
- Marut Dhungana (Lead Programmer)
- Awadh Chaudhary (Database and UI Programmer)
- Ravindra Mahaseth (Database and UI Programmer)
- Shirish Maharjan (GIS Programmer)
- Utsav Bhattarai (Water Resources Engineer)
- Rabindra Acharya (MIS Expert)



Prepared by

Water Modeling Solutions Pvt. Ltd.

Gwarko-8, Lalitpur, Nepal

Tel: 01-6214408

Email: info@wms.com.np

Url: www.wms.com.np



Desktop Based Geographical Management Information System (GMIS)

Apart from infrastructure rehabilitation and improvement of irrigation schemes, it is also necessary that any successful project has an accountability of systematically collecting and storing spatial and non-spatial data and information pertaining to sub projects. In this context, the Irrigation and Water Resource Project (IWRMP) had developed a first version of the Desktop based Geographical Management Information System (GMIS) application through outsourcing during 2009 to 2013. The desktop GMIS application had features of capturing information related to subproject type- surface and ground water with additional information related to subproject location, social, agricultural, engineering, economic as well as implementation and status. The mapping component were used to capture/delineate command area, canal alignment and structures. In addition, it also had functionalities of query, visualization and reporting. Although this version of the software was tested and applied in some project areas, it was discontinued due to some severe limitations in its application – mainly related to the use of proprietary software components and engines.

This updated desktop based **GMIS 2018** was conceptualized by IWRMP in order to overcome the limitations of the earlier version and was outsourced for development in 2017. **GMIS 2018** has been developed maintaining the integrity of its predecessor, keeping intact all the functionalities while using latest programming platform, methodology and completely free open source software components and engines. Further, errors and other redundancies in the earlier version of the system have been successfully rectified in this version.

How to use this Manual ?

The manual has been developed for the convenience of the desktop based GMIS user to use the **GMIS 2018**. It is targeted for data entry level technicians as well as database maintaining level professionals within the Department of Irrigation (DOI). Also, it can be a quick reference to the decision making/executive level officers to quickly view and map out the summary of desired projects within a spatial domain.

The manual describes in a step-by-step manner how a new sub-project can be created, how and existing sub-project can be edited and how detailed data is to be entered into the system. It also highlights the use of the GIS mapping component in which the user can add in shape files and create features manually. And finally, the manual describes about the reporting features of the GMIS.

Licensing

This desktop based GMIS 2018 uses the following free third party libraries. The developed application is automatically bound by the terms and conditions of licensing and use of the respective third-party libraries:

Component	Requirement
.NET Framework	<ul style="list-style-type: none">• NET 3.5 SP1 is a requirement for SQL Server 2014 when you select Database Engine, Reporting Services, Master Data Services, Data Quality Services, Replication, or SQL Server Management Studio, and it is no longer installed by SQL Server Setup.• If you run Setup and you do not have .NET 3.5 SP1, SQL Server Setup requires you to download and install .NET 3.5 SP1 before you can continue with the SQL Server installation. (Install .NET 3.5 SP1 from Microsoft .NET Framework 3.5 Service Pack 1.) The error message includes a link to the download center, or you can download .NET 3.5 SP1 from Windows Update. To avoid interruption during SQL Server Setup, you can download and install .NET 3.5 SP1 before you run SQL Server Setup.• If you run Setup on a computer with Windows Server 2008 R2 SP1 or Windows 8, you must enable .NET Framework 3.5 SP1 before you install SQL Server 2014.• If there is no internet access, you must download and install .NET Framework 3.5 SP1 before you run Setup to install any of the above mentioned components. For more information about the recommendations and guidance on how to acquire and enable .NET Framework 3.5 on Windows 8 and Windows Server 2012, see Microsoft .NET Framework 3.5 Deployment Considerations(http://msdn.microsoft.com/library/windows/hardware/hh975396).
Windows PowerShell	SQL Server 2014 does not install or enable Windows PowerShell 2.0; however Windows PowerShell 2.0 is an installation prerequisite for Database Engine components and SQL Server Management Studio. If Setup reports that Windows PowerShell 2.0 is not present, you can install or enable it by following the instructions on the Windows Management Framework page.

Component	Requirement
Network Software	Supported operating systems for SQL Server 2014 have built-in network software. Named and default instances of a stand-alone installation support the following network protocols: Shared memory, Named Pipes, TCP/IP and VIA.
Hard Disk	<p>SQL Server 2014 requires a minimum of 6 GB of available hard-disk space.</p> <p>Disk space requirements will vary with the SQL Server 2014 components you install. For more information, see Hard Disk Space Requirements (32-Bit and 64 Bit) later in this topic. For information on supported storage types for data files, see Storage Types for Data Files.</p>
Monitor	SQL Server 2014 requires Super-VGA (800x600) or higher resolution monitor.
Crystal Reports Requirements	<ul style="list-style-type: none"> • Processor: AMD or Intel based processors, Dual Core CPU • Operating Systems: Windows 7 SP1, Windows 8, Windows 10; Windows Server versions 2008 SP2, 2008 R2 SP1, 2012 • Data sources: Native, ODBC, OLE DB, and JDBC connectivity to relational, OLAP, Web services, XML, salesforce.com driver, legacy and enterprise data sources.

The desktop based **GMIS 2018** application is developed for public release through Department of Irrigation (DOI), Government of Nepal. DOI is solely responsible for the content of the software. The software may not be modified, abridged, decompiled, disassembled, obscured or reverse engineered. The user is solely responsible for the content, interactions, and effects of any and all amendments, if present, whether they be extension modules, language resource bundles, scripts or any other amendment.

Abbreviations

AMIS	Agency Managed Irrigation System
DOI	Department of Irrigation
FMIS	Farmer Managed Irrigation Schemes
GCA	Gross Command Area
GIS	Geographic Information System
GUI	Graphical User Interface
GW	Groundwater
ha	hectare
IWRMP	Irrigation & Water Resources Management Project
km	kilometer
lps	liters per second
m ³ /s	cubic meters per second
m	meter
NCA	Net Command Area
RS	Remote Sensing
UI	User Interface
WMS	Water Modeling Solutions Pvt. Ltd.
WUA	Water Users' Association

Table of Contents

1. System Requirements	1
2. Installation and Uninstall Procedure.....	2
3. Getting Started with GMIS 2018	3
4. Exploring the Components of GMIS Interface.....	4
5. Creating a New Project	5
6. Opening an Existing Project.....	7
7. Project Information.....	8
8. Location.....	10
9. Social Information	12
10. Agricultural Information.....	14
11. Engineering Information.....	16
12. Ground Water Project Information	19
13. Economic Information	22
14. Implementation Information	24
15. Salient Features	26
16. Document Uploads	27
17. GIS Mapper.....	28
18. Print Layout of Maps	36

1. System Requirements

Before installing the desktop based GMIS 2018 application, the user needs to make sure that his/her computer has at least the minimum required hardware and software. In order to get the maximum performance from the application, recommended system requirements are given below.

Hardware Requirement

Processor	2 GHz or higher quad core processor
Hard disk	50 GB (Min)
RAM	4GB (Min)
Graphics	Microsoft DirectX 9 graphics device with WDDM driver
Architecture	64-BIT / 32-BIT

Software Requirement

- Windows 7 operating system (minimum requirement)
- SQL Server 2008 or above
- .Net Framework Version 4.5 or above

The developer team does not take responsibility over the developed application's performance and is not to be held liable if the GMIS application is installed, tested and used on a desktop computer that does not meet the above mentioned requirements.

2. Installation and Uninstall Procedure

The user cannot simply copy files from the installation DVD and paste it to the desktop computer. The user must use the Setup program, which decompresses and installs the required files to the appropriate directories, as well as registers certain files (.dll, etc.) with the operating system. As the GMIS 2018 makes use of SQL Server and SQL Studio for database, they have to be installed into the computer before installing the GMIS 2018 software.

Installation procedure of these prerequisite softwares are given separately in another document.

Once the prerequisite softwares are successfully installed into the system, GMIS 2018 shall be installed following the step-by-step procedures shown below:

Installation

1. Double click in the exe file of GMIS 2018
2. Program installer will guide you through the installation process. Follow the on-screen instructions carefully and provide input wherever required.

Uninstall

1. Open Control Panel.
2. Click Program & Features.
3. Select GMIS 2018.
4. Click Uninstall.

3. Getting Started with GMIS 2018

After successful installation of the application into your computer, you can start the GMIS application in the following way:

1. Go to Start Menu
2. Click on All Programs
3. Click on the GMIS 2018 icon (Alternatively you can also directly click on the GMIS 2018 icon located in your desktop)
4. Then login window appears (as shown in Fig. 1 below)
5. Please enter user name and password that has been provided to you to login into the program

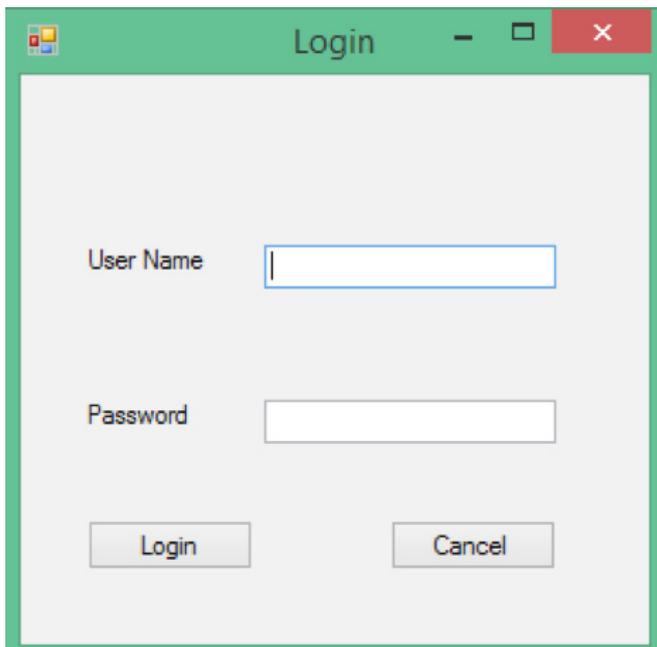


Fig. 1: Login dialog box

4. Exploring the Components of GMIS Interface

After login, the main GMIS interface is displayed with the background image and six buttons in the menu bar (Fig. 2). The user can carry out the respective tasks of creating, opening/editing, managing, logging out and viewing the details and help of this application by clicking on the respective buttons. This document explains to the users how to use GMIS 2018 application in a step-by-step manner through the following:

- New Project
- Open Project
- Log Out
- About
- Help

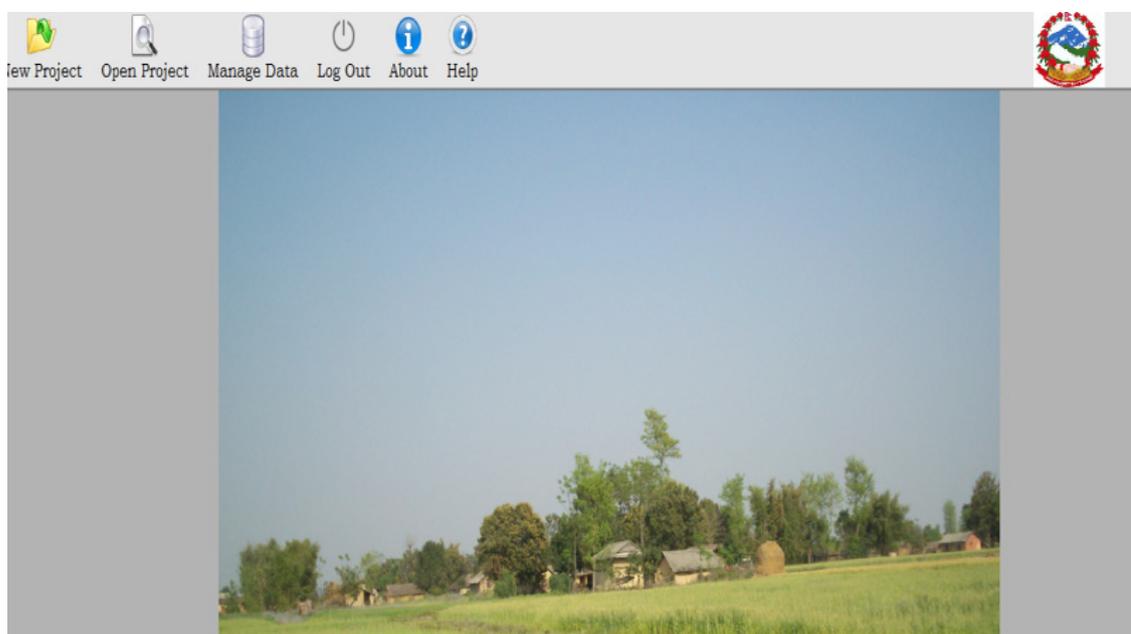


Fig. 2: GMIS main interface

5. Creating a New Project

This module is used to create a New Sub-Project for the specified Program as shown in Fig. 3.

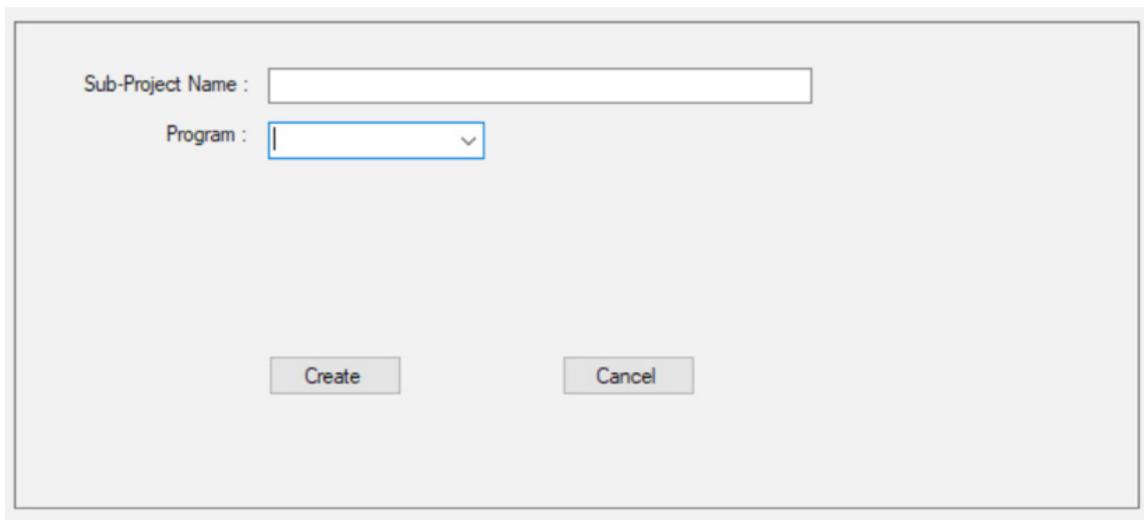
The image shows a software window titled "New Sub-Project". It contains two input fields: "Sub-Project Name" with a text box, and "Program" with a dropdown menu. Below these fields are two buttons: "Create" and "Cancel".

Fig. 3: New Sub-Project window

The user needs to enter the following information systematically in this window as shown below:

- Type the Sub-Project name.
- Select the Program from the drop-down menu.
- Click Create button to create a new sub-project and start entering the information
- Click Cancel if you want to logout without creating any new sub-project.

After creating a new project, the user will see a list of buttons on the left hand side which needs to be clicked to enter the data of the Sub Project (Fig. 4). When no data is entered there is a red cross alongside the button. It automatically changes to a green tick once data is entered and saved into the database.

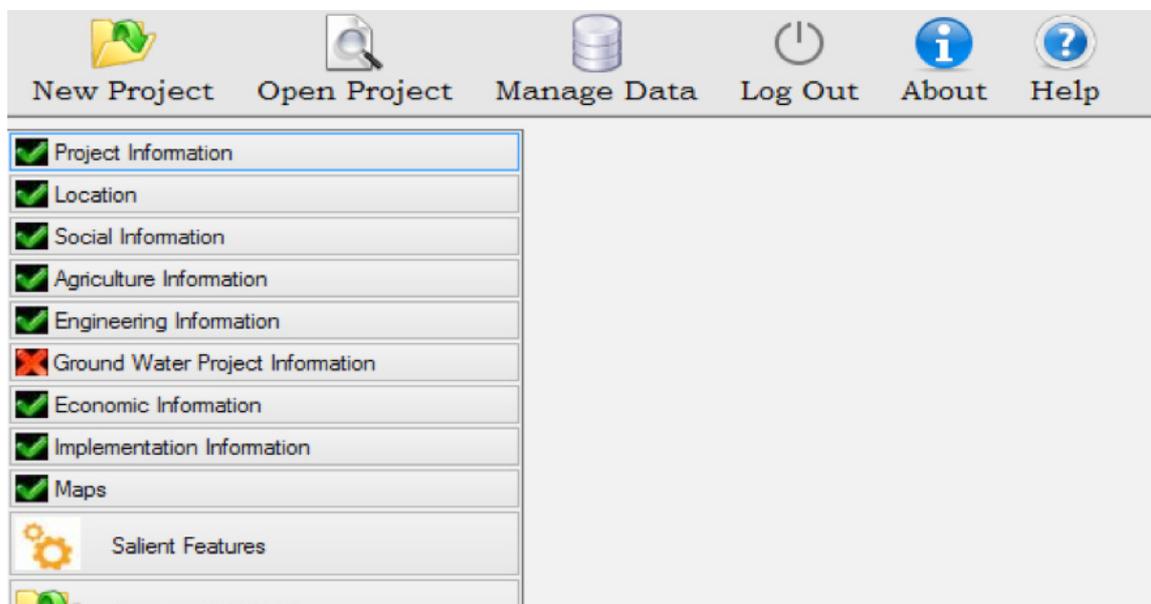


Fig. 4: List of buttons for data entry

All the features corresponding to each button for data entry in the list are explained separately in the following sections for the convenience of the user.

6. Opening an Existing Project

This module is used to open an existing Sub-Project for viewing or editing its data as shown in Fig. 5.

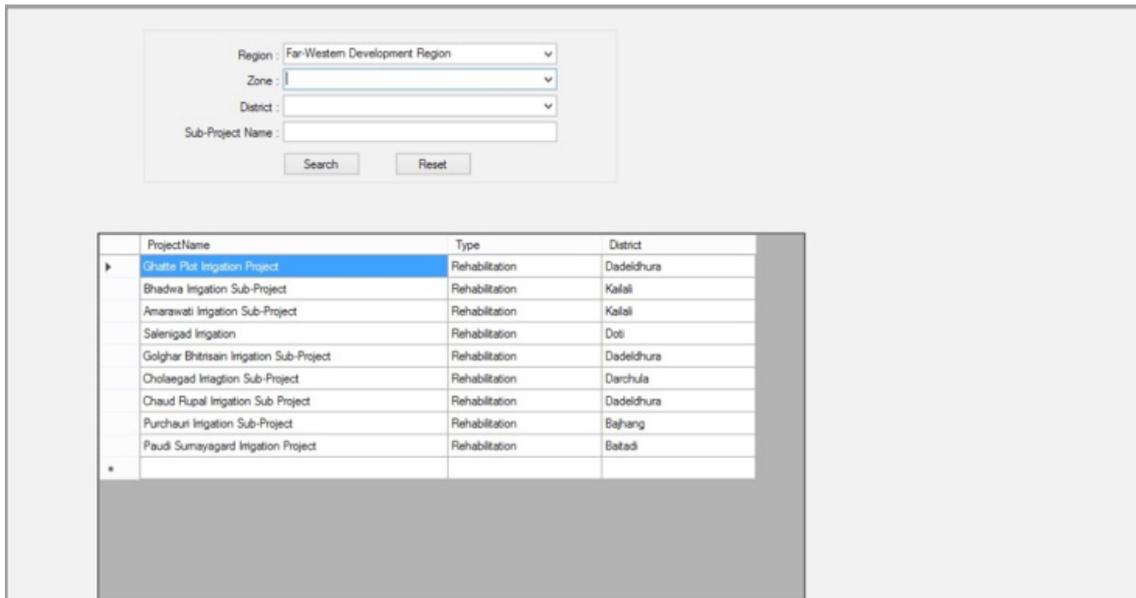


Fig. 5: Open Existing Sub-Project window

The user can search for the existing sub-projects by *Region*, *Zone*, *District* and *Sub-project Name*. It has to be noted that the sub-projects should have already been previously created and stored in the database. To view all the sub-projects, the user can click on the table on the lower side of the screen and then simply click on the Search button above. All the sub-projects stored in the local database will be displayed in the list (as shown in the above screenshot). Then the user can click on any of the desired projects from the list and go the other sections for data entry and editing. From here onwards, the user will get to view the same screen as shown in Fig. 4. All the steps after this is the same for *Creating a New Project* or *Opening and Editing an Existing Project*.

7. Project Information

The user needs to enter the project information as shown in Fig. 6.

Fig. 6: Project information entry screen

The user needs to fill in the respective fields with the appropriate data either by typing or selecting from the drop-down menu, whichever is applicable.

S.N.	Field Name	Data Type	Input Method	Example
1	GCA (Gross Command Area in ha)	Number (Real)	To be typed by the user	150.5
2	NCA (Net Command Area in ha)	Number (Real)	To be typed by the user	120.8
3	Program	Text	To be selected from dropdown menu To be typed by the user if Add/Edit Program is selected	IWRMP
4	Sub Project Type	Text	To be selected using radio button	New
5	Status of Project	Text	To be selected from dropdown menu	Pre-feasibility
6	Sub Project Comment	Text	To be typed by the user	The project was constructed in 2000 but later destroyed and again rehabilitated in 2010.
7	Prepared by	Text	To be typed by the user	Ghatte Kulo WUA
8	Recommended by	Text	To be typed by the user	DDC
9	Approved by	Text	To be typed by the user	DTO
10	Approved date, Start date, End date	Date (YYYY-MM-DD)	To be selected from calendar	2011-04-12

After all the data has been entered, the following steps need to be followed.

- Click *Save* button to save the information.
- Click *Reset* button to clear and enter again.
- Click *Cancel* button to cancel.

8. Location

The user needs to enter the data for Location as shown in Fig. 7.

The screenshot shows the 'Location' information entry screen. On the left is a sidebar with a list of information categories, each with a checkbox: Project Information, Location (checked), Social Information, Agriculture Information, Engineering Information, Ground Water Project Information (unchecked), Economic Information, Implementation Information, Maps, Salient Features, and Documents Upload. The main area is titled 'Zone, District, Local Govt. Body, Ward No:' and contains a table with the following data:

Zone	District	Local Govt. Body	Wards
Mahakali	Dadeldhura	SHIRSHE	9

Below the table are several input fields:

- Ecological Region : Hill (dropdown menu)
- Nearest Road Head : Jogbuda (text field)
- Distance : 10.000 Km (text field)
- Nearest Airport : Dhangadhi (text field)
- Distance : (text field) Km
- Nearest Market : Dadeldhura Bazar (text field)
- Distance : (text field) Km
- Major River Basin : (dropdown menu)
- Local River Basin : (text field)
- River Source : Rangoon Khola (text field)

At the bottom of the form are three buttons: Save, Reset, and Cancel.

Fig. 7: Location information entry screen

The user needs to fill in the respective fields with the appropriate data either by typing or selecting from the drop-down menu, radio button, etc. whichever is applicable. The following data needs to be entered:

S.N.	Field Name	Data Type	Input Method	Example
1	District	Text	To be selected from drop-down menu	Dhankuta
2	Local Govt. Body	Text	To be typed by the user	Bhimeshwor Gaupalika
3	Ward No.	Number (Integer)	To be typed by the user	10
4	Nearest Road Head, Nearest Airport, Nearest Market, Local River Basin, River Source	Text	To be typed by the user	Ram Janaki Sadak
5	Distance (km)	Number (Real)	To be typed by the user	Puwa Khola
6	Ecological Region	Text	To be selected from drop-down menu	15.6
7	Major River Basin (View button is available alongside to viewthe river basin reference map)	Text	To be selected from drop-down menu	Hill
8	Local River Basin	Text	To be typed by the user	Ghatte Khola Basin
9	River Source	Text	To be typed by the user	Rangoon Khola

After all the data has been entered, the following steps need to be followed.

- Click *Save* button to save the information.
- Click *Reset* button to clear and enter again.
- Click *Cancel* button to cancel.

9. Social Information

The user needs to enter the social data as shown in Fig. 8 below.

The screenshot displays the 'Social Information' entry screen. On the left is a sidebar with a list of menu items: Project Information, Location, Social Information (highlighted), Agriculture Information, Engineering Information, Ground Water Project Information, Economic Information, Implementation Information, Maps, and Summary Reports. The main content area includes the following fields and tables:

- Number of Household :** 110
- Women Headed Household :** [empty]
- Total Population :** 0
- Male :** [empty]
- Female :** [empty]
- Major Source of Income :** -- Select --
- Annual Income per Family :** [empty]
- From Agriculture :** [empty]
- From Other Sources :** [empty]
- Literacy Rate :** [empty]
- Male :** [empty]
- Female :** [empty]
- Ethnic Groups :** A table with columns: Name, Total Number, Percentage. It is currently empty.
- Annual Migration In :** [empty]
- Annual Migration Out :** [empty]
- Year of Survey :** 2017
- Land Tenure (Household Nos) :** A table with columns: Category, Number, Percentage.

	Number	Percentage
▶ Land Owners	100	100.00
Tenants		
Owner with Tenants		
Landless		
Total	100	100
- Farm Size (Household Nos) :** A table with columns: Category, Number, Percentage.

	Number	Percentage
▶ small (less than 0.5 hectare)	75	75.00
medium (0.5 - 1.0 hectare)	20	20.00
large (1.0 - 1.5 hectare)	5	5.00

Fig. 8: Social Information entry screen

The user needs to fill in the respective fields with the appropriate data either by typing or selecting from the drop-down menu, whichever is applicable. The following data needs to be entered:

S.N.	Field Name	Data Type	Input Method	Example
1	Number of Household	Number (Integer)	To be typed by the user	10
2	Woman Headed HH	Number (Integer)	To be typed by the user	5
3	Year of Survey	Date (YYYY)	To be typed by the user	2017
4	Male	Number (Integer)	To be typed by the user	2000
5	Female	Number (Integer)	To be typed by the user	1800
6	Total Population		Auto-calculated	3800

S.N.	Field Name	Data Type	Input Method	Example
7	Major Source of Income	Text	To be selected from drop-down menu	Agriculture
8	Annual income per family (Rs), From Agriculture (Rs), From Other Sources (Rs)	Number (Real)	To be typed by the user	100000
9	Literacy Rate (%), Male (%), Female (%)	Number (Real)	To be typed by the user	43.5%
10	Ethnic Group Name	Text	To be selected from drop-down menu	Dhimal
11	Total Number	Number (Integer)	To be typed by the user	200
12	Percentage		Auto-calculated	4.6%
13	Annual Population Migration In	Number (Integer)	To be typed by the user	1000
14	Annual Population Migration Out	Number (Integer)	To be typed by the user	1500
15	Land Tenure (Household Nos.)	Text	To be selected from drop-down menu	Land Owners
16	Number	Number (Integer)	To be typed by the user	200
17	Percentage	Number (Real)	Auto-calculated	7.2
18	Farm Size (Household Nos.) Category	Text	To be selected by the user	Large (1.0 – 1.5 hectare)
19	Number	Number (Integer)	To be typed by the user	50
20	Percentage	Number (Real)	Auto-calculated	3.5
21	Annual Food Sufficiency	Text	To be selected from radio button	Sufficient
22	If Deficit is chosen, Number of months	Number (Integer)	To be typed by the user	3

After all the data has been entered, the following steps need to be followed.

- Click *Save* button to save the social information. The user will be able to see all the added data in tabular format in the same screen.
- Click *Reset* button to clear and enter again.
- Click *Cancel* button to cancel.

10. Agricultural Information

The user needs to enter the agricultural data as shown in Fig.9 below.

Fig. 9: Agricultural information entry screen

The user needs to fill in the respective fields with the appropriate data either by typing or selecting from the drop-down menu, whichever is applicable. The following data needs to be entered:

S.N.	Field Name	Data Type	Input Method	Example
1	Crop Name	Text	To be selected from drop-down menu	Paddy
2	Planting date & week	Text	To be selected from drop-down menu	January
3	Harvesting date & week	Text	To be selected from drop-down menu	October
4	Crop area in ha	Number (Real)	To be typed by the user	200.5
5	Average crop yield in ton/ha	Number (Real)	To be typed by the user	4.5

S.N.	Field Name	Data Type	Input Method	Example
6	Average Farm Input Seed in kg/ha	Number (Real)	To be typed by the user	100
7	DAP in kg/ha	Number (Real)	To be typed by the user	85
8	Human labor in mandays/ha	Number (Real)	To be typed by the user	15
9	Organic Manure NRs/ha	Number (Real)	To be typed by the user	5000
10	Potash in kg/ha	Number (Real)	To be typed by the user	60
11	Animal labor days/ha	Number (Real)	To be typed by the user	20
12	Urea in kg/ha	Number (Real)	To be typed by the user	65
13	Machine labor in hours/ha	Number (Real)	To be typed by the user	50
Once the data has been entered for a crop click <i>Add</i> button to store it in grid. The user can then enter the information of another crop.				
The exact same procedure that is mentioned above is to be followed for the <i>Proposed Cropping Pattern</i> also.				
14	Nearest Agriculture Extension Office, Nearest Agro-vet Center	Text	To be typed by the user	Sahabir Agro-Vet Pvt. Ltd.
15	Distance in km	Number (Real)	To be typed by the user	2

After all the data has been entered, the following steps need to be followed.

- Click *Save* button to save the Agricultural information. The user will be able to see all the added data in tabular format in the same screen.
- Click *Reset* button to clear and enter again.
- Click *Cancel* button to cancel.

11. Engineering Information

The user needs to enter the engineering information as shown in Fig. 10 below.

Fig. 10: Engineering information entry screen

The user needs to fill in the respective fields with the appropriate data either by typing or selecting from the drop-down menu, whichever is applicable. The following data needs to be entered:

S.N.	Field Name	Data Type	Input Method	Example
1	River Hydrology Catchment Area in sq. km	Number (Real)	To be typed by the user	122.5
2	River Width at Headworks site in m	Number (Real)	To be typed by the user	30.78
3	Longitudinal Slope of River at Headworks site in 1:n (V:H) format	Number (Real)	To be typed by the user	1000
4	Average Annual Rainfall in mm	Number (Real)	To be typed by the user	1353.7
5	Flood Discharge corresponding to return period of 25 years, 50 years and 100 years in cumecs	Number (Real)	To be typed by the user	1500

S.N.	Field Name	Data Type	Input Method	Example
6	Method of Flood Calculation	Text	To be typed by the user	DHM-WECS Method
7	MIP (2016) Hydrological Region	Number (Integer)	To be selected from the drop-down menu	12
8	River Source	Text	Auto-generated	Ratabhira Khola
9	River Basin	Text	Auto-generated	Khahare Khola Basin
10	Main Canal Information Canal Direction	Text	To be selected from the drop-down menu Click on the <i>Next</i> >> button to toggle between left and right canals	Left
11	Total length in km	Number (Real)	To be typed by the user	20
12	Lined type canal length in km	Number (Real)	To be typed by the user	7.6
13	Unlined type canal length in km	Number (Real)	To be typed by the user	12.4
14	Design discharge in lps	Number (Real)	To be typed by the user	200
15	Top width in m	Number (Real)	To be typed by the user	25.4
16	Bottom width in m	Number (Real)	To be typed by the user	20.2
17	Total depth in m	Number (Real)	To be typed by the user	1.3
18	Longitudinal slope in 1:n (V:H) format	Number (Real)	To be typed by the user	2.5
19	Branch canal length in km	Number (Real)	To be typed by the user	6.8
20	No. of branch canal	Number (Integer)	To be typed by the user	5
21	Major Structure Type	Text	To be selected from the drop-down menu	Super Passage
22	No, of Structure	Number (Integer)	To be typed by the user	3

S.N.	Field Name	Data Type	Input Method	Example
23	Branch Canal information Name of Branch Canal	Number (Real)	To be typed by the user	Bariya
24	Gross Command Area GCA in ha	Number (Real)	To be typed by the user	34.5
25	Cultivable Command Area CCA in ha	Number (Real)	To be typed by the user	28.6
26	Total length of canal in km	Number (Real)	To be typed by the user	3
27	Lined type canal length type in km	Number (Real)	To be typed by the user	1.2
28	Unlined type canal length in km	Number (Real)	To be typed by the user	1.8
29	Design discharge in lps	Number (Real)	To be typed by the user	35.5
30	No of tertiary canals	Number (Integer)	To be typed by the user	6
31	Sub branch length in km	Number (Real)	To be typed by the user	8.6
32	Canal structure	Text	To be typed by the user	Underpassage

After all the data has been entered, the following steps need to be followed.

- Click *Save* button to save the Engineering information. The user will be able to see all the added data in tabular format in the same screen.
- Click *Reset* button to clear and enter again.
- Click *Cancel* button to cancel.

12. Ground Water Project Information

The user needs to enter the groundwater related data for the sub-project as shown in Fig. 11.

Fig. 11: Groundwater information entry screen

The user needs to fill in the respective fields with the appropriate data for each Tubewell (identified by Tubewell Number) either by typing or selecting from the drop-down menu, whichever is applicable. The following data needs to be entered:

S.N.	Field Name	Data Type	Input Method	Example
1	Tubewell No.	Number (Integer)	To be typed by the user	7
2	Tubewell Information Location	Text	To be typed by the user	Gauthali-chaur
3	Latitude in decimal degrees	Number (Real)	To be typed by the user	27.673459
4	Longitude in decimal degrees	Number (Real)	To be typed by the user	83.497652
5	Elevation in masl	Number (Real)	To be typed by the user	605.6
6	Type of tubewell	Text	To be selected from the drop-down menu	Deep tubewell

S.N.	Field Name	Data Type	Input Method	Example
7	Tubewell housing pipe size in mm	Number (Real)	To be typed by the user	100
8	Tubewell screen and casing pipe size in mm	Number (Real)	To be typed by the user	150
9	Static water level in m	Number (Real)	To be typed by the user	4.7
10	Aquifer material	Text	To be typed by the user	Colluvium
11	Total drill depth in m	Number (Real)	To be typed by the user	20
12	Housing length in m	Number (Real)	To be typed by the user	7.6
13	Screen length in m	Number (Real)	To be typed by the user	12.4
14	Type of screen	Text	To be selected from the drop-down menu	Perforated
15	Pumping discharge in lps	Number (Real)	To be typed by the user	10.5
16	Drawdown in m	Number (Real)	To be typed by the user	5.7
17	Aquifer storage coefficient	Number (Real)	To be typed by the user	0.69
18	Aquifer transmissivity in m/day	Number (Real)	To be typed by the user	0.45
19	Distribution System information Type of distribution system	Text	To be selected from the drop-down menu	Open channel
20	Length of open channel in m	Number (Real)	To be typed by the user	550.8
21	No. of outlets	Number (Integer)	To be typed by the user	2
22	Size of alpha-alpha valve in mm	Number (Real)	To be typed by the user	50
23	Pipe material	Text	To be selected from the drop-down menu	PVC
24	Length of pipe in m	Number (Real)	To be typed by the user	320.6
25	No. of surge raiser	Number (Integer)	To be typed by the user	5
26	Pump information	Number (Real)	To be typed by the user	150

S.N.	Field Name	Data Type	Input Method	Example
27	Power in HP	Number (Real)	To be typed by the user	Kirlosker
28	Head in m	Number (Real)	To be typed by the user	1.5
29	Pump discharge in lps	Number (Real)	To be typed by the user	9.5
30	Efficiency of motor in %	Number (Real)	To be typed by the user	2.6
31	Efficiency of pump in %	Number (Real)	To be typed by the user	60
32	Pump lowering depth in m	Number (Real)	To be typed by the user	70
33	Column pipe size in mm	Number (Real)	To be typed by the user	8.25
34	Column type	Text	To be selected from the drop-down menu	100
35	Pump House information Size of pump house (length x breadth x height) in m	Number (Real)	To be typed by the user	MS
36	Height of overhead tank in m	Number (Real)	To be typed by the user	4x4x3.5
37	Volume of overhead tank in cubic meters	Number (Real)	To be typed by the user	4.5
38	Electrification information Length of 11 kV HT transmission line in m	Number (Real)	To be typed by the user	2.5
39	Length of 440 V LT transmission line in m	Number (Real)	To be typed by the user	850
40	Number of poles	Number (Integer)	To be typed by the user	10
41	Transformer capacity in KVA	Number (Real)	To be typed by the user	12
42	Control panel in HP	Number (Real)	To be typed by the user	5.5
43	Voltage stabilizer in KVA	Number (Real)	To be typed by the user	10

The data shown in the above table has to be saved each time the user adds data for a new tubewell. After all the data has been entered, the following steps need to be followed.

- Click *Save* button to save the Ground Water Project Information.
- Click *Reset* button to clear and enter again.
- Click *Cancel* button to cancel.

13. Economic Information

The user needs to enter the Economic information for the sub-project as shown in Fig. 12.

Fig. 12: Economic information entry screen

The user needs to fill in the respective fields with the appropriate data either by typing or selecting from the drop-down menu, whichever is applicable. The following data needs to be entered:

S.N.	Field Name	Data Type	Input Method	Example
1	Total project cost in NRs	Number (Integer)	To be typed by the user	105480
2	Costing year in AD	Date (YYYY)	To be typed by the user	2017
3	EIRR in %	Number (Real)	To be typed by the user	15.6
4	Benefit/Cost B/C ratio 1 and 2	Ratio	To be typed by the user	2:3
5	Discount rate 1 and 2 in %	Number (Real)	To be typed by the user	12.5

Once one set of data has been entered, the user needs to click on the Add button. The current data will be displayed on the table in the same screen. The same process needs to be followed for adding all the datasets. Click Cancel button to cancel the data entry.

After all the data has been entered, the following steps need to be followed.

- Click *Save* button to save the Economic information. After clicking Save button, the user will see the entered data in the table.
- Click *Reset* button to clear and enter again.
- Click *Cancel* button to cancel.

14. Implementation Information

The user needs to enter the data for Implementation Information as shown in Fig. 13 below.

Fig. 13: Implementation information entry screen

The user needs to fill in the respective fields with the appropriate data either by typing or selecting from the drop-down menu, whichever is applicable. The following data needs to be entered:

S.N.	Field Name	Data Type	Input Method	Example
1	Progress Monitoring information Government of Nepal GON Share in NRs	Number (Real)	To be typed by the user	500000
2	Water Users Association WUA share in NRs	Number (Real)	To be typed by the user	100000
3	Donor share in NRs	Number (Real)	To be typed by the user	500000

S.N.	Field Name	Data Type	Input Method	Example
4	Physical progress date in AD	Date (YYYY-MM-DD)	To be typed by the user	2017-03-08
5	Financial Progress	Text	To be typed by the user	25% completed; satisfactory
6	Financial Progress Date in AD	Date (YYYY-MM-DD)	To be typed by the user	2017-03-08
7	Institution Monitoring WUA Development Office Name, Number of WUA members, Registration place	Text	To be typed by the user	Satmule Water Users Association, 35, Bara
8	WUA Registration date in AD	Date (YYYY-MM-DD)	To be typed by the user	2015-02-10
9	WUA Training information Training name	Text	To be typed by the user	Orientation training
10	Training period in days	Number (Integer)	To be typed by the user	15
11	Training date in AD	Date (YYYY-MM-DD)	To be typed by the user	60
12	No. of participants	Number (Integer)	To be typed by the user	22

Once one set of data has been entered, the user needs to click on the *Add* button. The current data will be displayed on the table in the same screen. The same process needs to be followed for adding all the datasets. Click *Cancel* button to cancel the data entry.

After all the data has been entered, the following steps need to be followed.

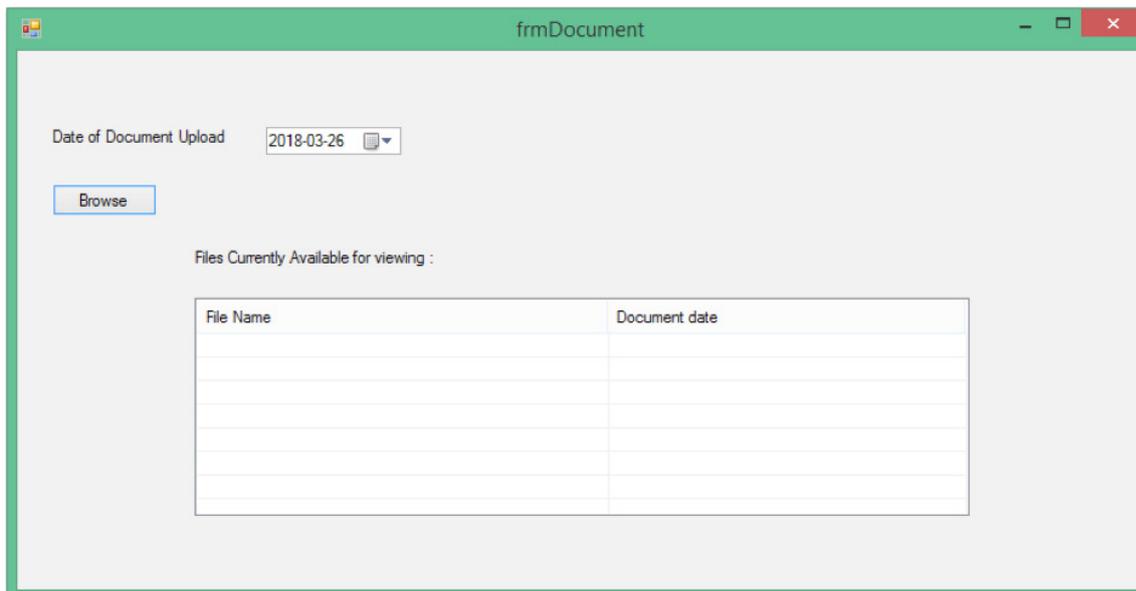
- Click *Save* button to save the Implementation information. After clicking Save button, the user will see the entered data in the table
- Click *Reset* button to clear and enter again.
- Click *Cancel* button to cancel.

15. Salient Features

The system provides summarized reports of the sub-project in the form of salient features. There is another separate section for generation of individual reports.

16. Document Uploads

To upload document, simply click in the document upload tab and follow the steps accordingly. Any number of documents can be stored of project and sub projects.



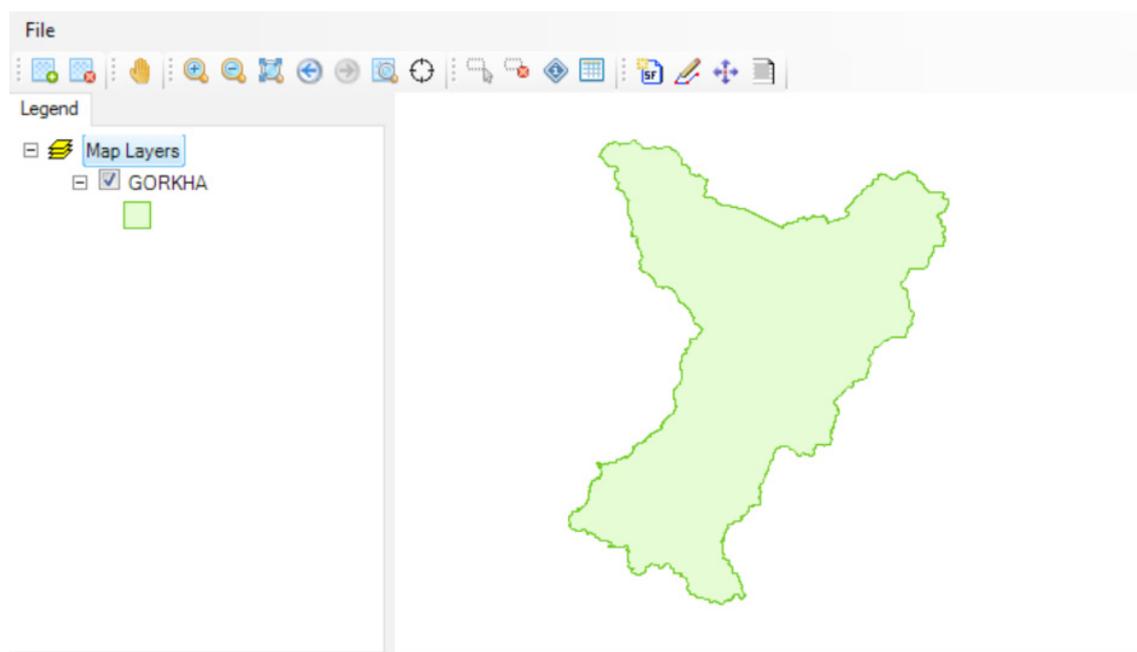
The screenshot shows a window titled "frmDocument" with a green title bar. Inside the window, there is a "Date of Document Upload" label followed by a date input field containing "2018-03-26" and a calendar icon. Below this is a "Browse" button. Underneath the button is the text "Files Currently Available for viewing :". Below this text is a table with two columns: "File Name" and "Document date". The table has 7 rows, with the first row containing the column headers and the remaining 6 rows being empty.

File Name	Document date

Fig. 14: Document Upload Panel

17. GIS Mapper

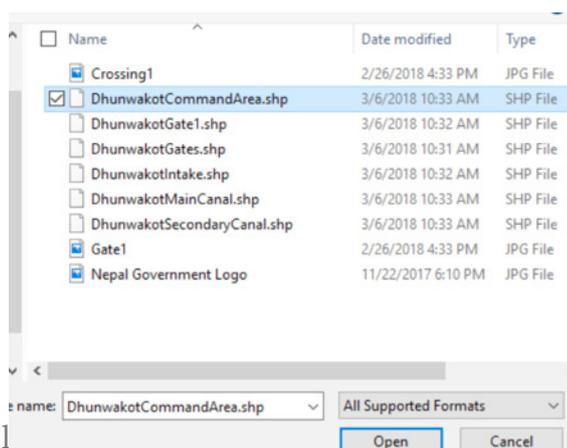
The user needs to click Maps on the left panel. The user will view the map as shown in Fig. 14 below. The map will have a basemap of the district in which the Sub-Project is located.



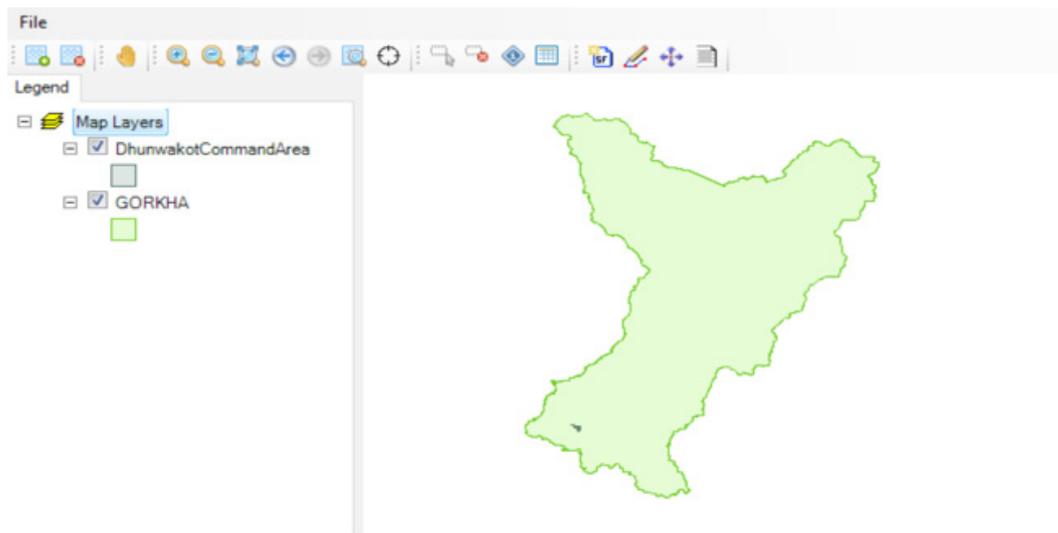
- Click Add Layer  button to add a new shape file (point/line/polygon) to the map.
- Use Navigation Tools to Pan, Zoom In, Zoom Out, Identify and more.



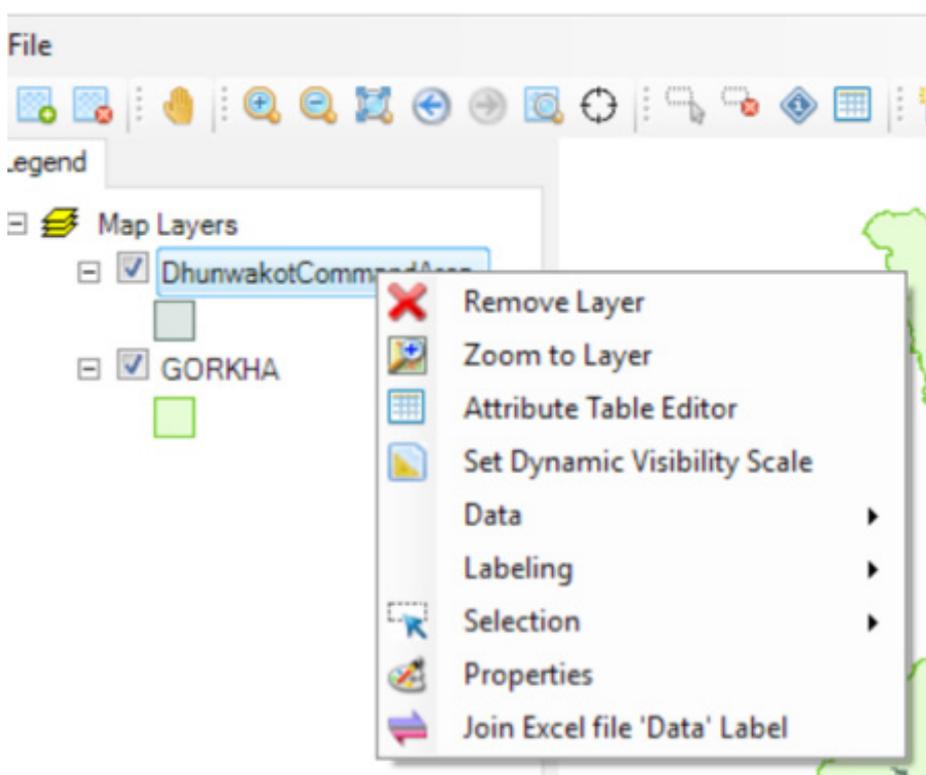
- As an example locate the “DhunwakotCommand Area.shp” shape file in your hard drive and click Open.



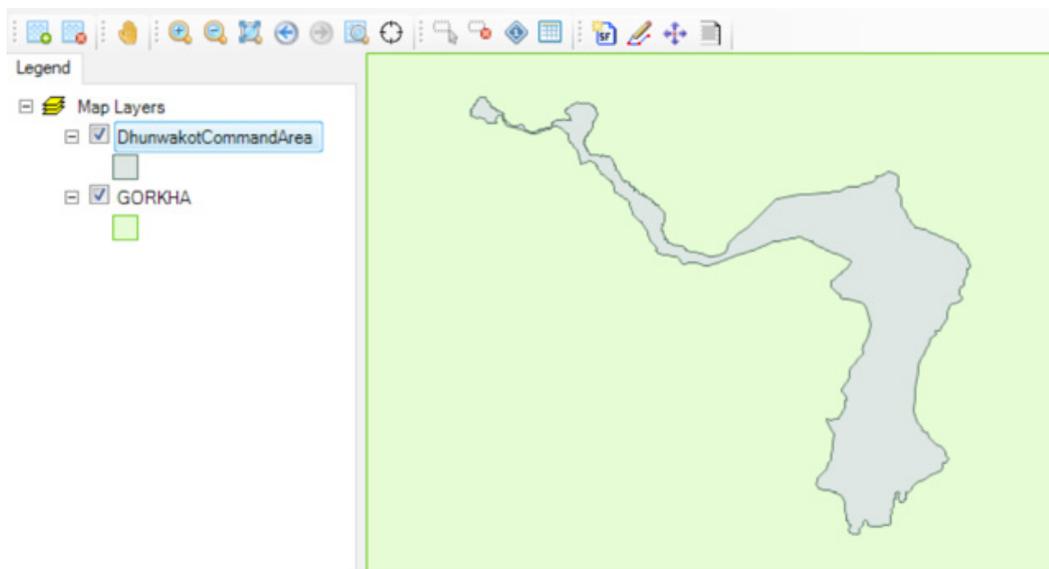
- Dhunwakot Command Area polygon will be added to your map as shown in the Figure below. Please note the added shapefile on the bottom right of Gorkha district.



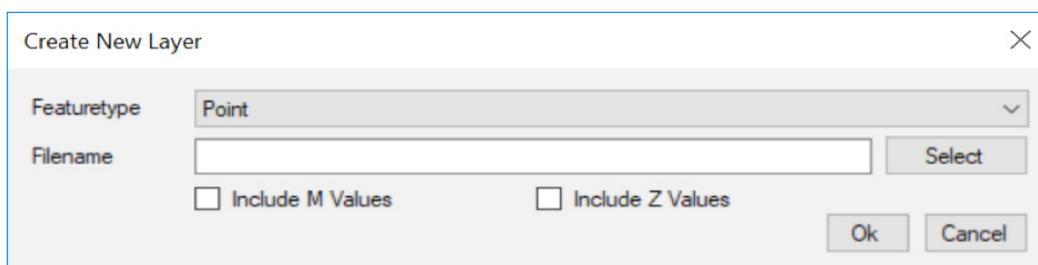
- From the left hand List of Shapefiles in the left hand pane, right click on the DhunwakotCommandArea and select Zoom to Layer



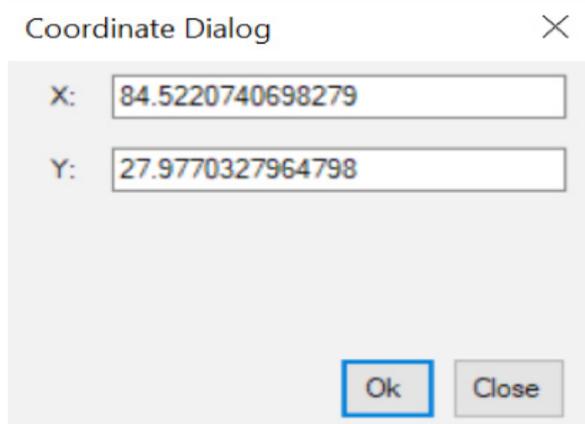
- You will get the following view of the map.



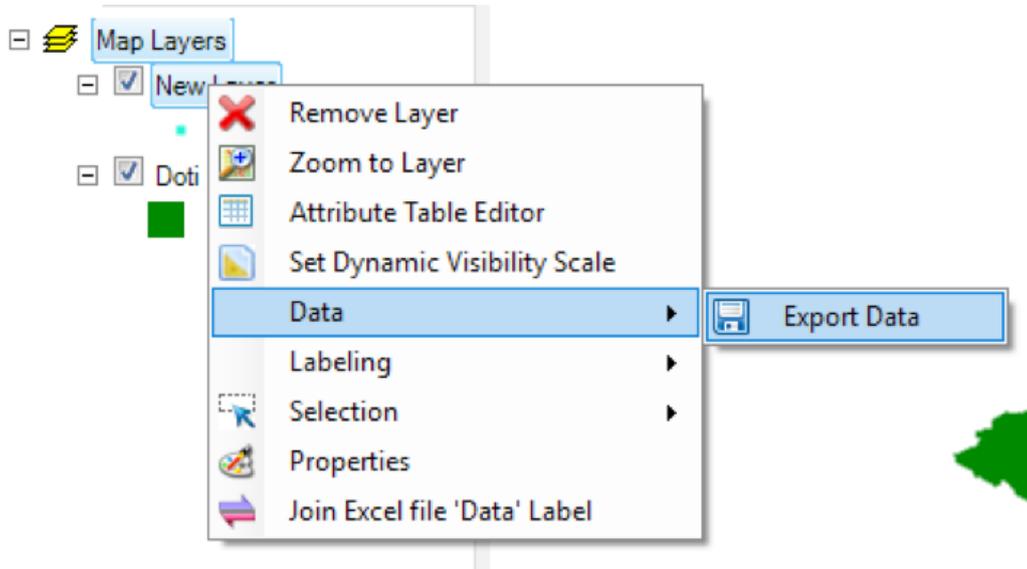
- To create new point (for example, location of Intakes (or gates, bridges, etc.) click 
- In the Create New Layer dialog box, select Point from the dropdown menu and give a Filename "Gate1" and click Select. Give the location in your computer to save the file and click OK.



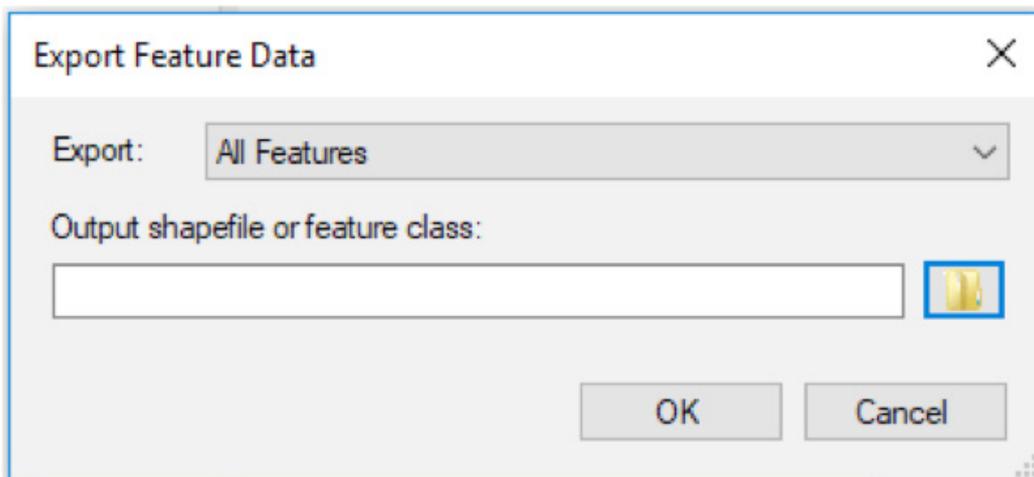
- Click *Add Shape*  button to add coordinate points for longitude and latitude as X and Y as shown below.



- Click **OK** button to add the point.
- Right Click **Point Layer** button and choose **Export data** as shown below.

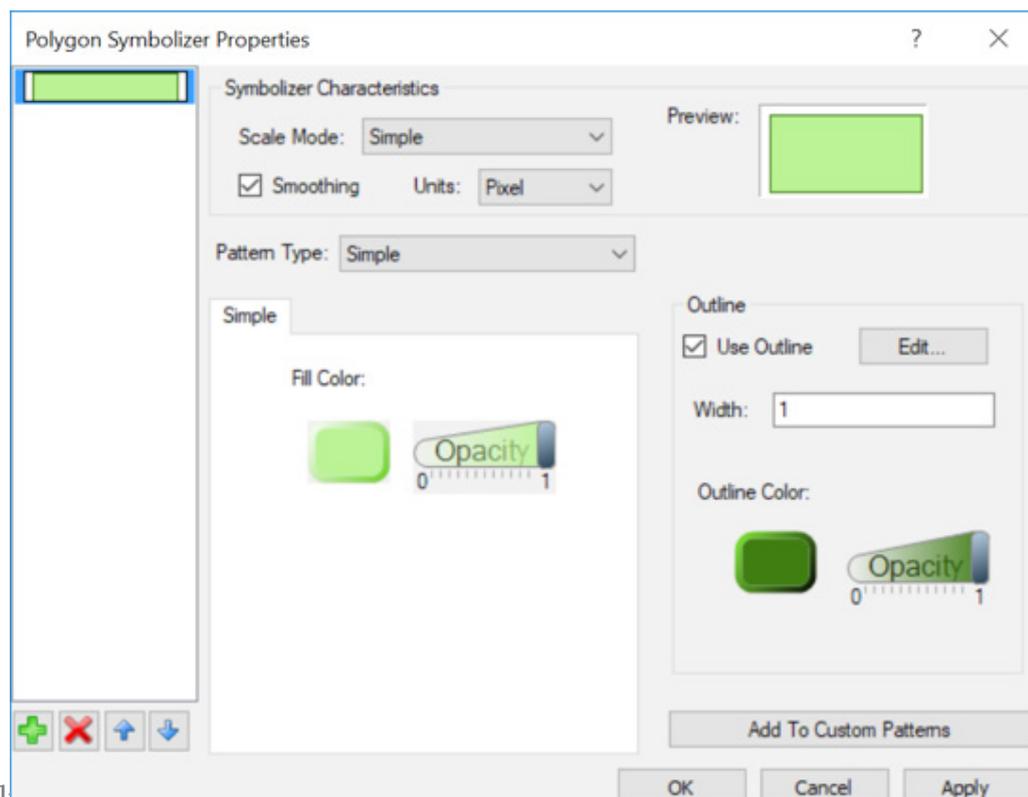
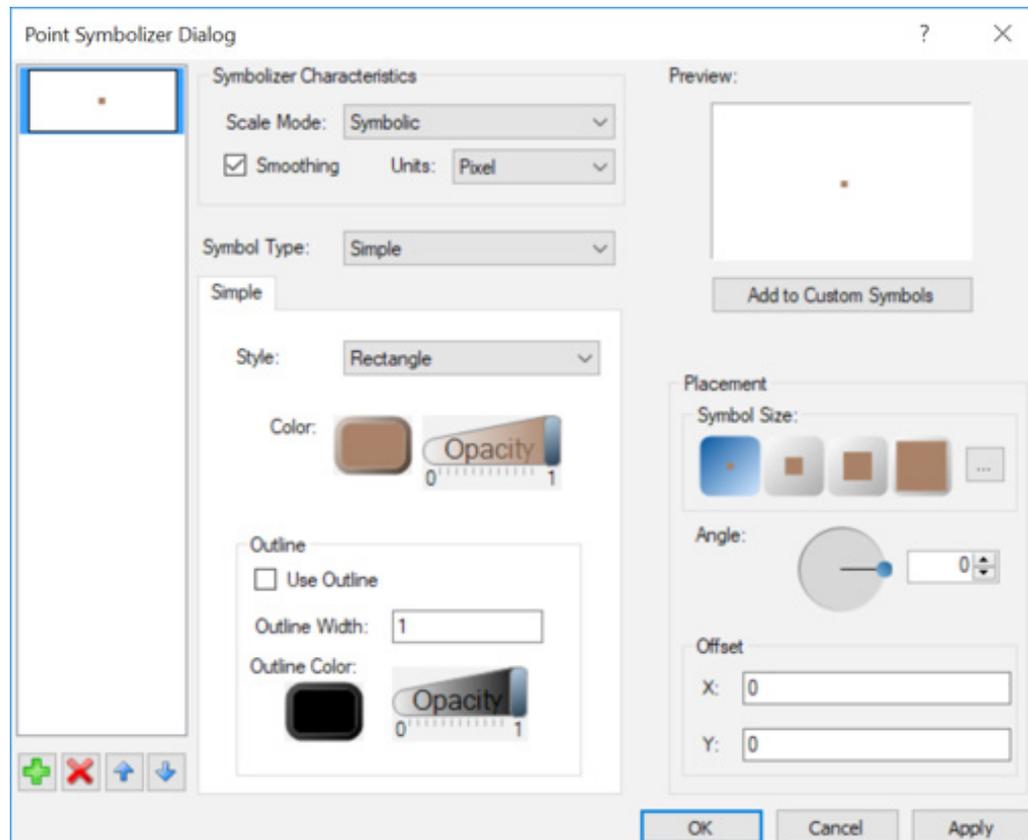


- Click **Export Data** button and following window appears.

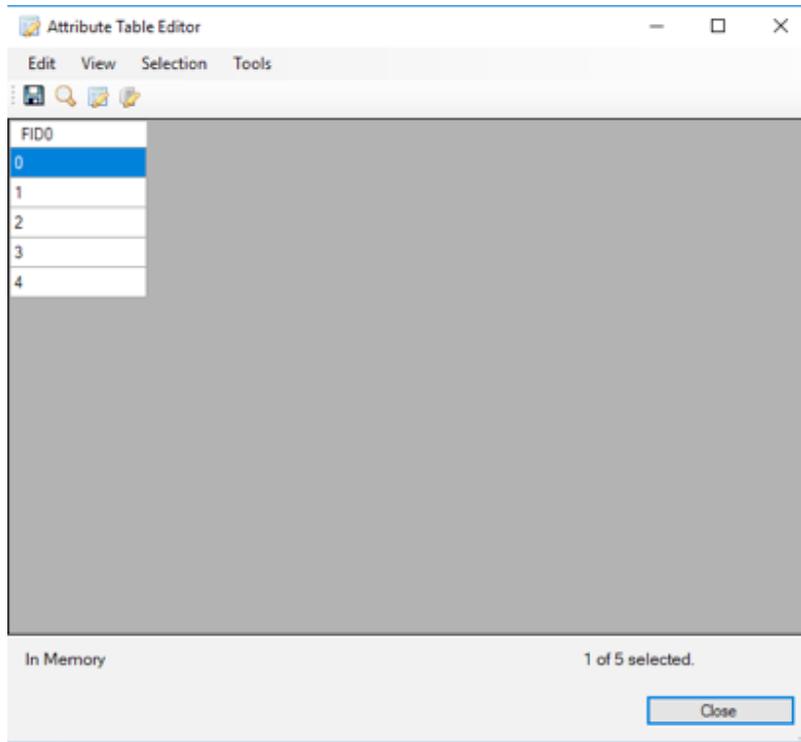


- Provide the appropriate file name and save it in required folder. When asked to load the shapefile choose Yes. The newly added layer will be displayed in the left hand list and also in the map.
Note: Do not delete the intermediate layer, it might cause the system to hang or close unwantedly.

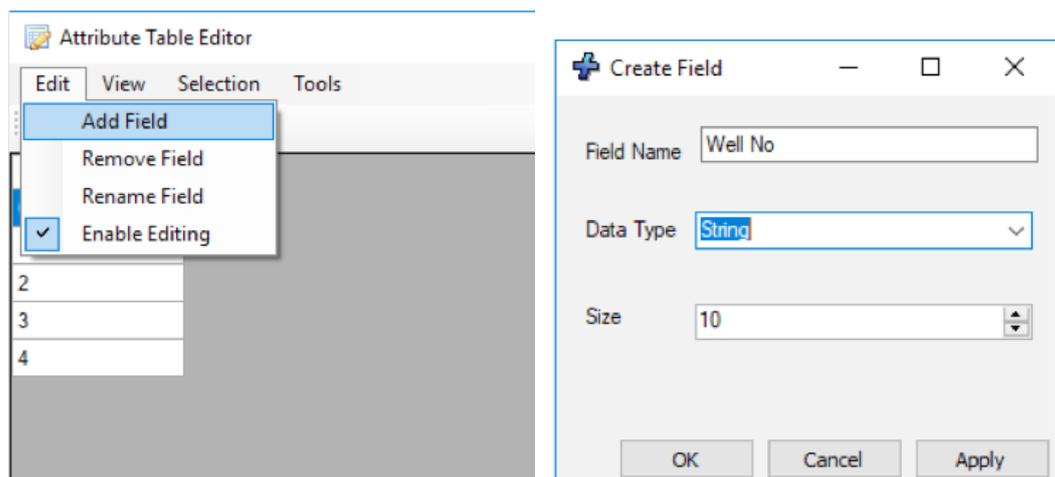
- Try varying the symbology (example, colour, opacity, point type, size of the added layers by double clicking on the symbol just below the layer name in the left-hand list. The symbology tab will appear as shown in the figure below.



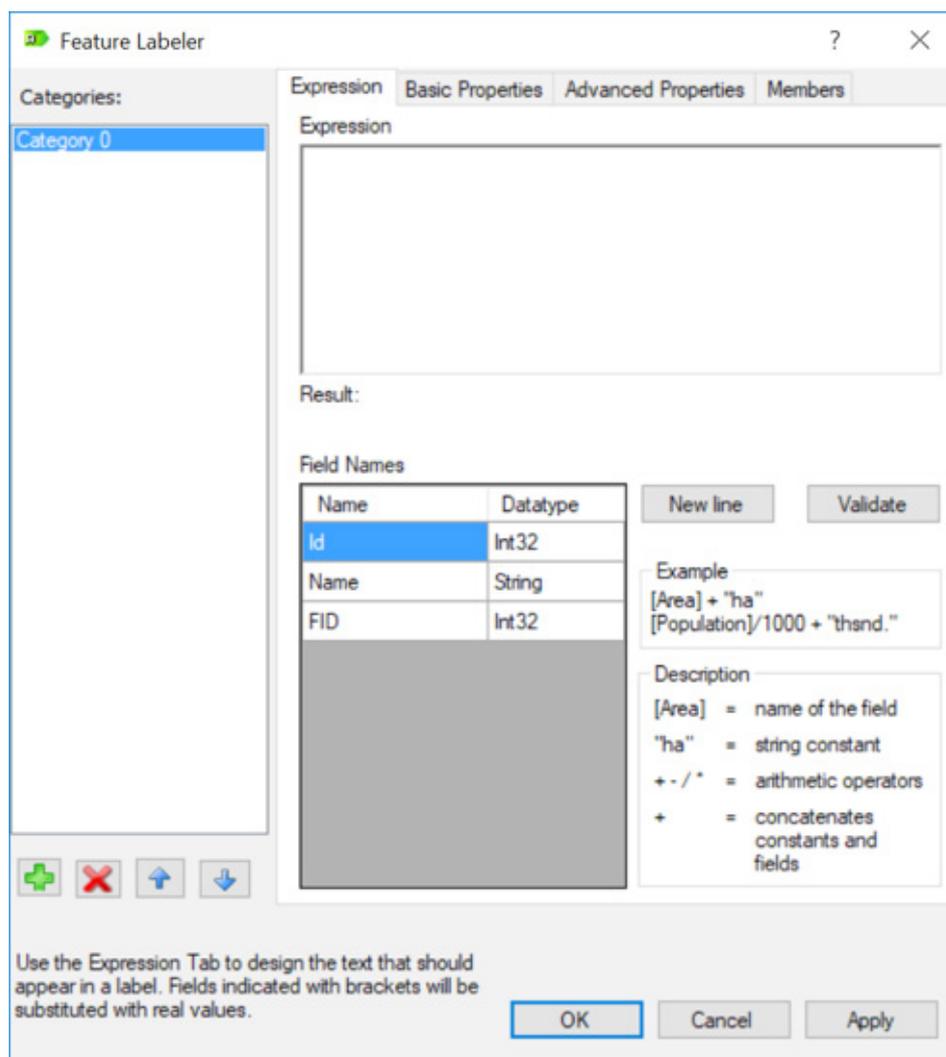
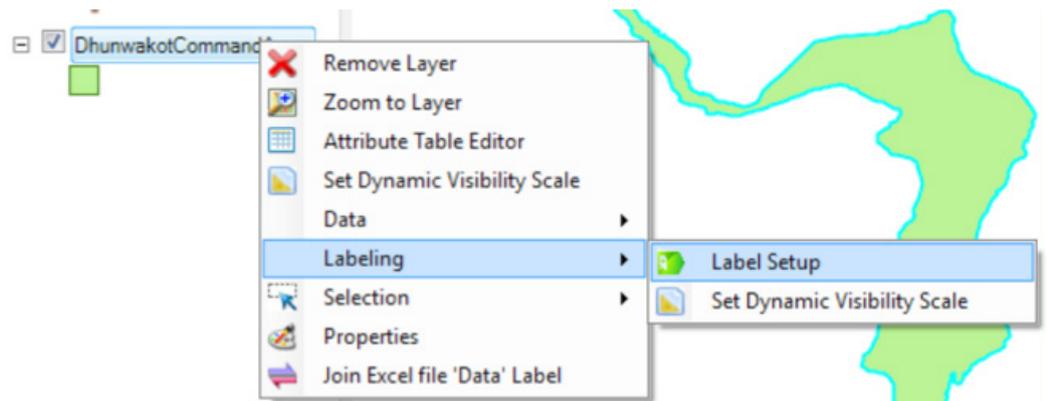
- Click  from the menu Attribute Editor button or right click on the layer list to view the attribute table.



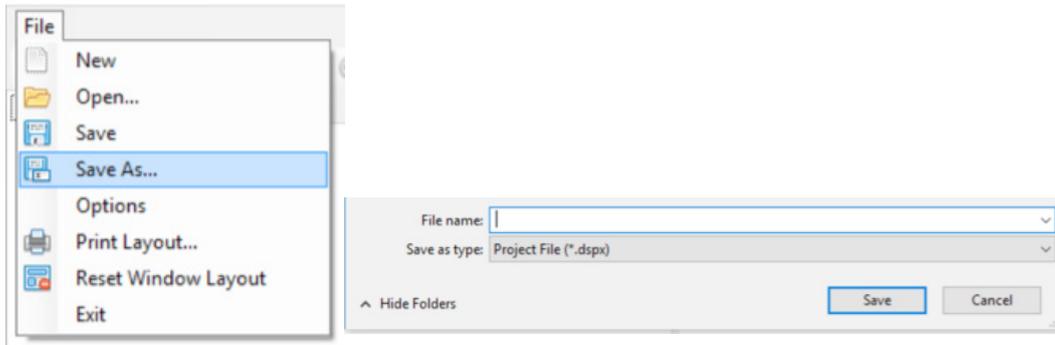
- Try adding fields with data.
- Click **Apply** to save the edits and click **Ok**.



- To add labels to the map, right click on the left hand layer list and click on the Label Setup. Select the field from which value is to be used for the label by double clicking as shown in the figure below. You can adjust the label properties using the other properties tabs. Click Apply and OK. The label should appear on your map.



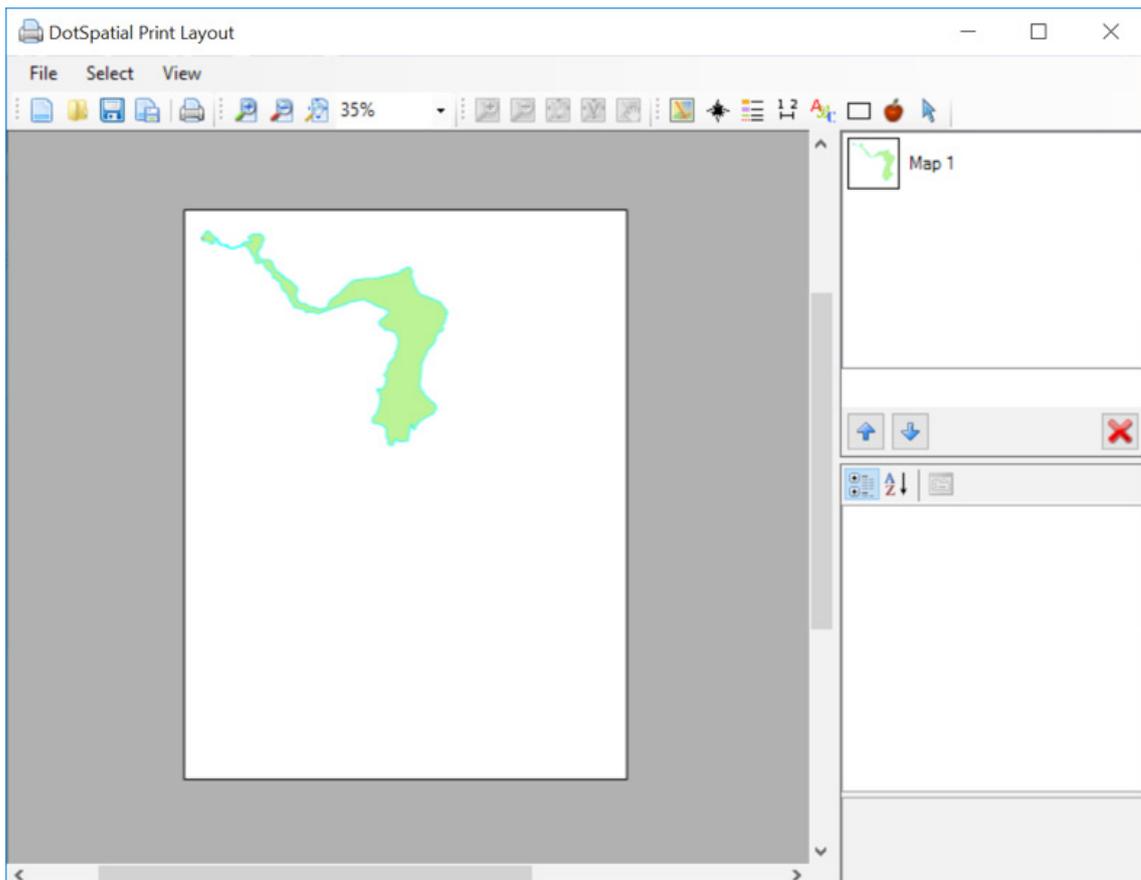
- To save the map project, click on File Save or Save As. In the dialog box, browse to a folder and give a suitable name to the project. Note that the extension of the project file is .dpx



- Next time when you want to open the project, locate the .dpx file that you have saved in the respective folder from the File > Open menu. All the elements of the map will be displayed as you have saved it in your previous session.

18. Print Layout of Maps

After your map is ready, click on File Menu > Print Layout. You will get a new window as shown below.



This opens a DotSpatial Print Layout window where you can organize content for printing. You can zoom in and out of the layout by clicking the Zoom In and Zoom Out buttons at the top of the window.

- In the **DotSpatial Print Layout** window, click the **Insert map** button  to activate that tool.
- Using the left mouse button, draw a box on the layout to position your map.

The map fills the box that you drew. This is how all of the tools work that insert elements into the layout.

Note: Do not add more than one type of element to the layout. For example, don't add two text boxes or two images. This is a known bug that may cause the program to freeze.

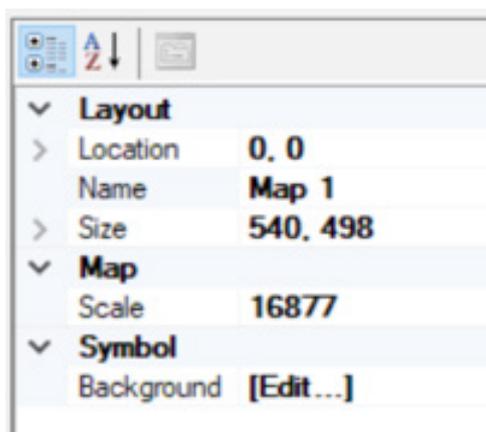
- Click the **Insert north arrow** button  to activate that tool.
- Using the left mouse button, draw a box on the layout to position your north arrow.

Tip

You can click and drag to move elements or resize them once they have been added to the layout.

- Click the **Insert legend** button  to activate that tool.
- Using the left mouse button, draw a box on the layout to position your legend.

The legend currently includes all visible map layers. With the new legend still selected, in the properties of the legend in the lower right corner of the window, click the word Layers to give that item focus.



- Click the drop-down arrow to the right of the word (**Collection**).
- Click anywhere in the layout to confirm the changes. This is how you change properties of other layout elements as well.
- Click the **Insert scale bar** button  to activate that tool.
- Using the left mouse button, draw a box on the layout to position your scale bar.
- Click the **Insert text** button  to activate that tool.
- Using the left mouse button, draw a box on the layout to position a title for the map.
- Click the **Insert rectangle** button  to activate that tool.
- Using the left mouse button, draw a box on the layout around the scale bar, north arrow, and legend to group them together aesthetically.
- Click the **Insert bitmap** button  to activate that tool. The tool prompts you for the location of the image file that you want to insert. You can insert pictures taken in the field, logos of the organization preparing the map, graphs and other information if they are in bit map format located in your hard disk.
- Using the left mouse button, draw a box on the layout to position the logo.
- Save your layout by clicking **File** and then **Save**. Specify the name and location of your choosing. Please note the map layout is saved in .mwl format.
- In the **DotSpatial Print Layout** window, you can choose the option of **Select>Convert to Bitmap** and specify the name and location of the map in jpg, png, etc.
- In the **DotSpatial Print Layout** window, click **File | Choose printer** to specify the printer to use.
- Click **File | Print** to print your layout.

DESKTOP BASED GEOGRAPHICAL MANAGEMENT INFORMATION SYSTEM (GMIS)

2018

User's Manual | Ver. 2.0

