

# SANKALAN 2.0

## USER MANUAL



# **USER MANUAL**

## **SANKALAN 2.0**

*A Mobile App for vetting, and attribute and Primary Data collection for master plan formulation (Sankalan 2.0) for the Sub-scheme on Formulation of GIS based Master Plans of Towns with population of 50,000-99,999 under AMRUT 2.0*

### **JOINTLY DEVELOPED BY:**

**Indian Institute of Remote Sensing (IIRS), Dehradun**

**Town and Country Planning Organization (TCPO), Ministry of Housing and Urban Affairs (MoHUA)**

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# 1. Introduction

Developing a city's master plan requires comprehensive data to address urban challenges and ensure sustainable growth. Geographic Information Systems (GIS) offer essential tools for managing and analysing spatial data, but challenges such as data acquisition, integration, analysis, and stakeholder engagement must be addressed. By leveraging GIS, urban planners can create evidence-based plans that promote sustainability, resilience, and liveability.

The current project, jointly formulated by MoHUA and IIRS, Dehradun, aims to establish a streamlined framework by developing an automated process using Python libraries integrated with GIS technology. The approach addresses key challenges such as data acquisition, integration, spatial analysis, stakeholder engagement, decision support, and implementation. A user-friendly mobile application will be developed to facilitate ground data collection by planners and surveyors.

This project empowers surveyors nationwide to conduct surveys with greater abstraction and minimal effort. It includes a scalable use case for national implementation, managed by the Ministry of Housing and Urban Affairs, leveraging geospatial technology for efficient ground data collection.

## 1.1 Background

The Government of India launched the Atal Mission for Rejuvenation and Urban Transformation 2.0 (AMRUT 2.0) to enhance urban infrastructure and governance. A key sub-scheme of this mission is the *Formulation of GIS-Based Master Plans for Small and Medium Towns*, emphasizing the pivotal role of geospatial technology in master planning and utility management.

The Indian Institute of Remote Sensing (IIRS) and the Town and Country Planning Organization (TCPO), under the Ministry of Housing and Urban Affairs (MoHUA), jointly developed comprehensive training materials to build the capacity of personnel engaged in the AMRUT sub-scheme at various levels. IIRS has also conducted extensive training programs for town planning professionals nationwide, emphasizing the effective application of geospatial technology within the AMRUT framework. During these training programs and deliberations on utilizing geospatial data for database creation, a critical need emerged for a GIS-based mobile application to facilitate efficient ground and attribute data collection and integration with GIS geodatabases. In response to this need, the mobile application *Sankalan 2.0* was developed.

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### ***Key Features of Sankalan 2.0:***

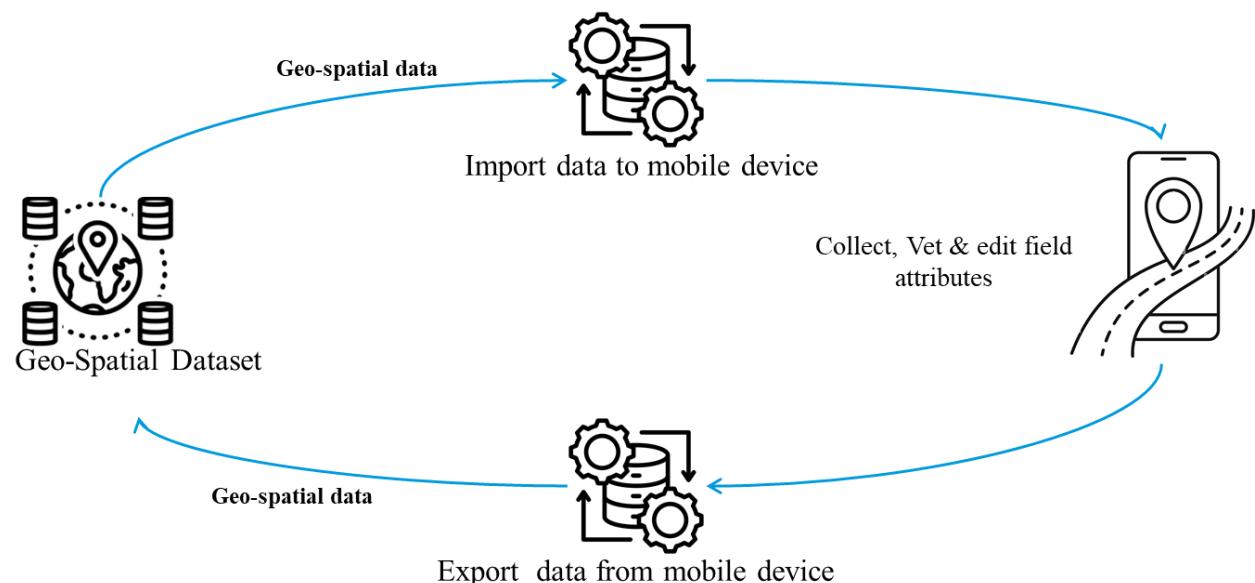
- Facilitates the collection and vetting of geo-attributes for each map feature on the ground.
- Supports field data collection and Vetting for GIS-based Master Plan preparation under the AMRUT 2.0 sub-scheme.

The application is designed to streamline field data collection, enhance the efficiency of GIS-based master planning, and support other urban planning processes. A pivotal aspect of the project is a user-friendly mobile application designed for planners and surveyors. The app facilitates seamless ground data collection, enabling users to upload satellite and drone imagery as background layers, collect attribute data, and integrate multimedia content. This approach ensures comprehensive and accurate datasets for master planning and transportation surveys.

## 2. Design approach and Details

The current field data collection framework involves significant manual effort, where shape files are manually created in QGIS, and attribute forms are designed by typing and configuring them using built-in tools. These forms are then provided to surveyors for data entry through a mobile application. The changes that will be made to this existing framework will require automating the entire process.

### 2.1 Conceptual Workflow



*Figure 1 Conceptual Workflow of the Application*

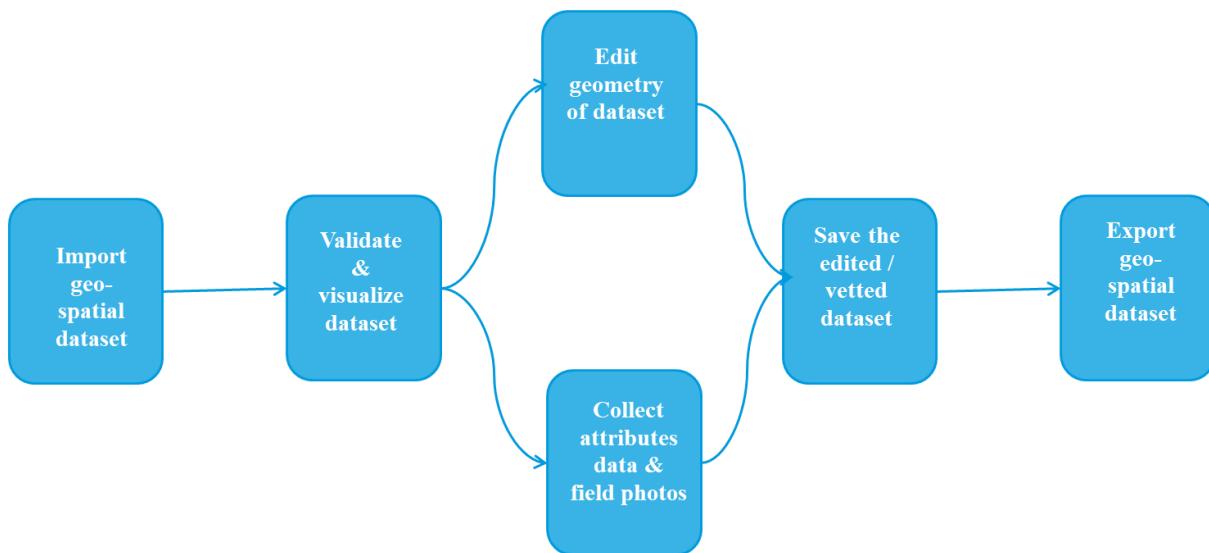
The geospatial data management workflow begins with geospatial datasets, such as base maps, satellite imagery, and GIS layers, which are stored in a central system. These datasets act as the starting point for field operations and analysis. The first step involves Importing Data to Mobile Devices, where the datasets are converted into formats compatible with mobile applications. Once prepared, the data is synchronized with mobile devices, allowing field teams to access and interact with it while on-site.

In the field, teams focus on Collecting, Vetting, and Editing Field Attributes. This includes capturing new data like GPS coordinates, photos, and additional details, verifying the accuracy of preloaded information, and updating or adding attributes directly through the mobile app. After the fieldwork is complete, the Export of Data from Mobile Devices ensures that all updated information is sent back to

the central system. This step allows the collected data to be integrated into the main geospatial database for analysis, reporting, and decision-making.

This workflow is designed to make the process of data collection easier for field teams and planners. By enabling bidirectional data flow, it ensures seamless updates between the central system and field devices. Automation reduces tedious manual data entry, while the field-centric design makes the process intuitive and efficient. This streamlined approach plays a vital role in projects like the AMRUT Mission, where accurate, GIS-based urban planning is essential for creating sustainable cities.

## 2.2 Application Workflow



*Figure 2 Application Workflow*

The figure above, illustrates a simple yet effective **App Workflow** for managing geospatial datasets. It breaks the process into clear steps, ensuring that data collection, validation, editing, and exporting are seamless and efficient. Here's how the workflow operates:

- 1. Import Geo-Spatial Dataset:** The process starts with bringing in geospatial datasets-both raster and vector, like satellite imageries, or vectorized GIS layers, into the app. This step ensures that all the necessary data is ready to work with, whether for field surveys or analysis.
- 2. Validate & Visualize Dataset:** After importing, the dataset is checked for accuracy and displayed for review. This gives users the chance to spot errors, verify details, and identify any parts of the data that may need adjustments or updates.

3. **Edit Geometry of Dataset:** If updates are needed, users can refine the dataset's geometry, such as modifying shapes, boundaries, or spatial features. This ensures that the dataset accurately represents what's on the ground.
4. **Collect Attribute Data & Field Photos:** Field teams play a crucial role by gathering extra information, like GPS points, descriptions, and photos. These additions enrich the dataset and make it more useful for planning and decision-making.
5. **Save the Edited/Vetted Dataset:** Once all changes are made, the updated dataset is saved. This ensures that all edits are preserved and ready for further use or integration.
6. **Export Geo-Spatial Dataset:** Finally, the polished dataset is returned to a central system or database. This step ensures the data is ready for analysis, reporting, or future planning.

This workflow is effective because it ensures seamless updates by allowing continuous dataset refinement, enhancing its quality at every step. Its field-friendly design enables the collection of attribute data and photos, ensuring that the dataset accurately reflects real-world conditions. Additionally, every step is focused on improving the reliability of the data, making it a robust foundation for informed decision-making. This workflow is essential for tasks like urban planning, disaster response, or infrastructure projects, ensuring geospatial data is accurate, timely, and easy to use.

### 3. System Requirements

To ensure optimal performance and compatibility, **Sankalan 2.0** requires specific system configurations for both its mobile application and QGIS plugin. The mobile application is designed to run on Android devices with sufficient memory and storage for smooth operation, while the QGIS plugin requires a desktop environment with adequate system resources to handle geospatial data processing efficiently. The following table outlines the recommended system specifications for both platforms.

System Requirements for Sankalan 2 Qgis Plugin

System Specification	Sankalan 2 Qgis Plugin
<b>Operating System</b>	Windows/ Linux Only.
<b>Minimum Main Memory (RAM)</b>	8 GB (recommended)
<b>Minimum Free Storage</b>	20 GB (recommended)
<b>QGIS Version:</b>	3.0 or later

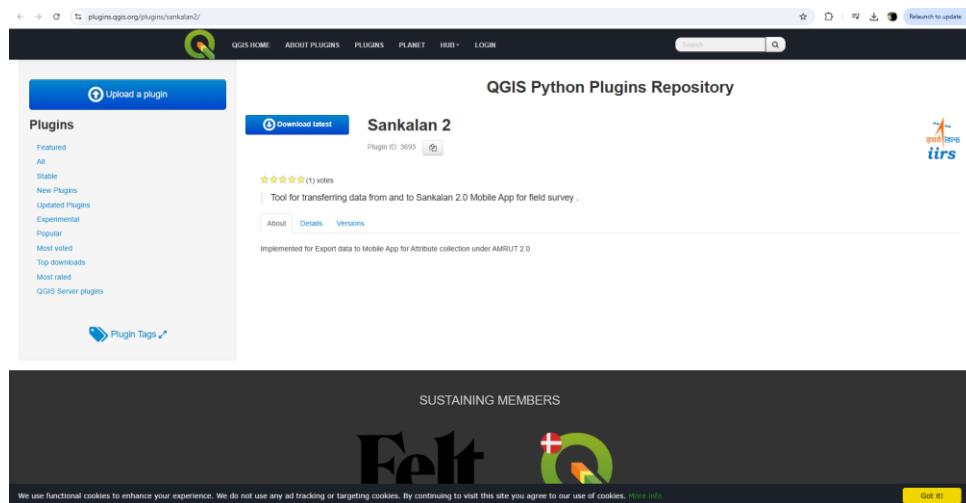
System Requirements for Sankalan 2.0 Mobile Application

System Specification	Sankalan 2.0 Mobile Application
<b>Operating System</b>	Android OS 7.0 or later
<b>Minimum Main Memory (RAM)</b>	3 GB (recommended)
<b>Minimum Free Storage</b>	500 MB (recommended)
<b>Minimum Display Size:</b>	5.5''
<b>GPS:</b>	Active and enabled

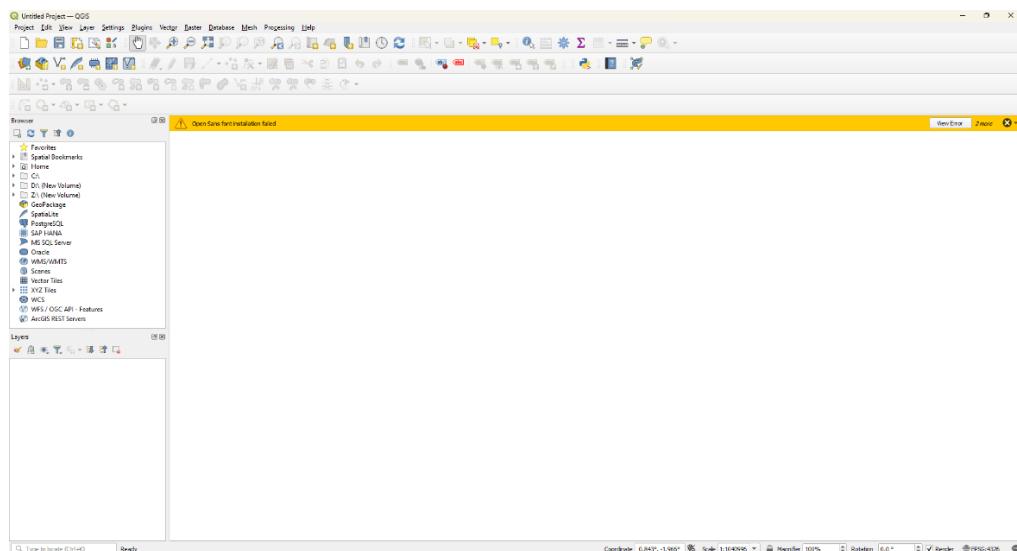
# 4. Sankalan 2- QGIS Plug-in

## 4.1 Installation of the QGIS Plugin

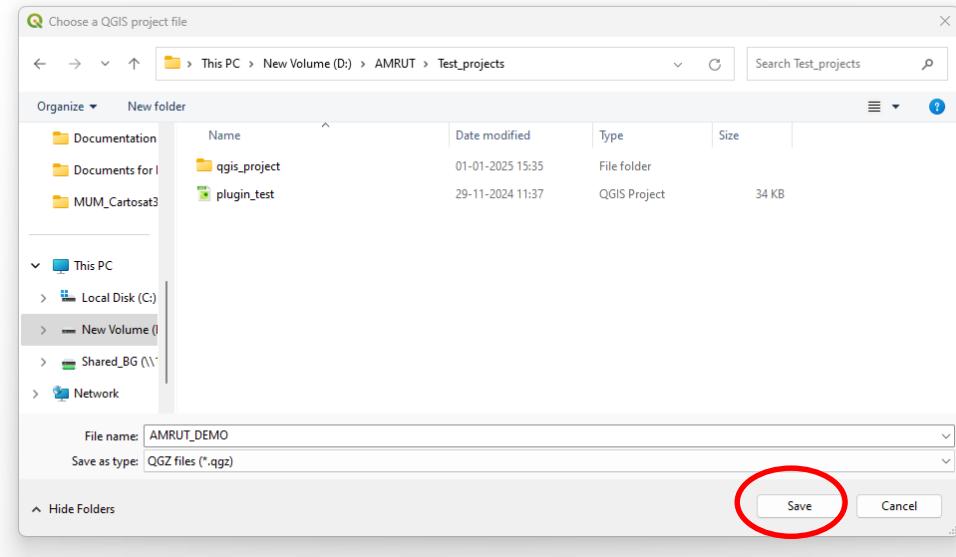
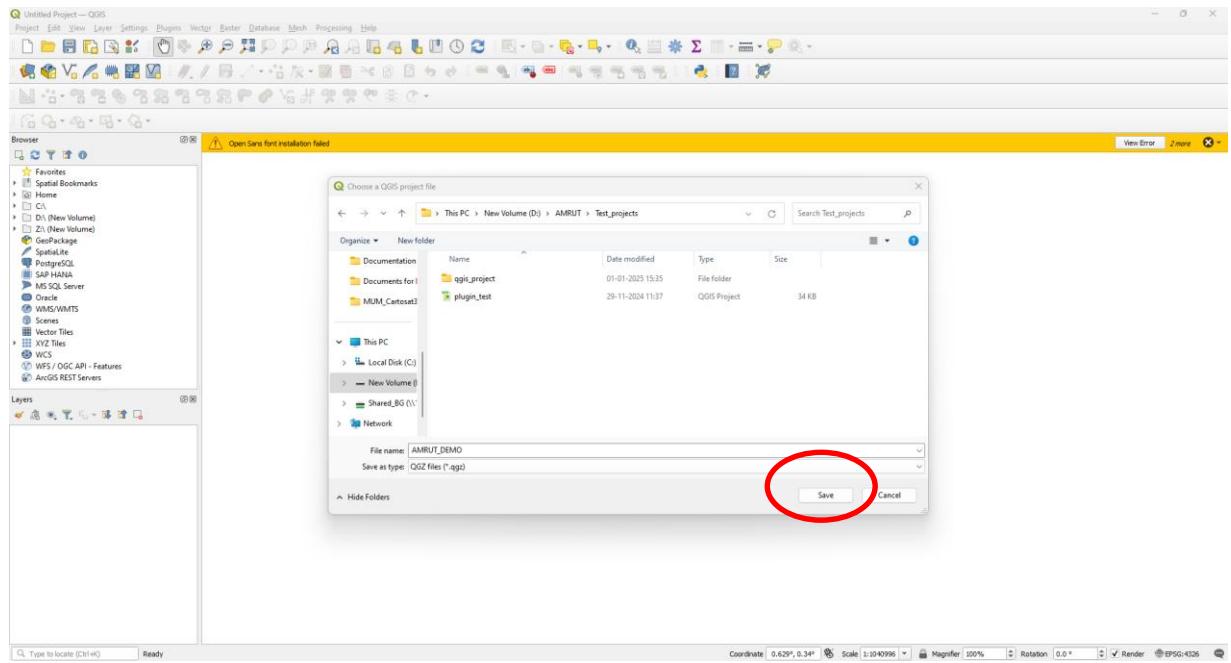
Link for Plugin: <https://plugins.qgis.org/plugins/sankalan2/>



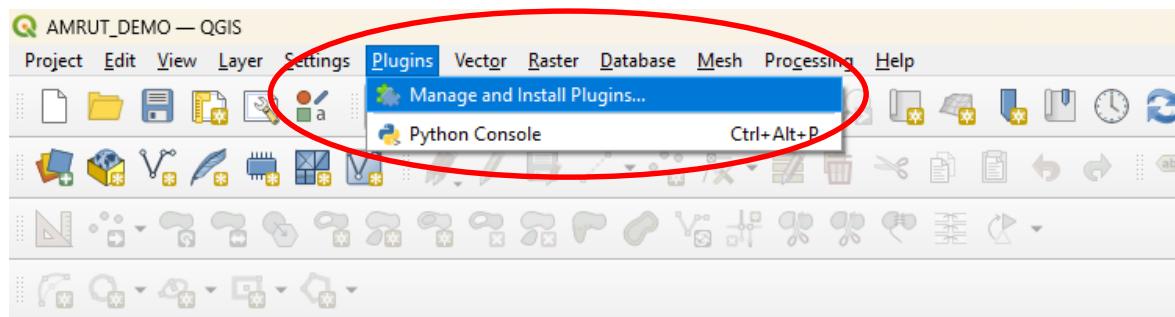
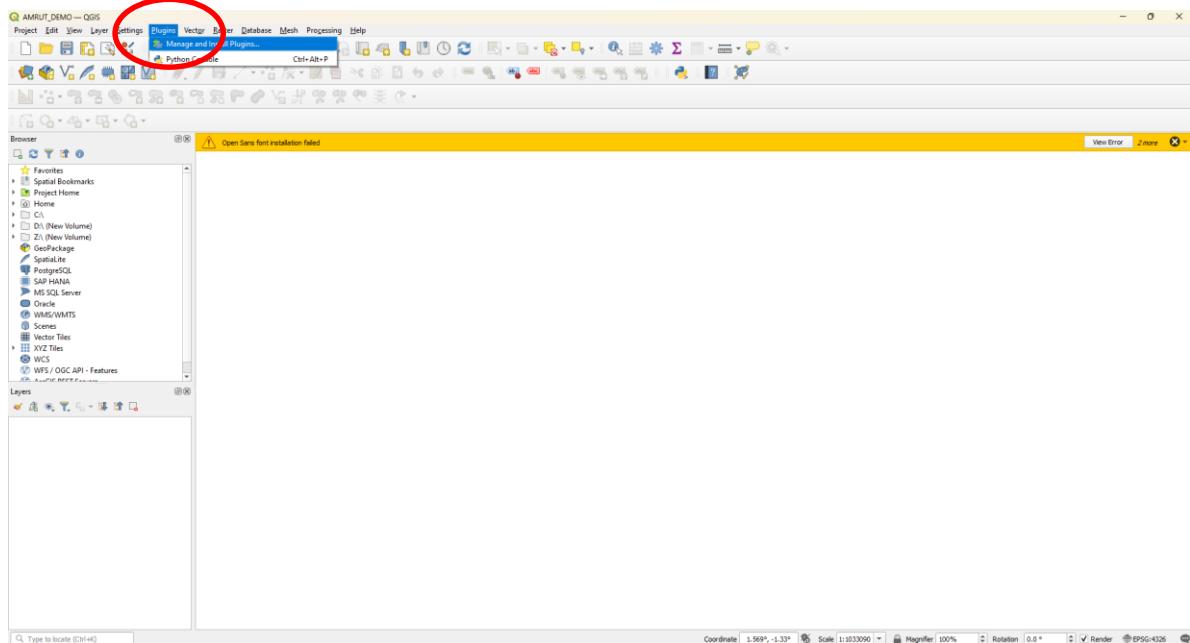
1. Open QGIS by double-clicking its icon or searching for it in the Start Menu (Windows).



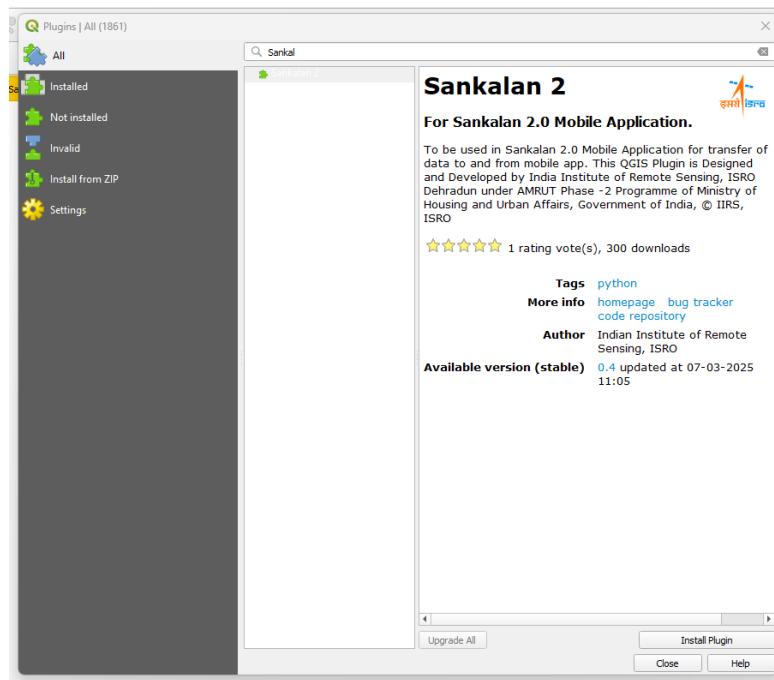
2. Save the QGIS project before proceeding.



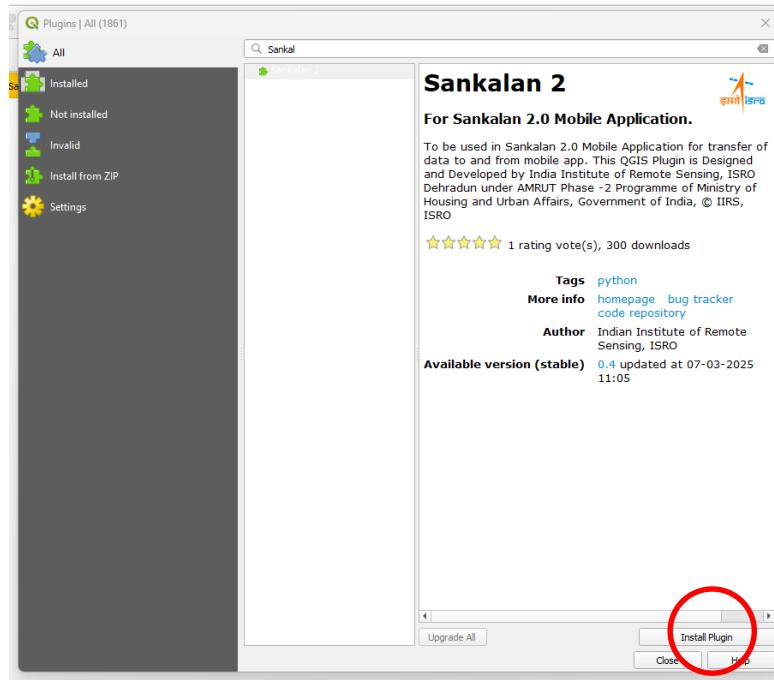
3. Once QGIS is open, locate the top menu bar and click on "**Plugins**". Select "**Manage and Install Plugins...**" from the dropdown menu to open the Plugin Manager.



4. In the Plugin Manager window, ensure you are in the "All Plugins" section and search for "Sankalan 2".



5. A list of matching plugins will appear. Look for "**Sankalan 2**" published by IIRS with the **Plugin ID: 3693**. Click on the plugin name to highlight it and then click the "**Install Plugin**" button at the bottom of the window.

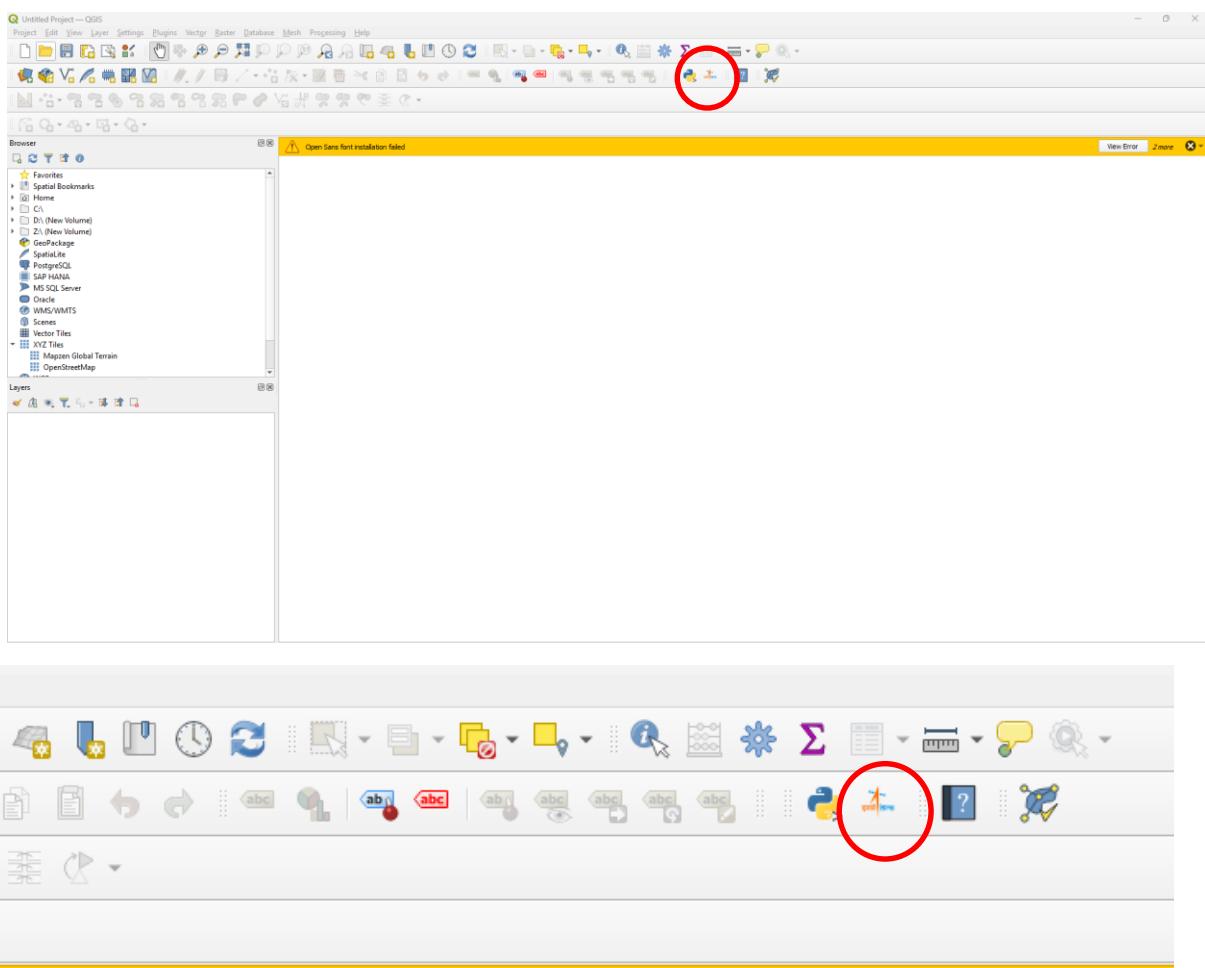


6. The plugin will begin downloading automatically. Once the download is complete, QGIS will install the plugin. Close the Plugin Manager and return to the main QGIS interface. You can now access and use the Sankalan 2 plugin as needed.

# 5. Sankalan 2- QGIS Plug-in: “Data to Mobile”

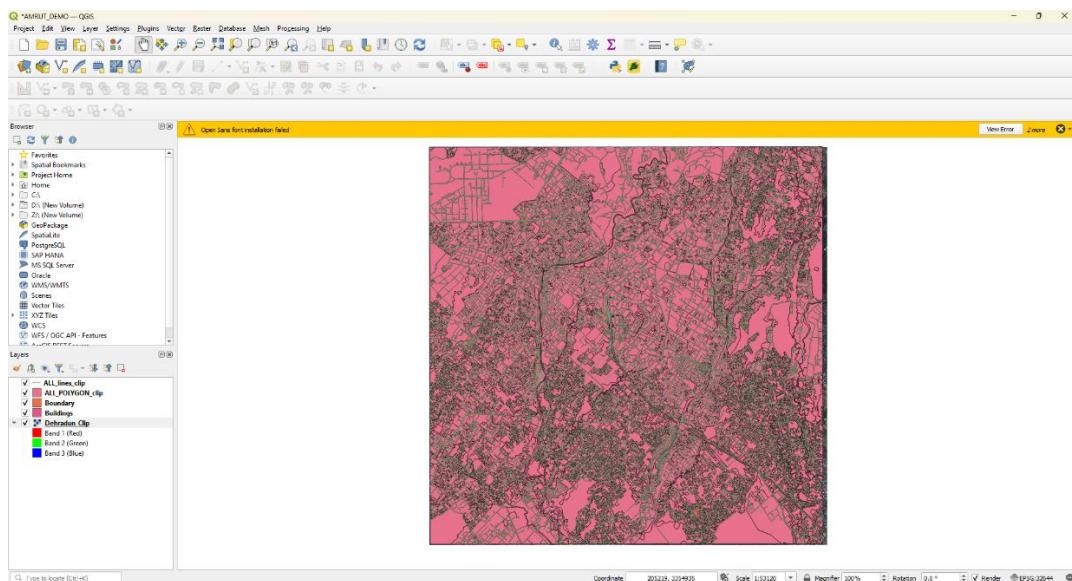
## 5.1 Data Preparation for the mobile phone: Splitting Spatial Data using existing Grid Layer (ward boundary or any fishnet layer) for Mobile App

1. From the "Plugins" menu, launch "Sankalan 2" by selecting it from the available plugins. The icon will appear in your Qgis Project.



2. Add the required layers to your QGIS project. Save your project before proceeding.

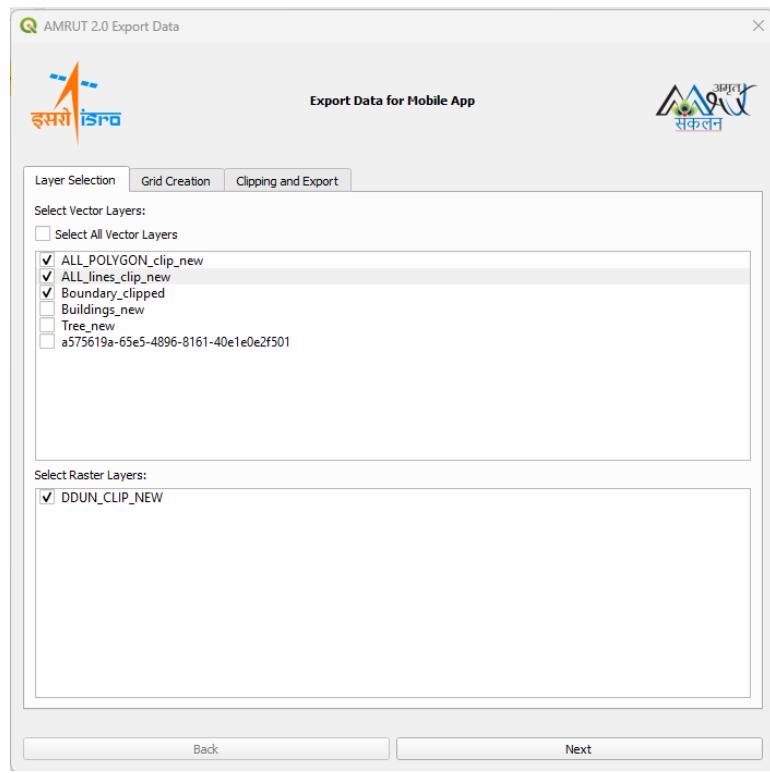
(Note: It is Mandatory to add all the geometries: Point, Line and Polygon and the raster layer in this step)



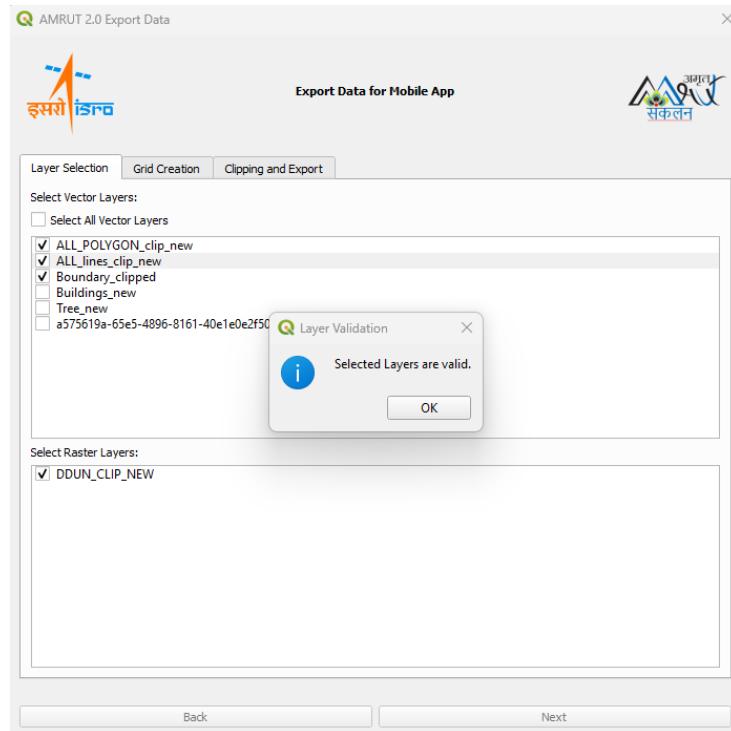
3. Click the AMRUT Plugin button. A dialog box will appear with two options: "**Data to Mobile**" and "**Data From Mobile**". Click on "**Data to Mobile**" to initiate the data export process, which will open the "**Data Export**" dialog.



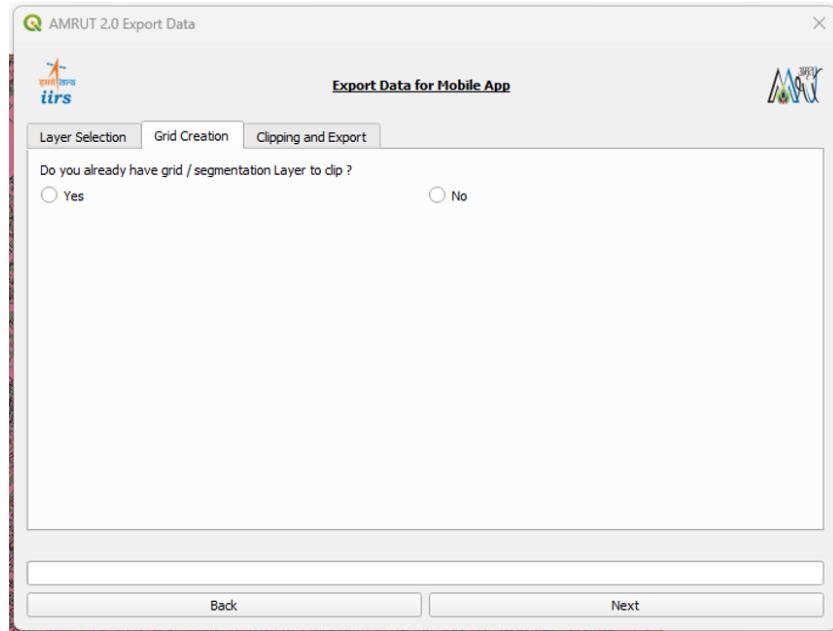
4. In the displayed dialog, navigate to the "**Layer Selection**" tab, where all the layers present in the current QGIS project will be listed. Select the layer you wish to export for the survey by clicking on it.



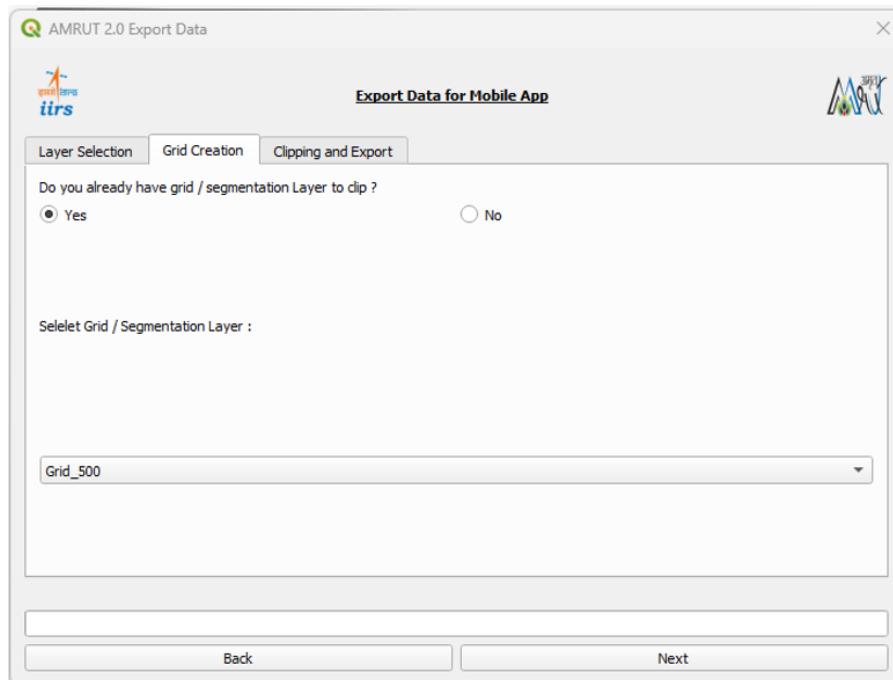
5. Click on the "Next" button to validate the selected layers. If validation fails, an error message will be displayed indicating the reason for failure. Resolve the issue and restart the process from Step 1.



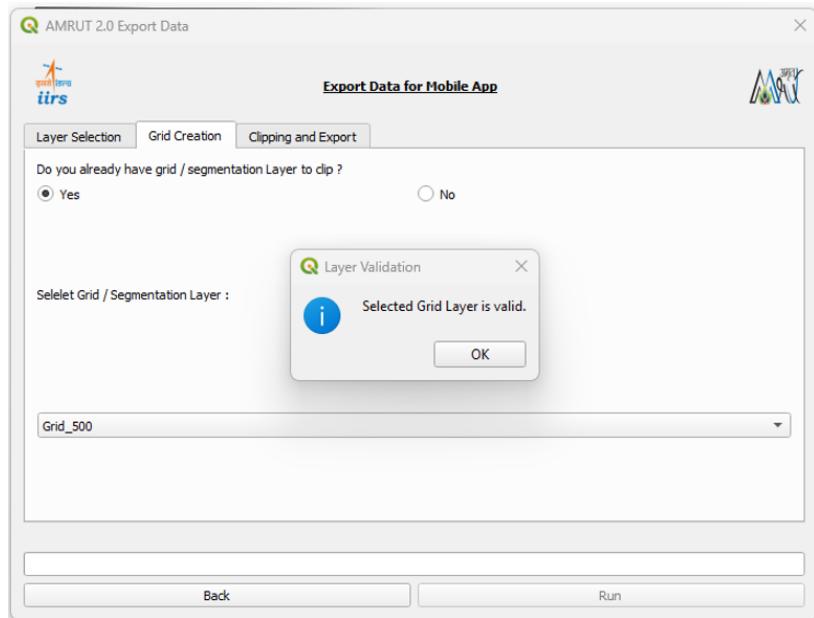
6. If validation is successful, a confirmation message will appear, allowing you to proceed to the "**Grid Creation**" tab.



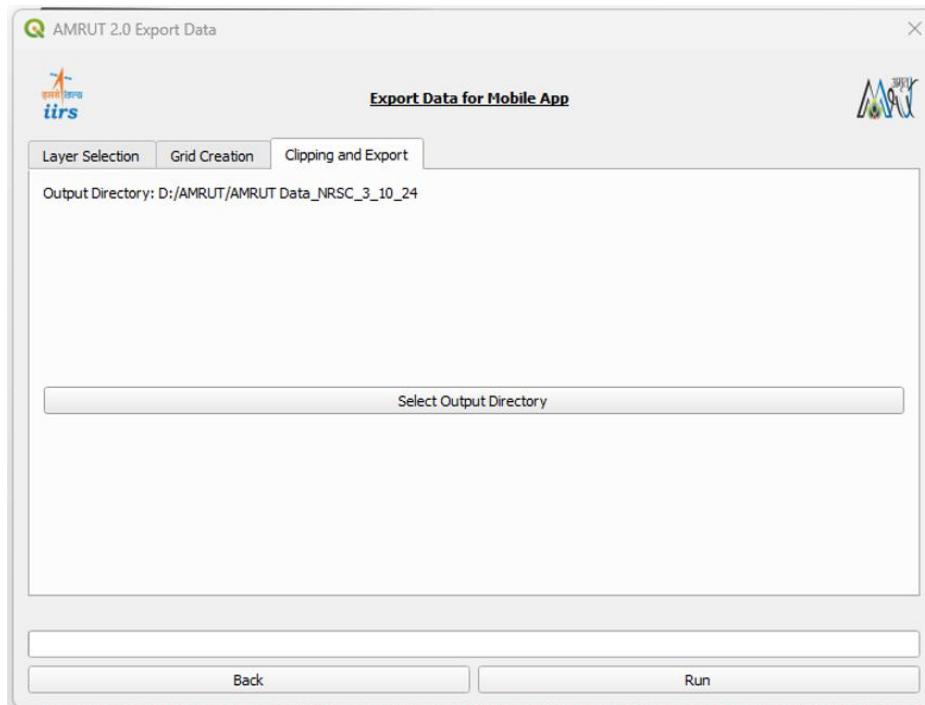
7. In the "**Grid Creation**" tab, click on "**Yes**" to enable grid selection. A "**Grid Selection**" dropdown menu will appear. Select a valid grid layer from the dropdown and proceed to the next step. If the grid layer validation fails, an error message will be shown explaining the issue. Resolve it and restart from Step 1.



8. If the grid layer validation is successful, a confirmation message will be displayed, allowing you to proceed to the "**Clipping and Export**" tab.



9. In the "**Clipping and Export**" tab, click "Select Output Directory" to choose where the exported data will be saved.



10. After selecting the output directory, click on "**Run**" to begin the clipping and export process. Wait for the process to complete. Once finished, a success message will be displayed, confirming the completion of clipping and export.
11. At the end of this step, an excel file containing all the details about the created grids and individual folders for all these grids would be formed. Inside the folder created, there are three files: a kml and a html file showing the location of the grid, a .amrut file containing all the clipped geospatial layers for the particular grid. This .amrut file would be imported to the Sankalan 2.0 Mobile Application.

## 5.2 Data Preparation for the mobile phone: Splitting Spatial Data by creating New Grid Layer using the plugin for the Mobile App

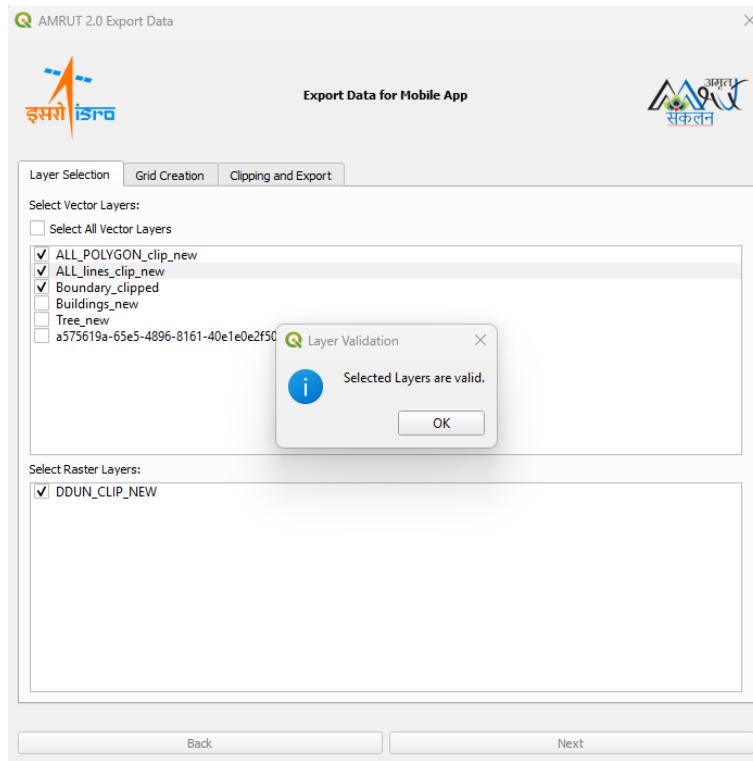
1. From the "Plugins" menu, launch "Sankalan 2" by selecting it from the available plugins. Add the required layers to your QGIS project. Save your project before proceeding.  
**(Note: It is Mandatory to add all the geometries: Point, Line and Polygon in this step)**
2. A dialog box will appear with two options: "Data to Mobile" and "Data from Mobile". Click on "Data to Mobile" to initiate the data export process, which will open the "Data Export" dialog.



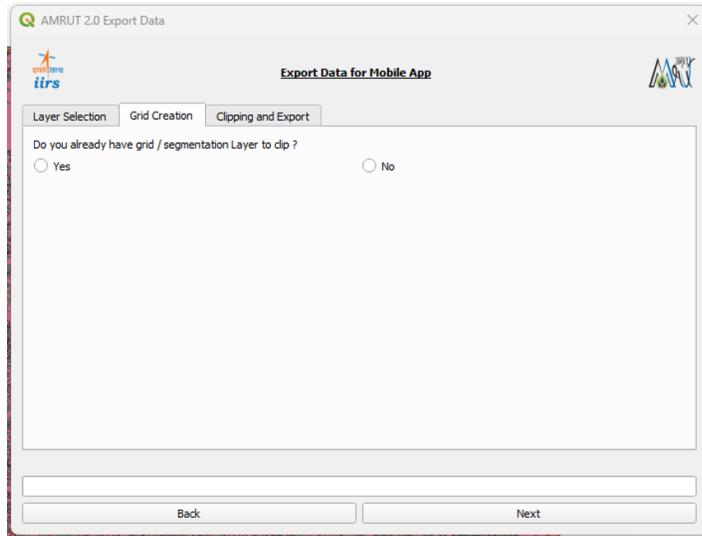
3. In the displayed dialog, navigate to the "Layer Selection" tab, where all the layers present in the current QGIS project will be listed. Click on the layer you wish to export for the survey.



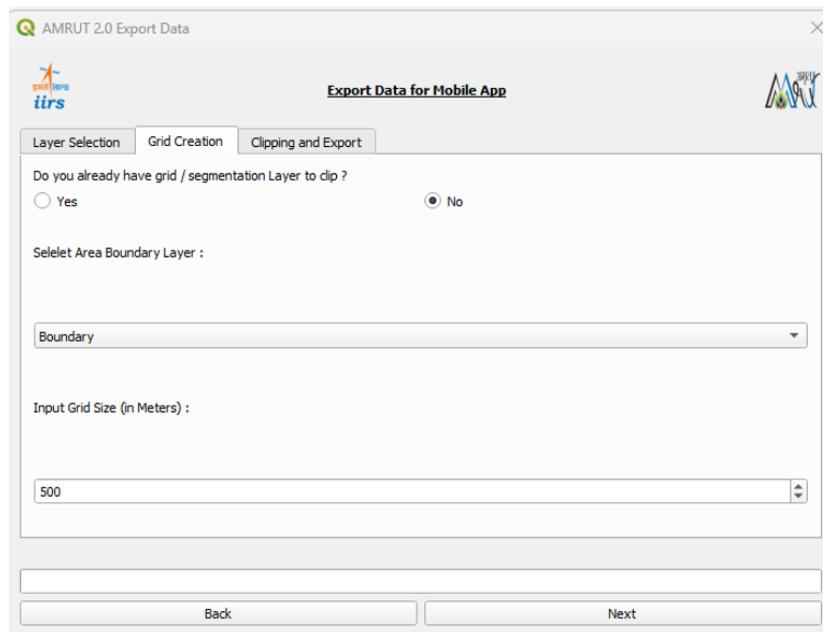
4. Click on the "Next" button to validate the selected layers. If validation fails, an error message will be displayed indicating the reason for failure. Resolve the issue and restart the process from Step 1.



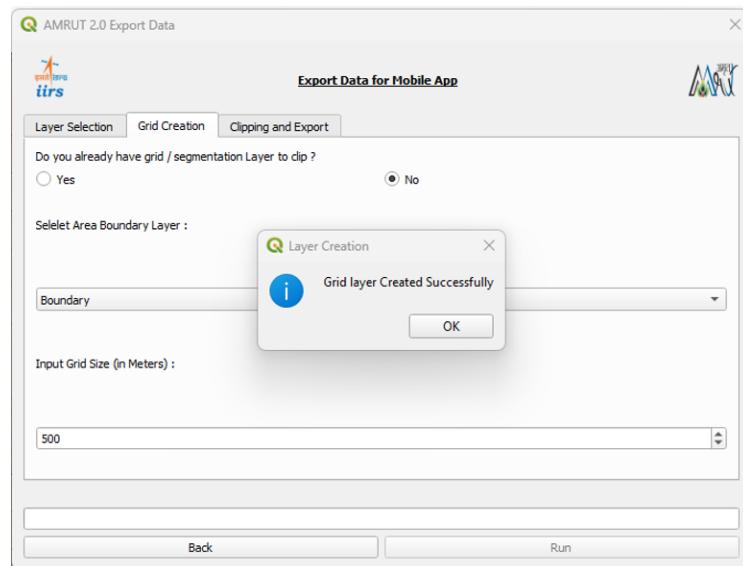
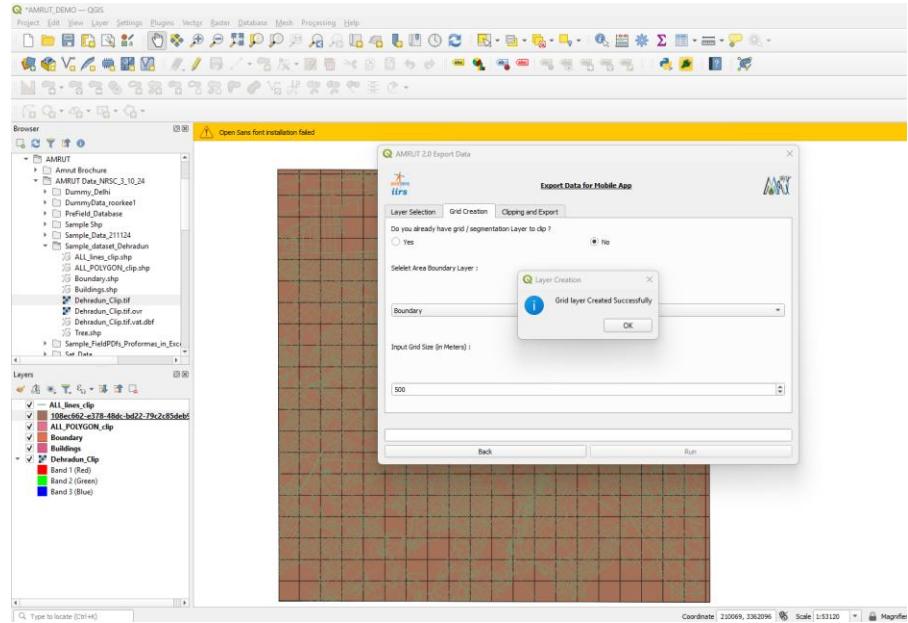
- A confirmation message will appear if validation is successful, allowing you to proceed to the "Grid Creation" tab.



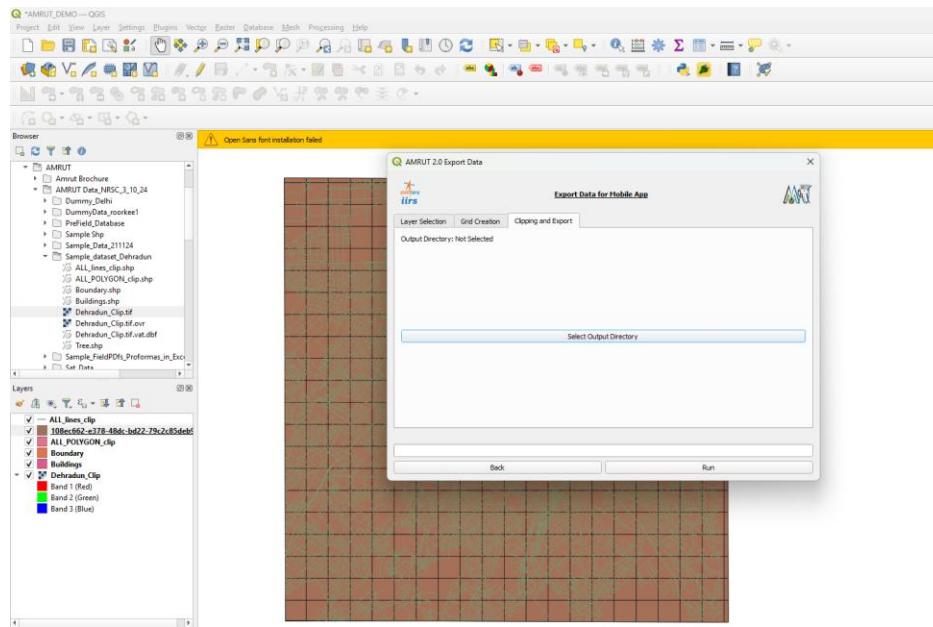
- Click on "No" in the "Grid Creation" tab. An "AOI/ROI Selection" dropdown menu will appear. In this case the plugin will create grids based on the single polygon AOI/ROI layer given by the user. (**Note: Please make sure the AOI/ROI Layer is not smaller than the other layers. The layers to be clipped should be smaller or of equal size of the AOI/ROI. The chosen AOI file should be a single polygon layer covering the entire city area.**)
- Select a valid AOI/ROI layer from the dropdown list. Set the grid size in meters (**Recommended: 500 meters**).



8. The selected AOI layer would be then validated. If the AOI/ROI layer validation fails, an error message will be shown explaining the issue. Resolve it and restart from Step 1.
9. If validation is successful, a confirmation message will appear, a grid will be created, and it will be added to the project.



10. Navigate to the "Clipping and Export" tab and click on "Select Output Directory" to choose the location where the exported data will be saved. After selecting the output directory, click on "Run" to begin the clipping and export process.

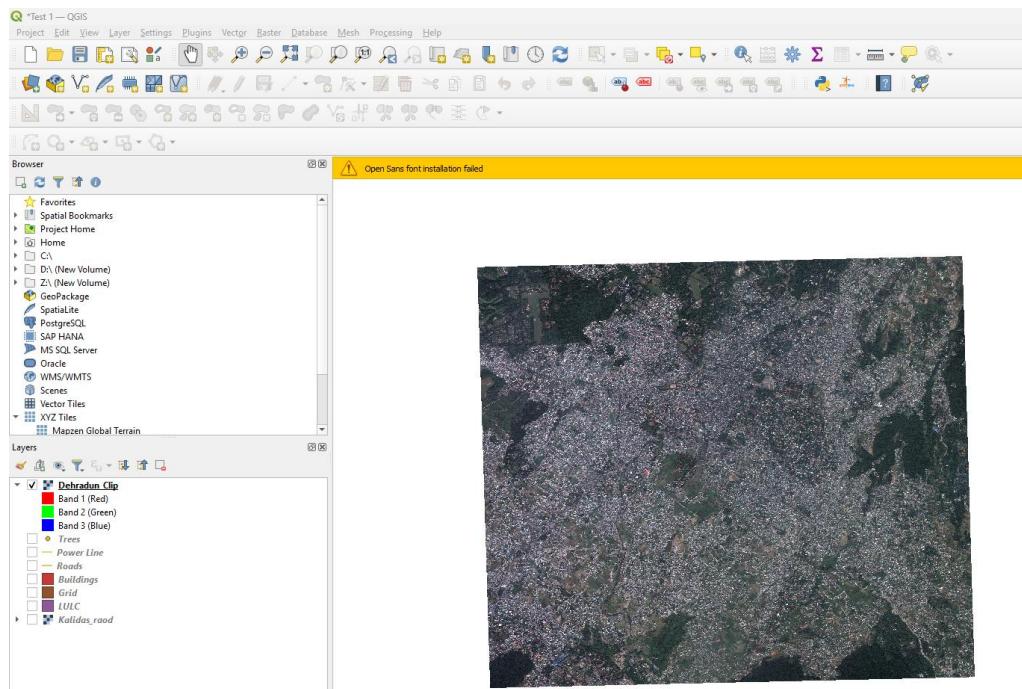


11. Wait for the process to complete. Once finished, a success message will be displayed, confirming the completion of clipping and export.
12. At the end of this step, an excel file containing all the details about the created grids and individual folders for all these grids would be formed. Inside the folder created, there are three files: a kml and a html file showing the location of the grid, a .amrut file containing all the clipped geospatial layers for the particular grid. This .amrut file would be imported to the Sankalan 2.0 Mobile Application.

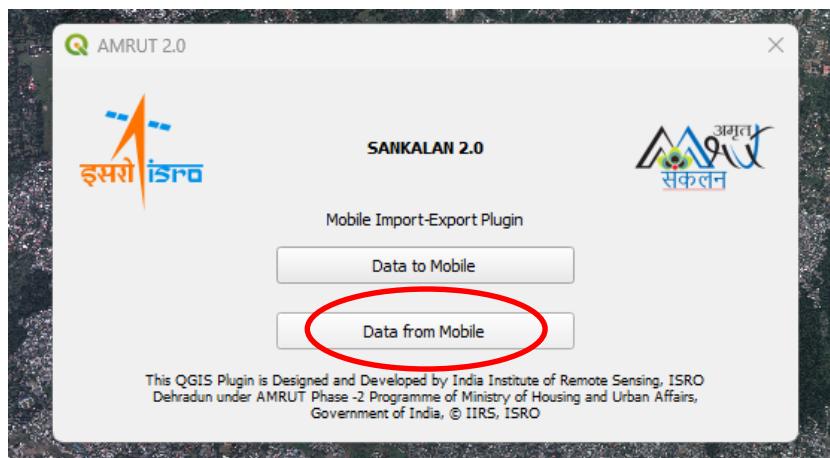
# 6. Sankalan 2- QGIS Plug-in: “Data from Mobile”

## 6.1 Quality Check 1: No Changes Found in the selected layer and layer present in the project

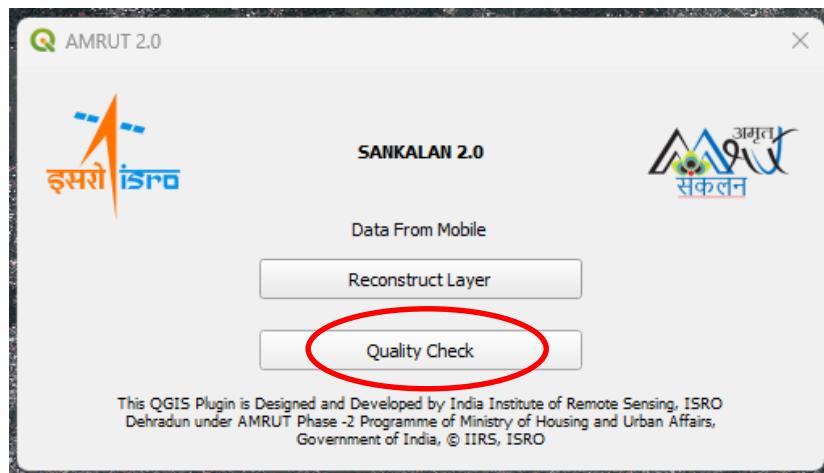
1. Open the QGIS project which was previously used for the data exportation to mobile phone with all the layers used for vetting.



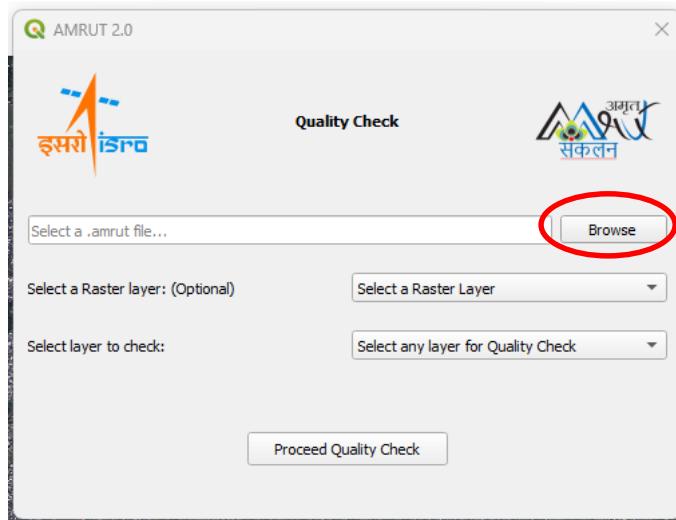
2. From the "Plugins" menu, launch "Sankalan 2" by selecting it from the available plugins.

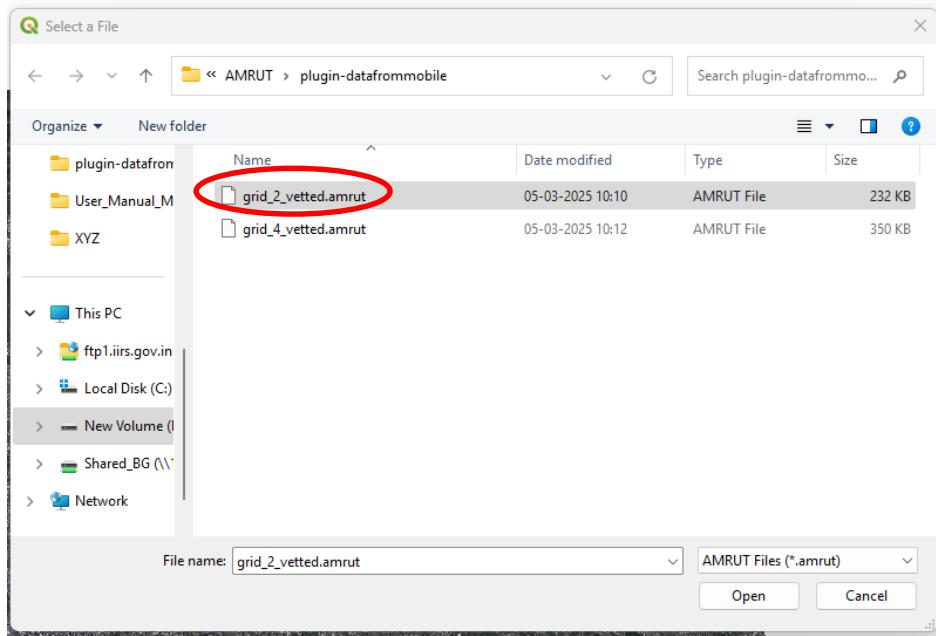


3. A dialog box will appear with two options: "**Data to Mobile**" and "**Data from Mobile**". Click on "**Data from Mobile**" which will open another dialog box with the options, "**Reconstruct Layers**" and "**Quality Check**". Click on "**Quality Check**" to proceed with the quality check.

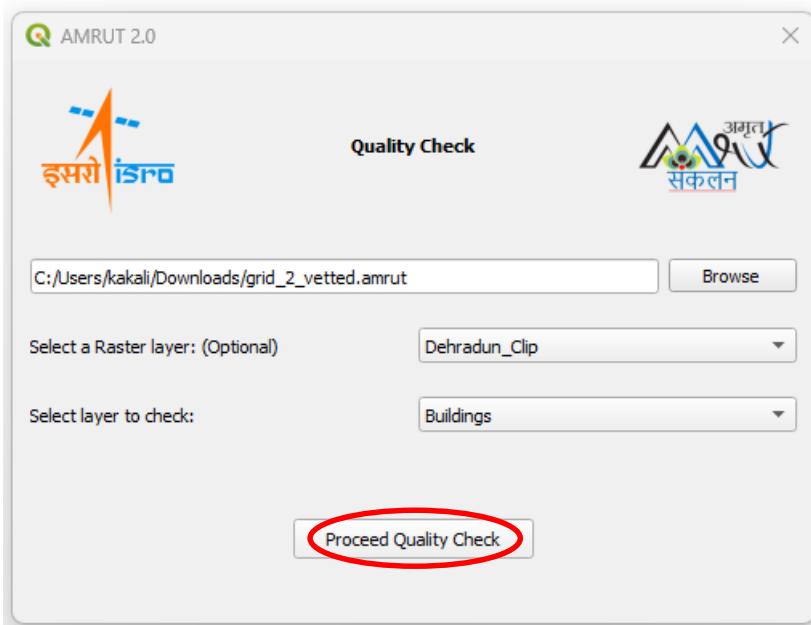


4. A quality check dialog will appear. Navigate to the location of the saved .amrut files and select a valid .amrut file. Proceed with the validation. If validation fails, the system will display the reason for the failure. Resolve the issue and restart from Step 3.





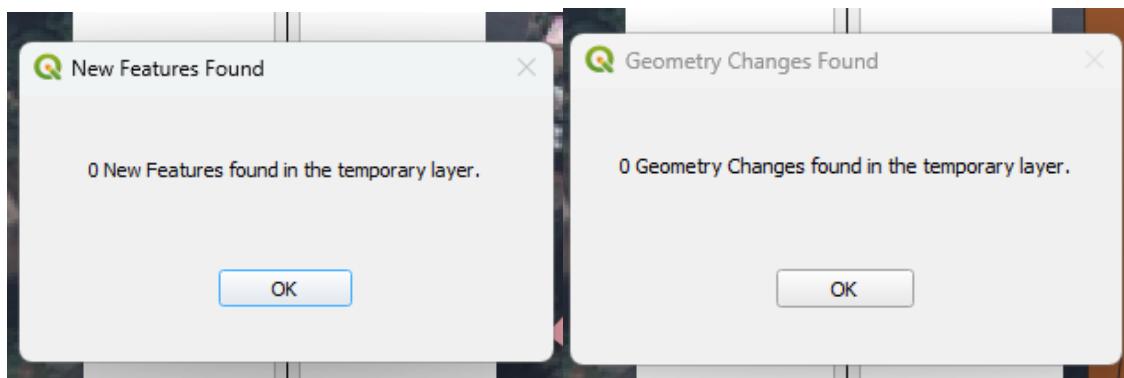
5. Click “Select Raster Layer” to select any raster from the drop-down menu.
6. Click “Select Any Layer for Quality Check”, and select the layer on which you want to perform the quality check. Click on the “Proceed Quality Check” button.



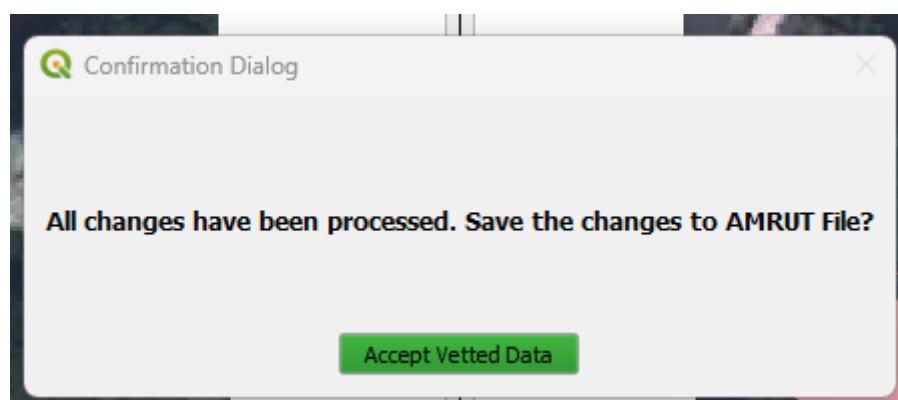
7. If a raster layer was selected, its extent will be validated in this step. If the validation fails, ensure the selected raster covers the entire grid extent. Select an appropriate raster and retry.
8. In the next step a new window will appear which displays the "Original Data" on the left side and "Field Data" on the right side.



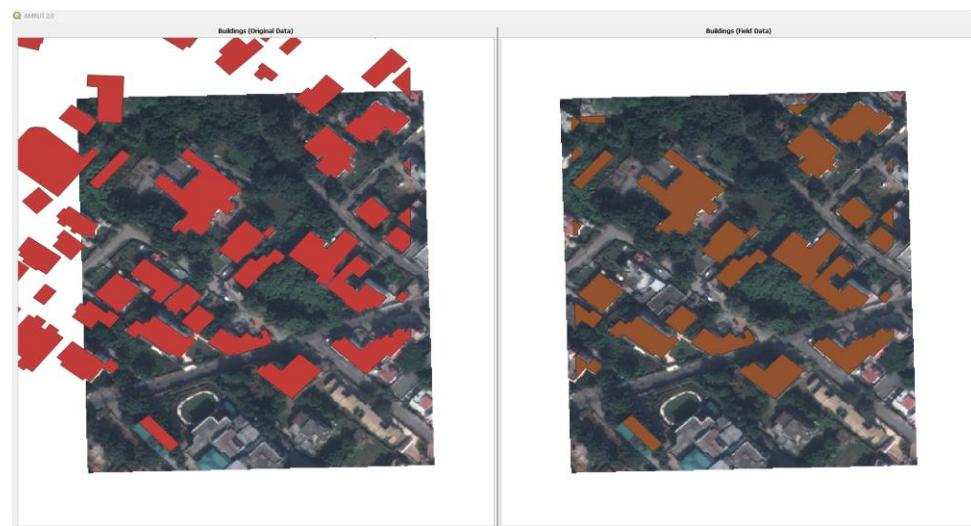
9. For this case, a "New Feature Found" Dialog will appear with the text "**0 new features found in temporary layer**". Click on the "Ok" button. Next, a "Geometry Changes Found" Dialog will appear with the text "**0 geometry changes found in temporary layer**". Click on "Ok" button.



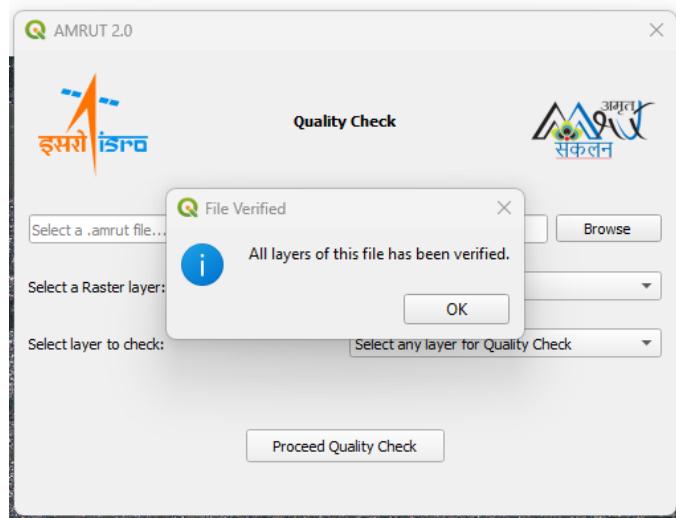
10. A Confirmation Dialog will appear. Click on "Accept Vetted Data" button.



11. The Confirmation dialog will be closed and you will be redirected to the window which displays the original data on left side and field data on the right side. Close that window.



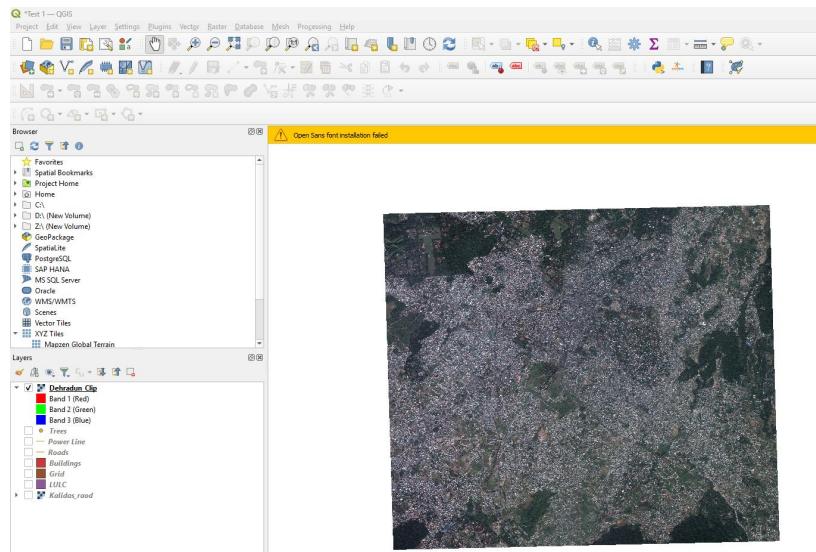
12. If all the layers of the selected .amrut file are verified, a "File Verified" dialog will appear. Click on the "Okay" button and repeat from step 4 if you wish to perform a Quality Check on any other .amrut file.



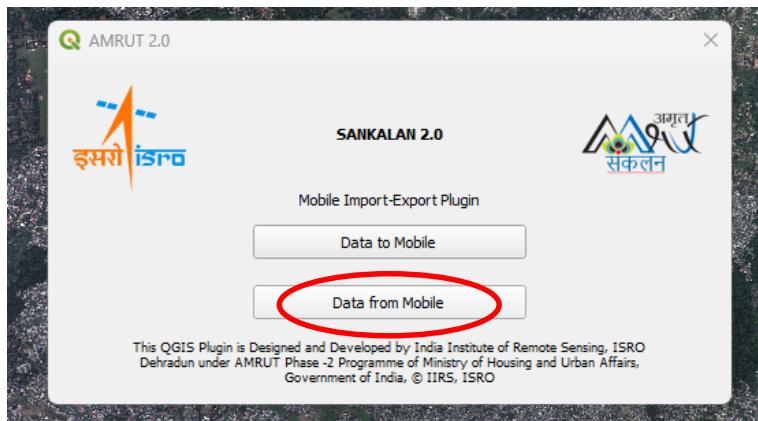
13. To verify another .amrut file, repeat from Step 4. To check another layer within the same file, repeat from Step 6.

## 6.2 Quality Check 2: New Features and Change in Geometry present in the selected layer for Quality check

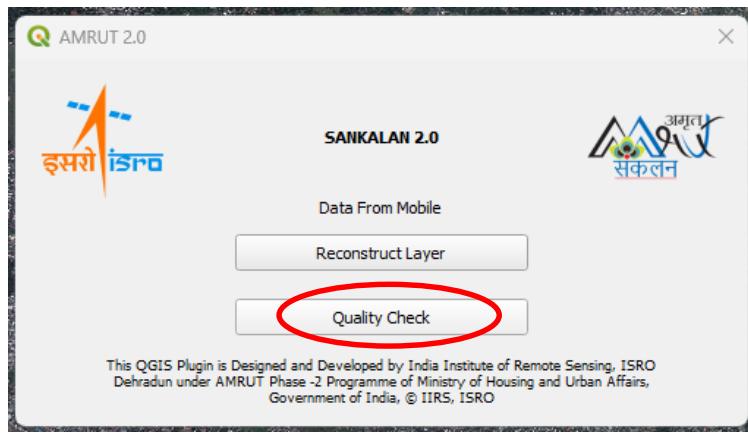
1. Open the QGIS project which was previously used for the data exportation to mobile phone with all the layers used for vetting.



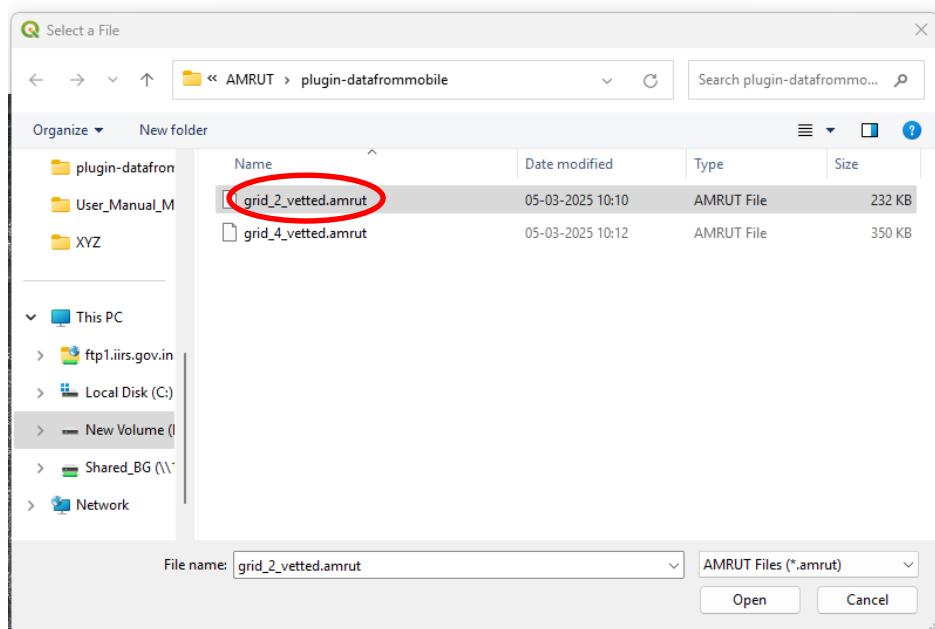
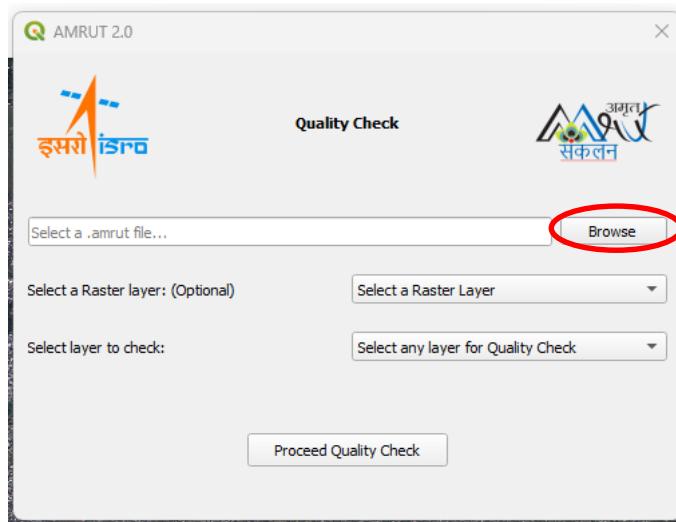
2. From the "Plugins" menu, launch "Sankalan 2" by selecting it from the available plugins. Add the required layers to your QGIS project. Save your project before proceeding.



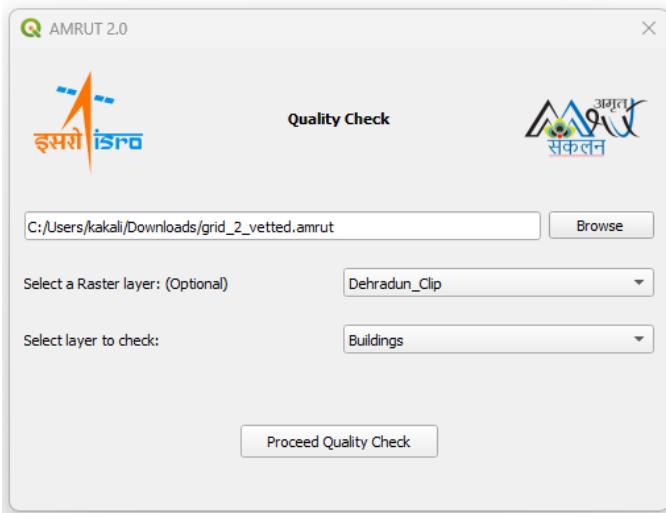
3. A dialog box will appear with two options: "**Data to Mobile**" and "**Data from Mobile**". Click on "**Data from Mobile**" which will open the another dialog box with the options, "**Reconstruct Layers**" and "**Quality Check**". Click on "**Quality Check**" to proceed with the quality check.



4. A quality check dialog will appear. Navigate to the location of the saved .amrut files and select a valid .amrut file. Proceed with the validation. If validation fails, the system will display the reason for the failure. Resolve the issue and restart from Step 3.



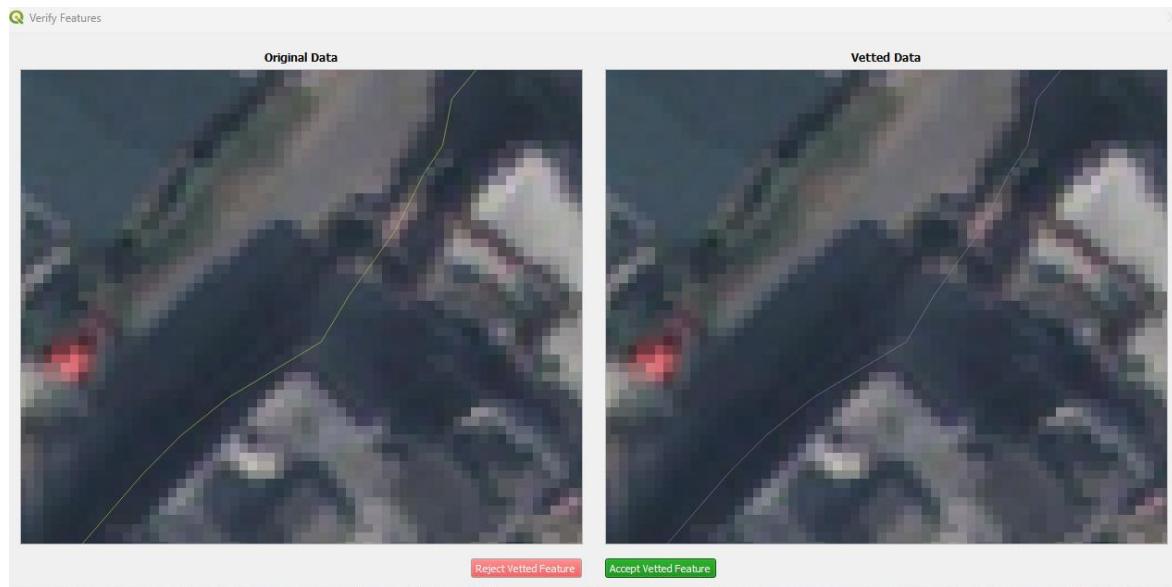
- Click on “Select Raster Layer” to select any raster for the drop down menu. Click on “Select Any Layer for Quality Check”, and select the layer on which you want to perform the quality check. Click on the “Proceed Quality Check” button.



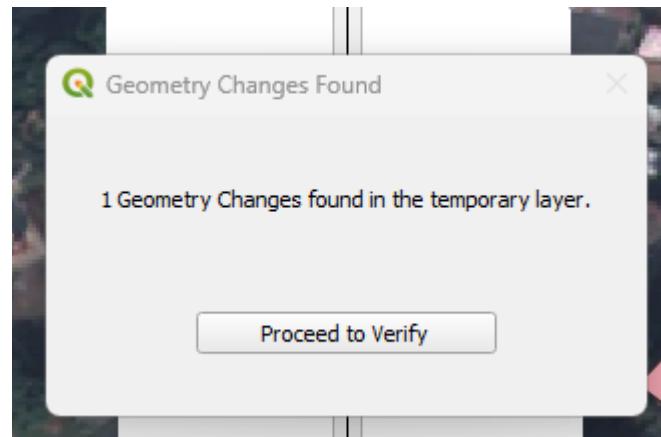
- If a raster layer was selected, its extent will be validated in this step. If the validation fails, ensure the selected raster covers the entire grid extent. Select an appropriate raster and retry.
- In the next step a new window will appear which displays the "Original Data" on left side and "Field Data" on right side.
- A “New Feature Found” dialog will appear, displaying the number of new features detected in the temporary layer. Click “OK” to continue.



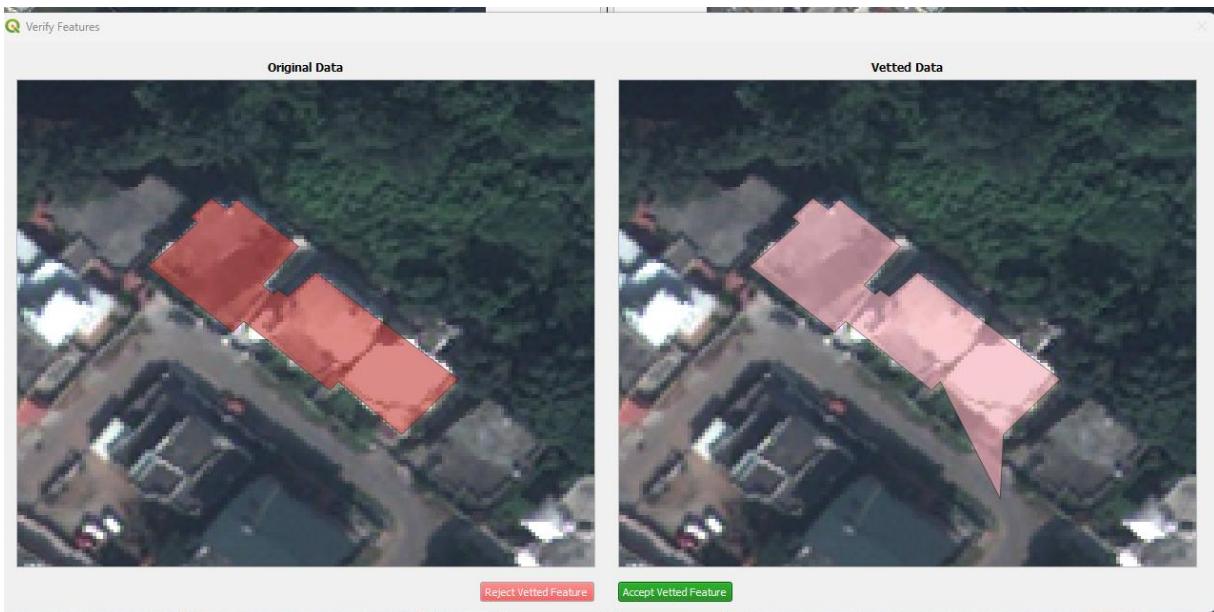
- The next step would be to verify these new features one by one. If you wish to accept a new feature from the vetted data, click “Accept Vetted Feature”. If you do not want to accept the feature, click “Reject Vetted Feature”.



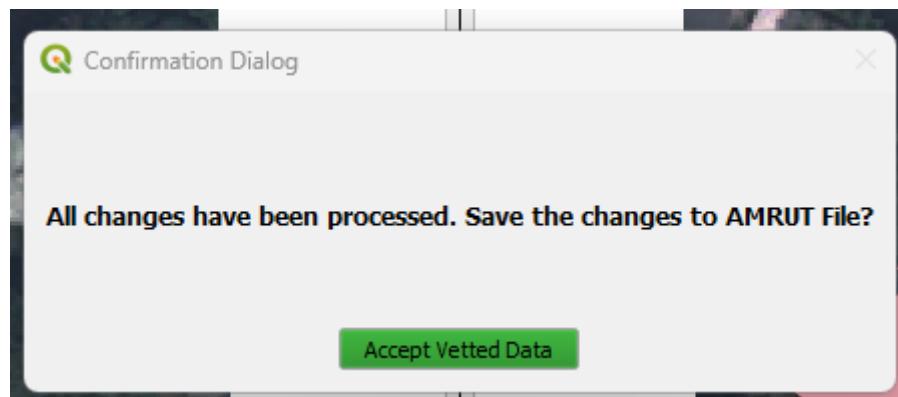
10. For geometry change, a "**Geometry Changes Found**" Dialog will appear with the count of features whose geometry has been changed in temporary layer. Click "**OK**" to continue.



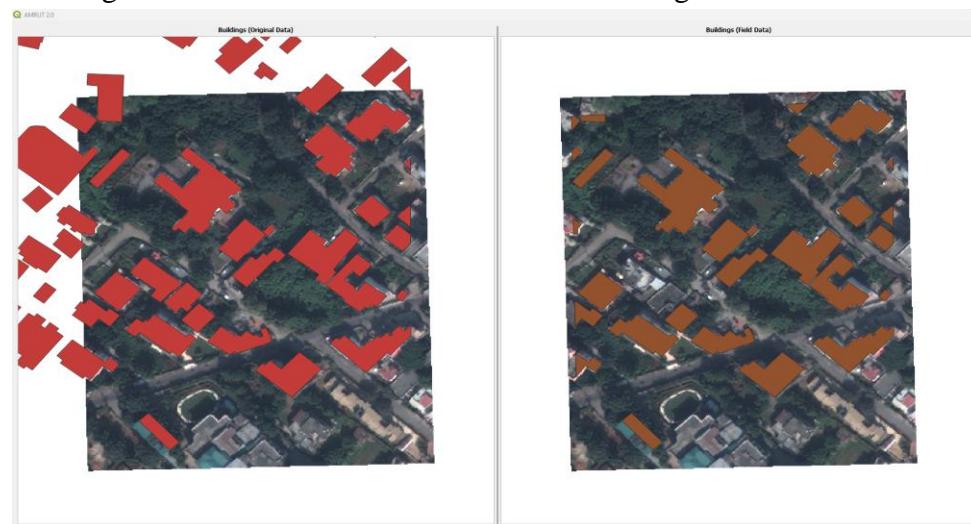
11. The next step would be to verify these geometry changes one by one. If you wish to accept the geometry change in the feature from the vetted data, click "**Accept Vetted Feature**". If you do not want to accept, click "**Reject Vetted Feature**".



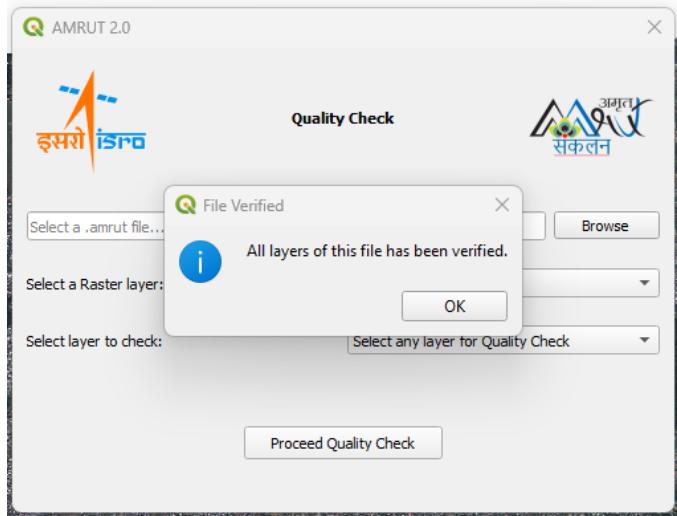
- Once all the geometry changes are reviewed, a Confirmation Dialog will appear. Click on "Accept Vetted Data" button.



- The Confirmation dialog will be closed and you will be redirected to the window which displays the original data on left side and field data on the right side. Close that window.



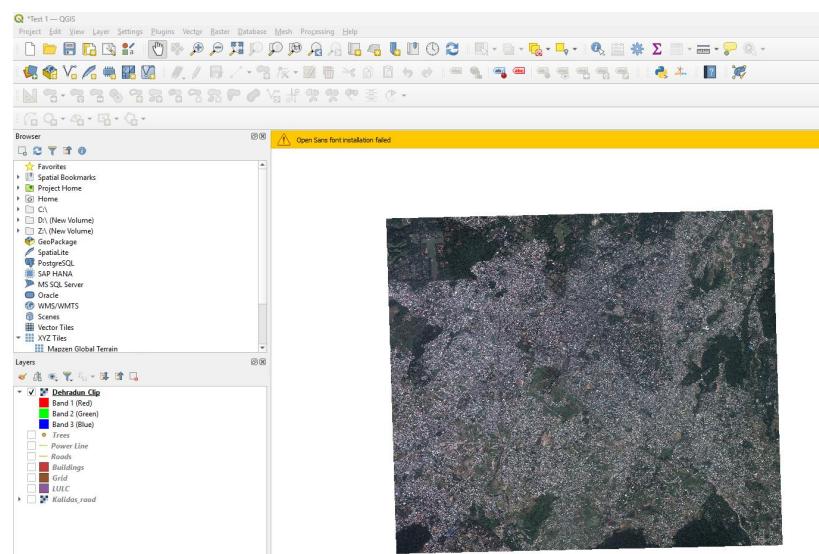
14. If all the layers of the selected .amrut file are verified a "File Verified" dialog will appear. Click on "Okay" button and repeat from step 4 if you wish to perform Quality Check on any other .amrut file.



15. To verify another .amrut file, repeat from Step 4. To check another layer within the same file, repeat from Step 6.

### 6.3 Reconstructing a layer from a layer whose attribute selection is pending.

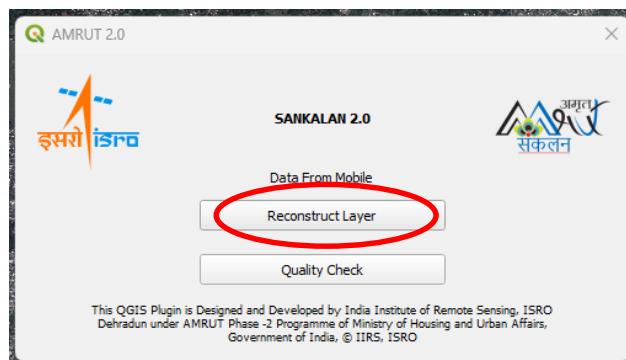
1. Open the QGIS project which was previously used for the data exportation to mobile phone with all the layers used for vetting.



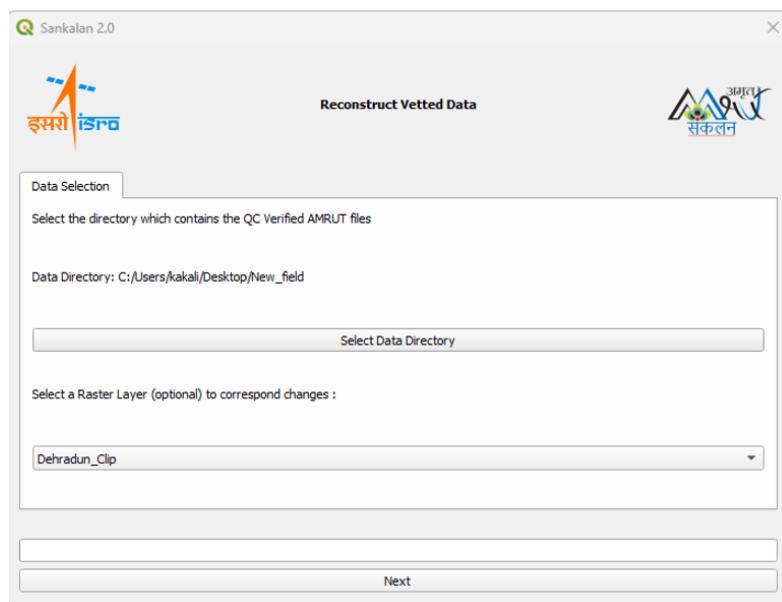
2. From the "Plugins" menu, launch "Sankalan 2" by selecting it from the available plugins. Add the required layers to your QGIS project. Save your project before proceeding.



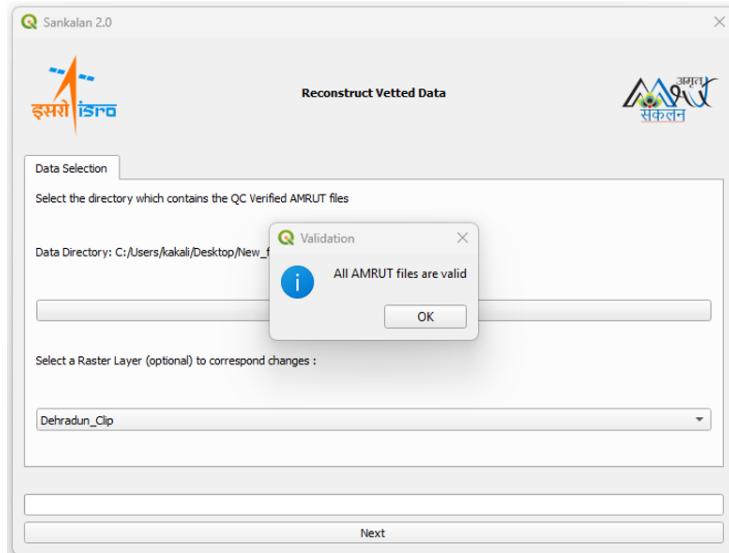
3. A dialog box will appear with two options: "**Data to Mobile**" and "**Data From Mobile**". Click on "**Data from Mobile**" which will open the another dialog box with the options, "**Reconstruct Layers**" and "**Quality Check**". Click on "**Reconstruct Layers**" to proceed with the layer reconstruction.



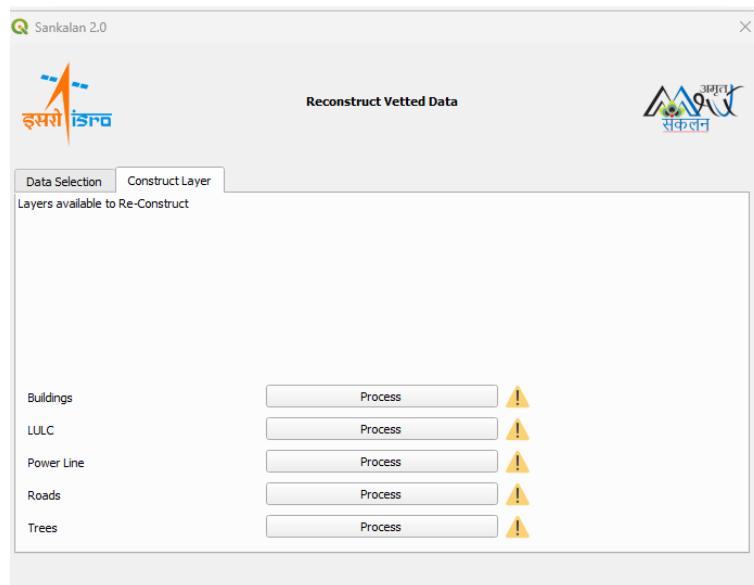
4. The Reconstruct Layer dialog will appear. In the shown dialog, "**Data Selection**" tab shows an input button to select data directory and an input dropdown which shows all the raster layers present in the project.



- Select Data Directory, which consist of all AMRUT files whose **Quality Check** has been completed. Select Raster Layer for better visualization (Optional step - takes time to process). Click on Next button, the selected directory will be validated.

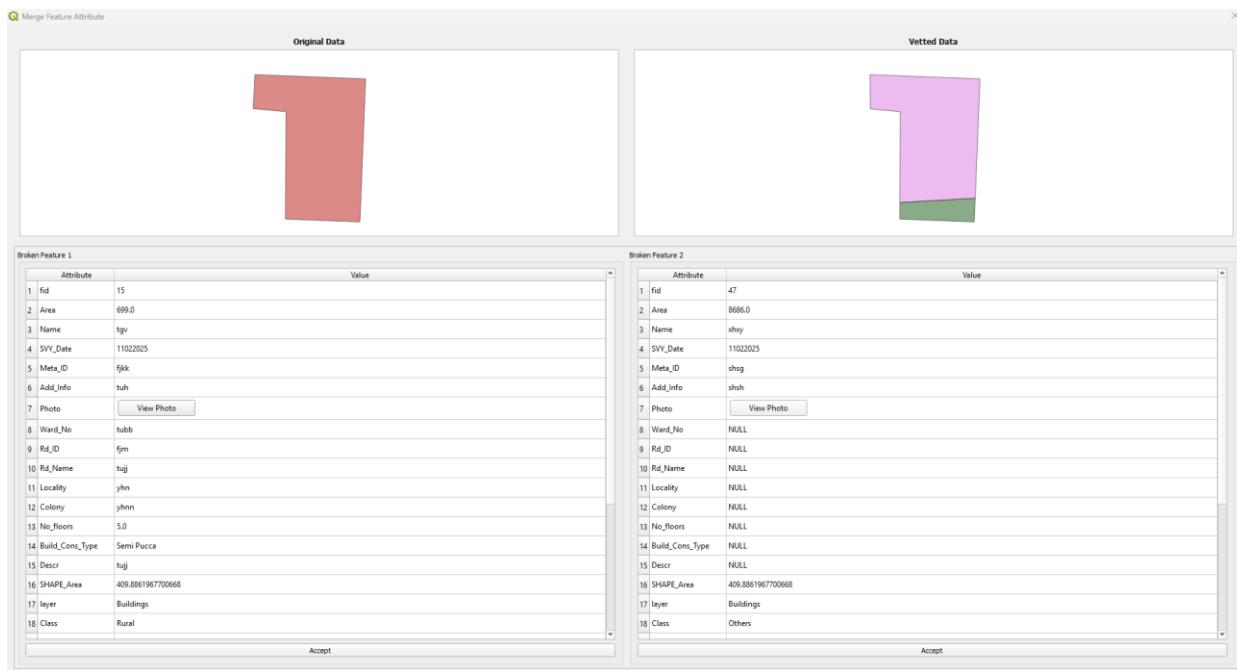


- If validation is not success, it will show the reason, resolve the issue and start from step 1. Else, a validation success message will appear and then proceed to "**Construct Layer**" tab.
- "Construct Layer"** tab will show all layers with their status (Process / Partially Processed / Processed). Click on the Process button, the selected layer will be then validated.

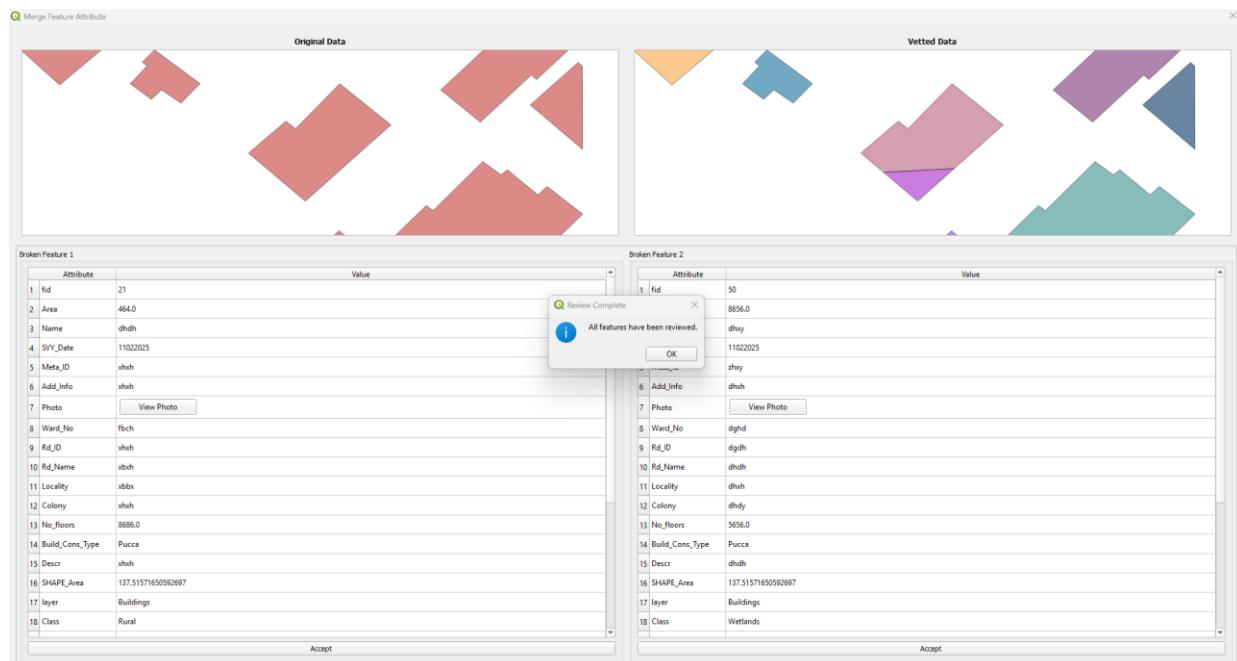


- If validation is not success, it will show the reason, resolve the issue and start again. Else, a validation success message will appear and then click on OK button. A new temporary file will be created in the project.

9. "Merge Feature Attribute" dialog becomes visible, which one by one shows visual representation of all the broken features. Which consist of original data, vetted data, attribute table of all the broken parts of original data and a button to select one of the attribute table.



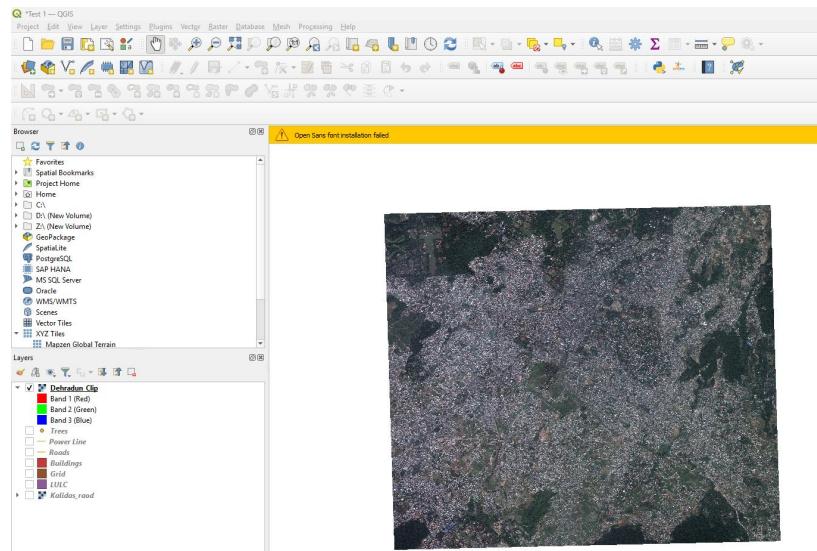
10. Select appropriate attribute values for all the features. A success message will appear and then click on OK button.



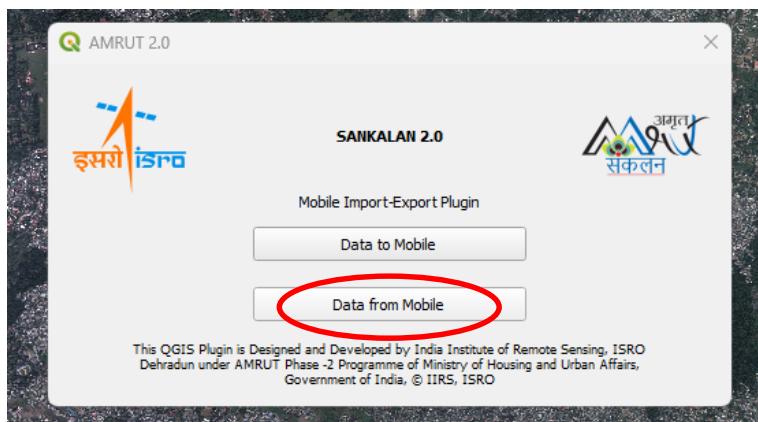
- Wait for merging to finish, a Process button will be disabled and button's text will be changed to Processed. Temporary layer's name will be changed according to vetted layer.

## 6.4 Reconstructing a layer from whose attribute selection is semi-processed.

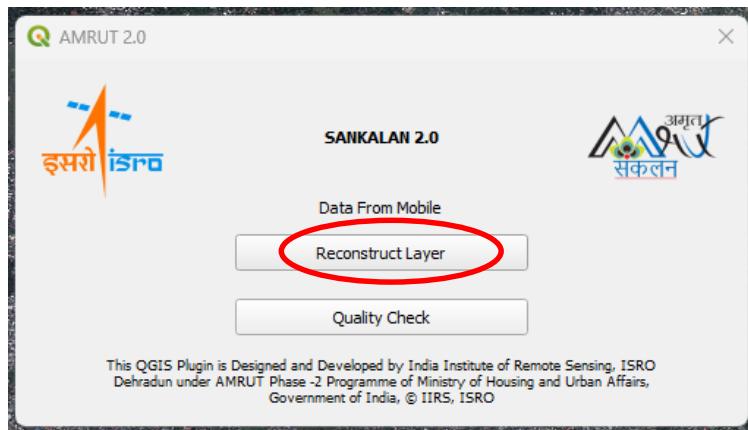
- Open the QGIS project which was previously used for the data exportation to mobile phone with all the layers used for vetting.



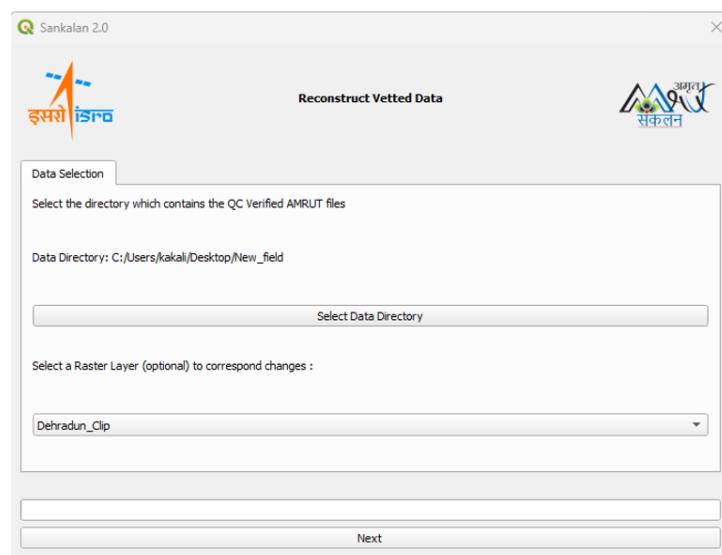
- From the "Plugins" menu, launch "Sankalan 2" by selecting it from the available plugins. Add the required layers to your QGIS project. Save your project before proceeding.



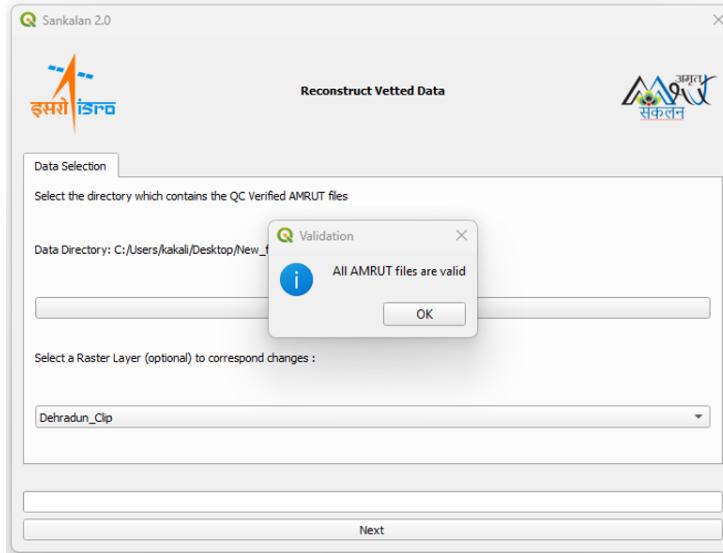
- A dialog box will appear with two options: "**Data to Mobile**" and "**Data From Mobile**". Click on "**Data from Mobile**" which will open the another dialog box with the options, "**Reconstruct Layers**" and "**Quality Check**". Click on "**Reconstruct Layers**" to proceed with the layer reconstruction.



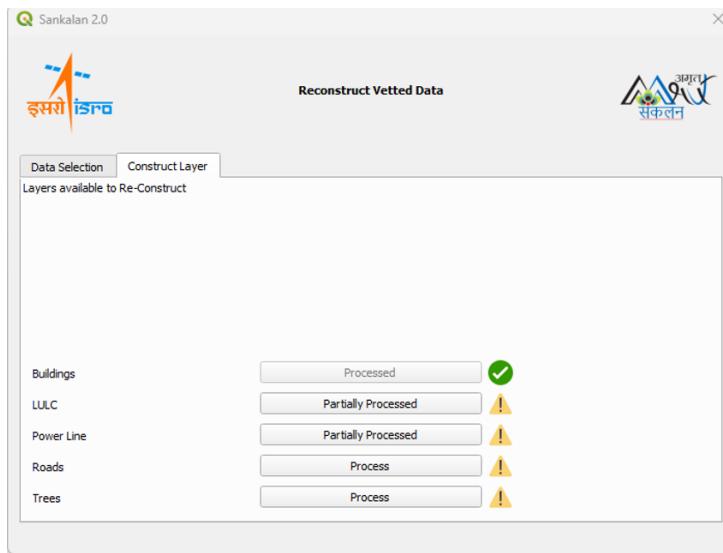
4. The Reconstruct Layer dialog will appear. In the shown dialog, “**Data Selection**” tab shows an input button to select data directory and an input dropdown which shows all the raster layers present in the project.



5. Select Data Directory, which consist of all AMRUT files whose **Quality Check** has been completed. Select Raster Layer for better visualization (Optional step - takes time to process). Click on Next button, the selected directory will be validated.

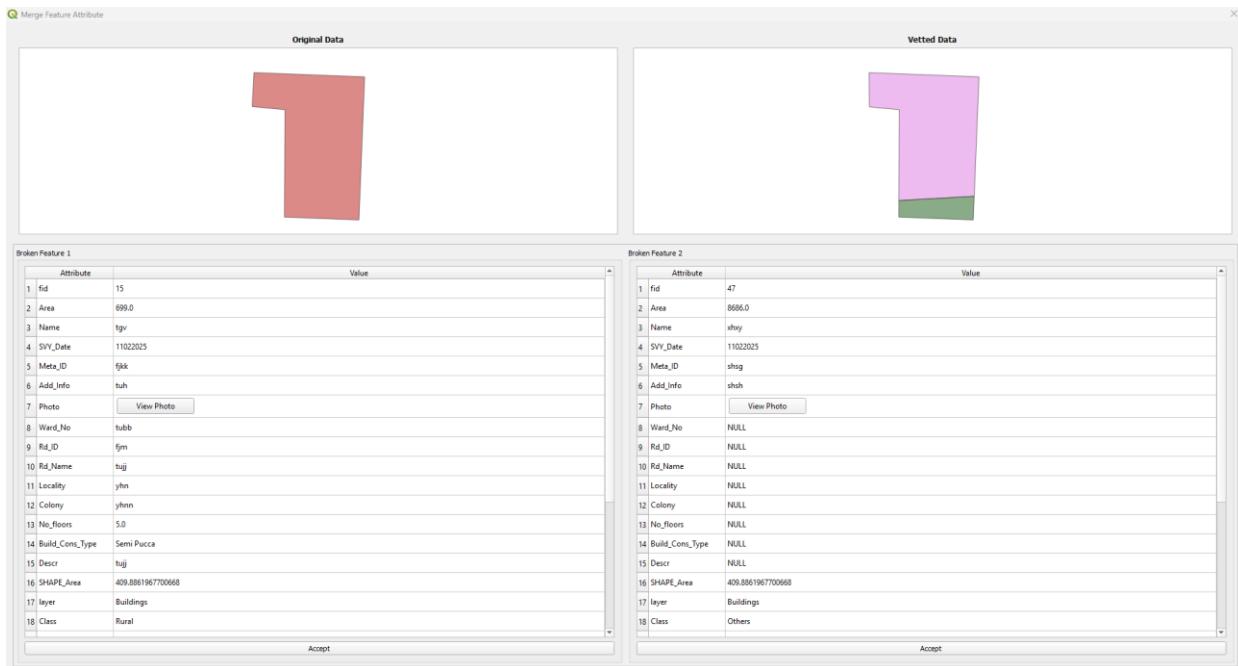


6. If validation is not success, it will show the reason, resolve the issue and start from step 1. Else, a validation success message will appear and then proceed to the "**Construct Layer**" tab.
7. The "**Construct Layer**" tab will show all layers with their status (Process / Partially Processed / Processed). Click on the **Partially Processed** button, the selected layer will be validated.

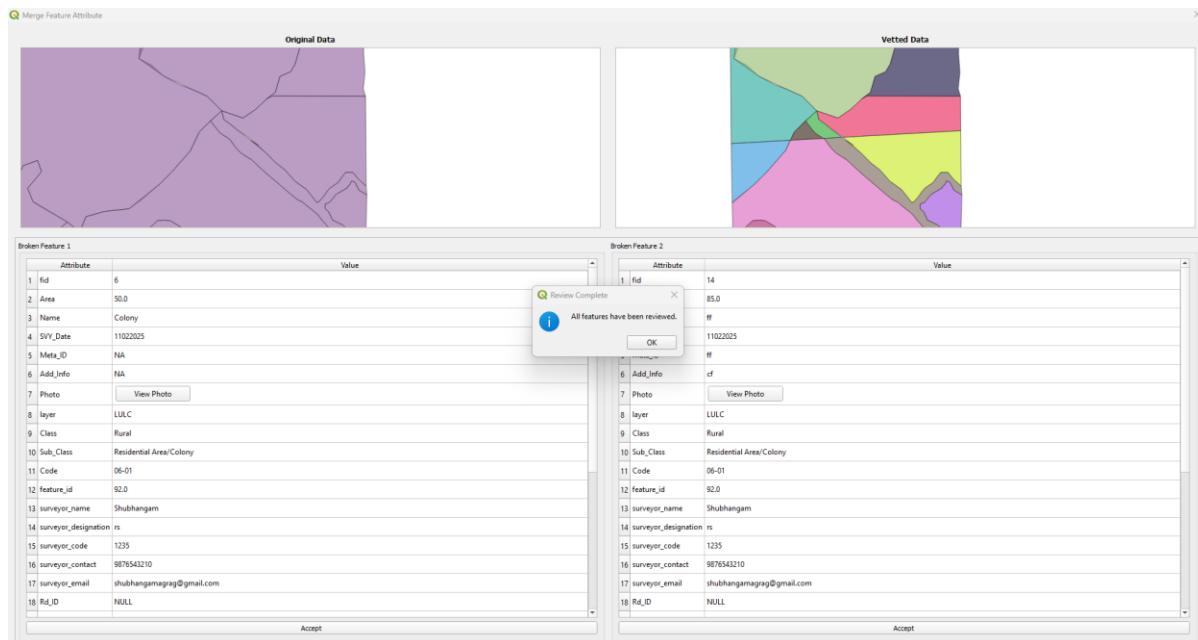


8. If validation is unsuccessful, it will show the reason, resolve the issue and start again. Else, a validation success message will appear, and then click on the **OK** button
9. The "**Merge Feature Attribute**" dialog will appear. This dialog sequentially displays all remaining broken features that require attribute selection. The dialog will consist of the original data, the vetted data, the Attribute Table containing all broken parts of the original

data. Select the appropriate attribute values for all the features from the attribute table to ensure data consistency.



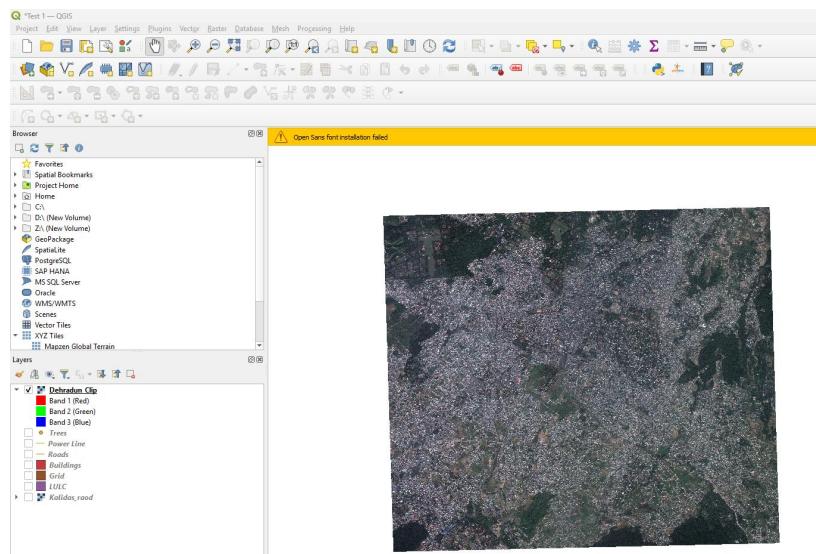
- A success message will appear once all attributes are selected. Click on the OK button to proceed.



- Wait for merging to finish, a Process button will be disabled and button's text will be changed to Processed. Temporary layer's name will be changed according to vetted layer.

## 6.5 Reconstructing a layer where there is no need for attribute selection.

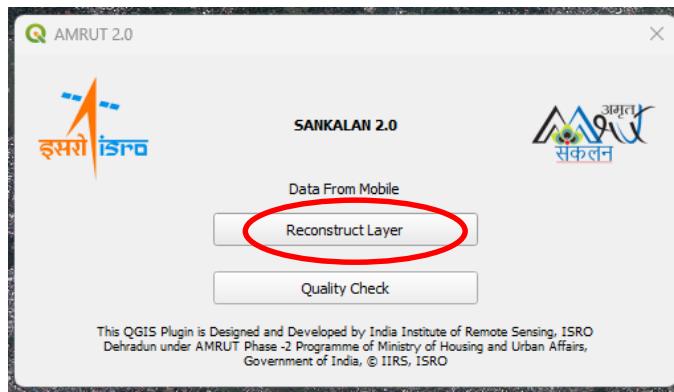
1. Open the QGIS project which was previously used for the data exportation to mobile phone with all the layers used for vetting.



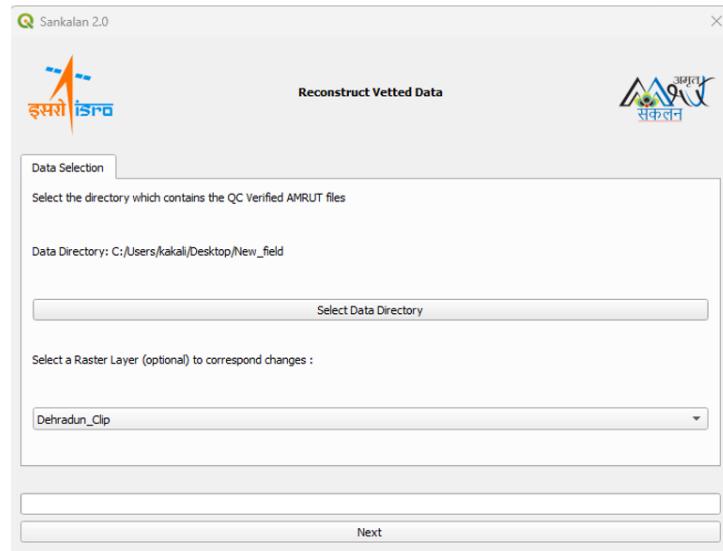
2. From the "Plugins" menu, launch "Sankalan 2" by selecting it from the available plugins. Add the required layers to your QGIS project. Save your project before proceeding.



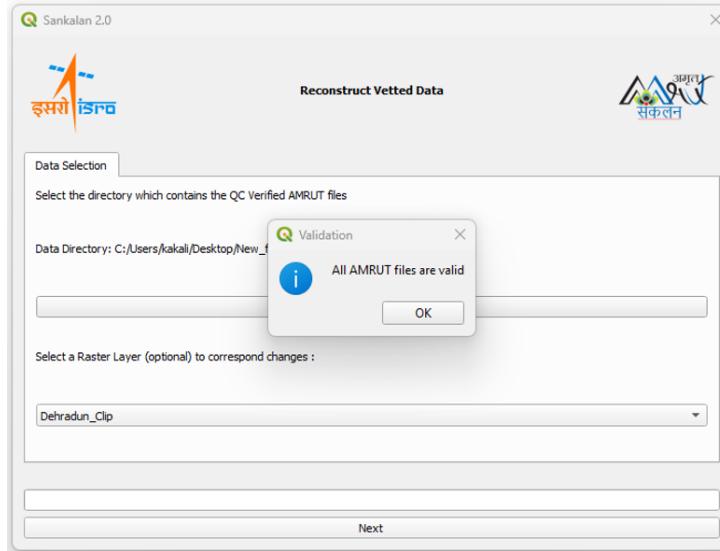
3. A dialog box will appear with two options: "**Data to Mobile**" and "**Data from Mobile**". Click on "**Data from Mobile**" which will open the another dialog box with the options, "**Reconstruct Layers**" and "**Quality Check**". Click on "**Reconstruct Layers**" to proceed with the layer reconstruction.



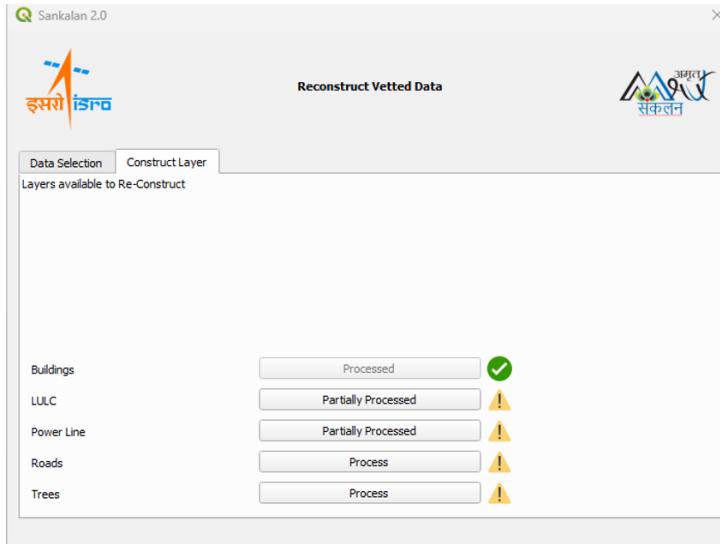
4. The Reconstruct Layer dialog will appear. In the shown dialog, “**Data Selection**” tab shows an input button to select data directory and an input dropdown which shows all the raster layers present in the project.



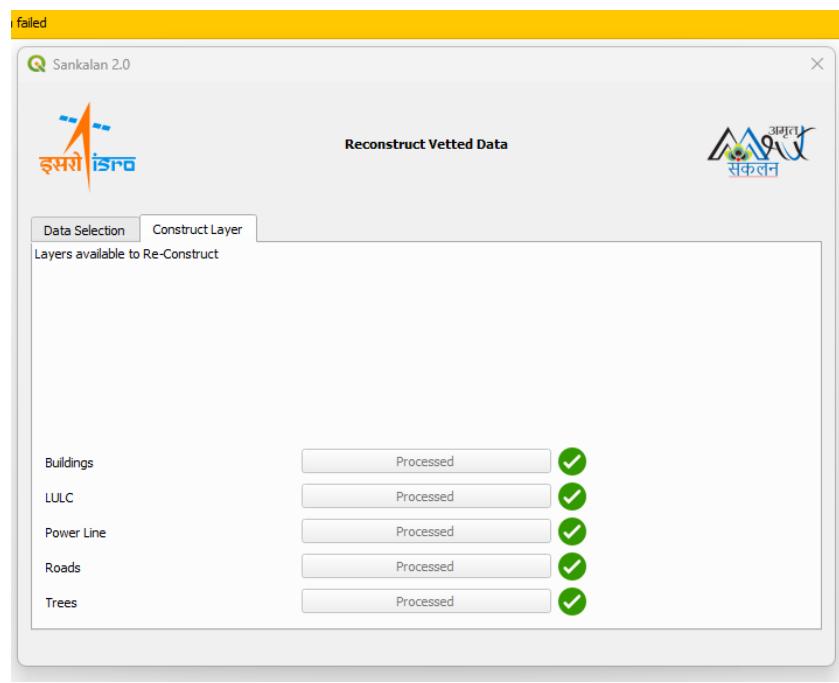
5. Select Data Directory, which consist of all AMRUT files whose **Quality Check** has been completed. Select Raster Layer for better visualization (Optional step - takes time to process). Click on Next button, the selected directory will be validated.



6. If validation is not success, it will show the reason, resolve the issue and start from step 1. Else, a validation success message will appear and then proceed to the "**Construct Layer**" tab.
7. The "**Construct Layer**" tab will show all layers with their status (Process / Partially Processed / Processed). Click on the **Processed** button, the selected layer will be validated.



8. If validation is unsuccessful, it will show the reason, resolve the issue and start again. Else, a validation success message will appear, and then click on the **OK** button. A new temporary file will be created in the project.
9. Wait for merging to finish, a Process button will be disabled and button's text will be changed to Processed. Wait for merging to finish, a Process button will be disabled and button's text will be changed to Processed. Temporary layer's name will be changed according to vetted layer.



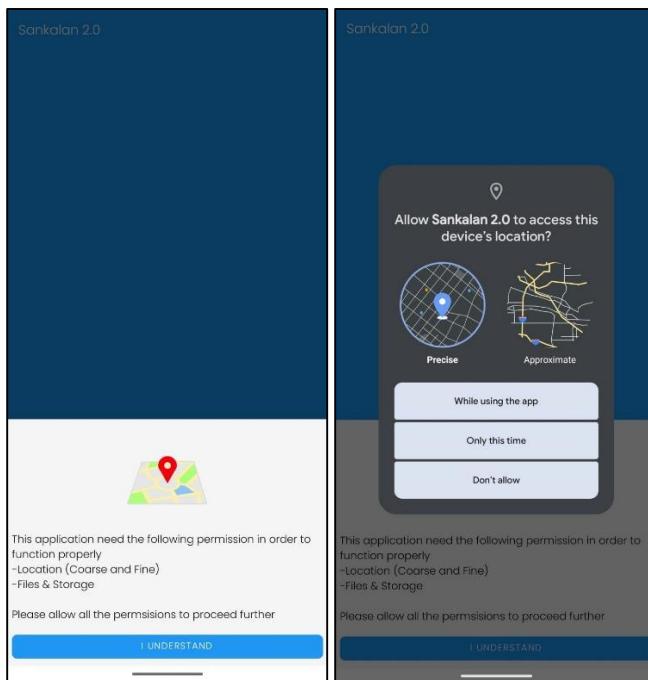
# 7. SANKALAN 2.0 – Mobile Application

## 7.1 Downloading/Installation of Sankalan 2.0

1. Open the Google Play Store on your mobile device. Search for "**Sankalan 2.0**" in the search bar.
2. Click on the "**Install**" button to download and install the app.

## 7.2 Initialization of Sankalan 2.0 Mobile Application

1. Once the installation is complete, open the app from the Play Store by clicking on "**Open**" or **launch it from the app**.
2. A permission dialog will appear requesting the location access. Click on "**I Understand**" to proceed. A system dialog box will appear to confirm the location permission request. Select "**While Using the App**" to grant location access.

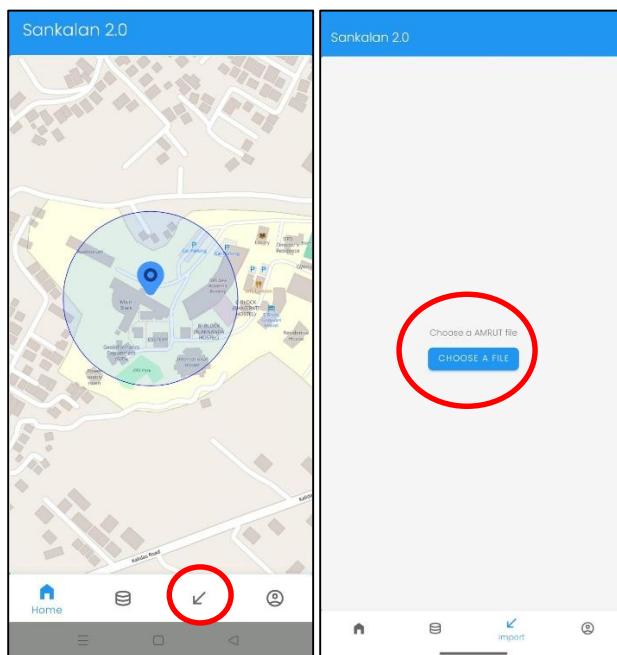


3. A form will appear prompting the user to enter surveyor details. Fill out all the required fields in the form. Click on "**Save**" to submit the details.

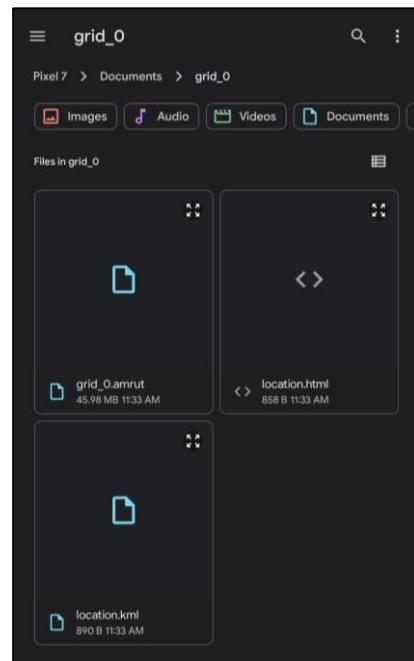
- After successful form submission, the home page of the application will be displayed. The home page will show the current location of the user along with a Geo-Fence boundary.

### 7.3 Regular Launch of Sankalan 2.0 and Import of AMRUT file from QGIS Plugin

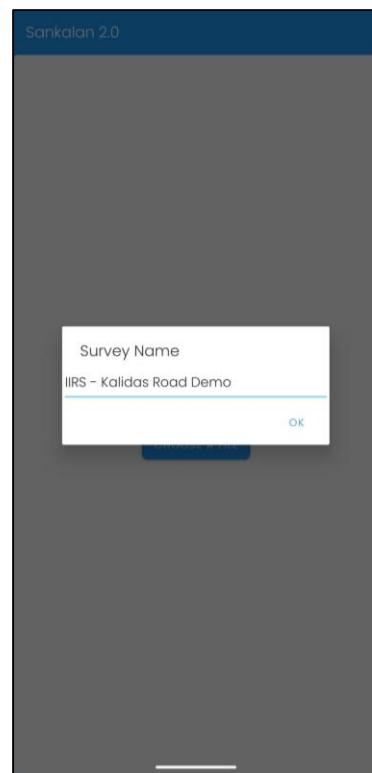
- Once the installation is complete, open the app from the Play Store by clicking on "Open" or **launch it from the app**.
- Click on the ↘ icon located on the Bottom Navigation Bar. Click on "**Choose AMRUT File.**"



3. Navigate to the folder where you have saved your folder. Choose the required **AMRUT file** from the system File Manager.



4. The file will be processed, and a prompt will appear to enter the **Survey Name**. Input the name of the survey and proceed.



## 7.4 Loading an already Imported/Saved Survey/Project

1. Open the app from the icon available on your phone.
2. Click on the  icon in the Bottom Navigation Bar.



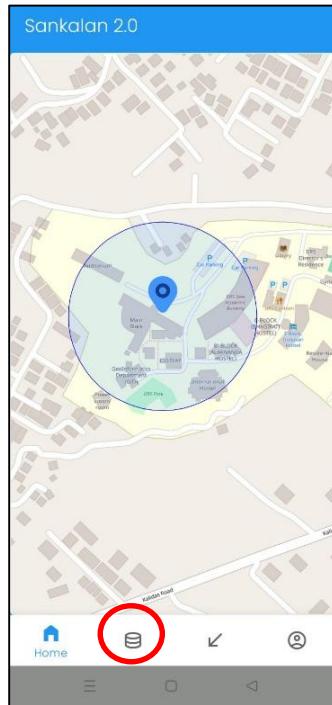
3. A list of imported surveys will appear.



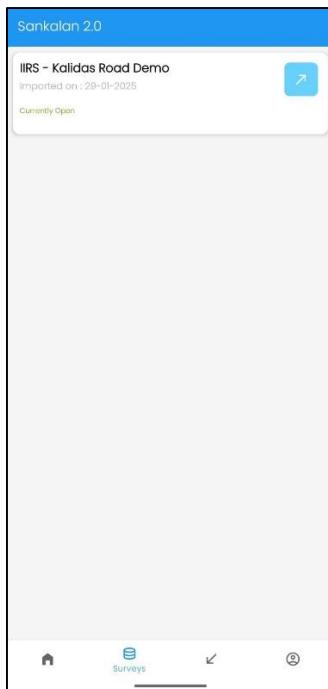
4. Click on the desired survey to open it.

## 7.5 Vetting Data / Attribute Input of Existing Geometry

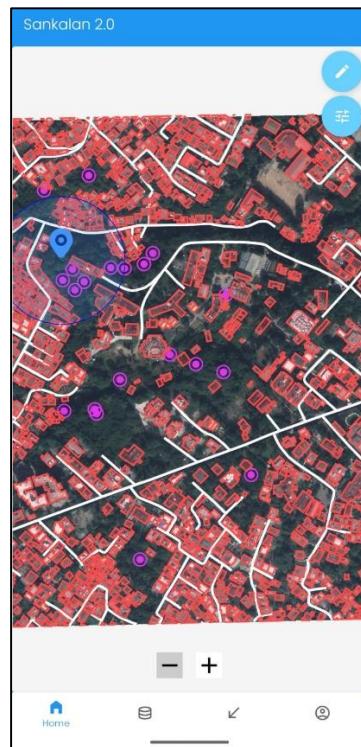
1. Open the app from the icon available on your phone.
2. Click on the  icon in the Bottom Navigation Bar.



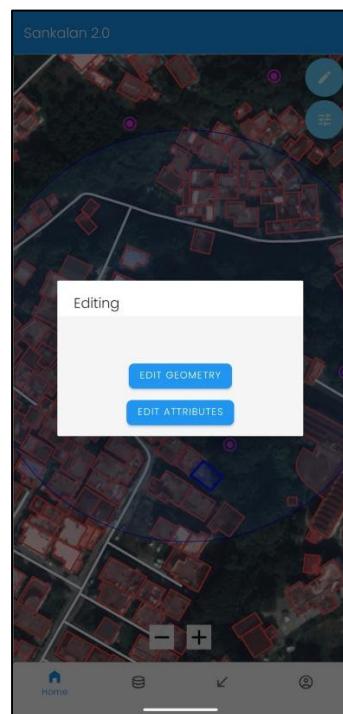
3. A list of imported surveys will appear. Click on the desired survey to open it.



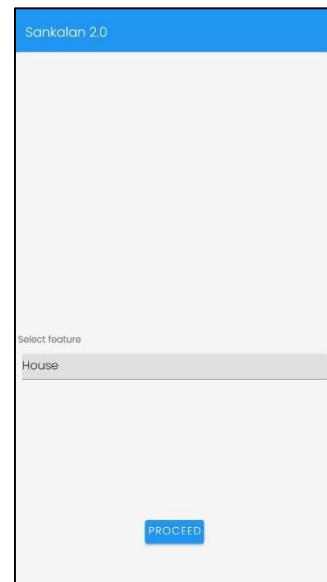
4. Within the Geo-Fence, tap and hold a geometry to select any geometry. It is very important to note that, edit or vetting of attribute data is not permitted outside the geo-fence boundary.



5. A pop-up will appear to choose between “Edit Geometry” or “Edit Attributes”. Choose “Edit Attributes” to edit/vet attribute data.



6. A page to select a feature will be displayed. Select a suitable feature and click on “Proceed”.

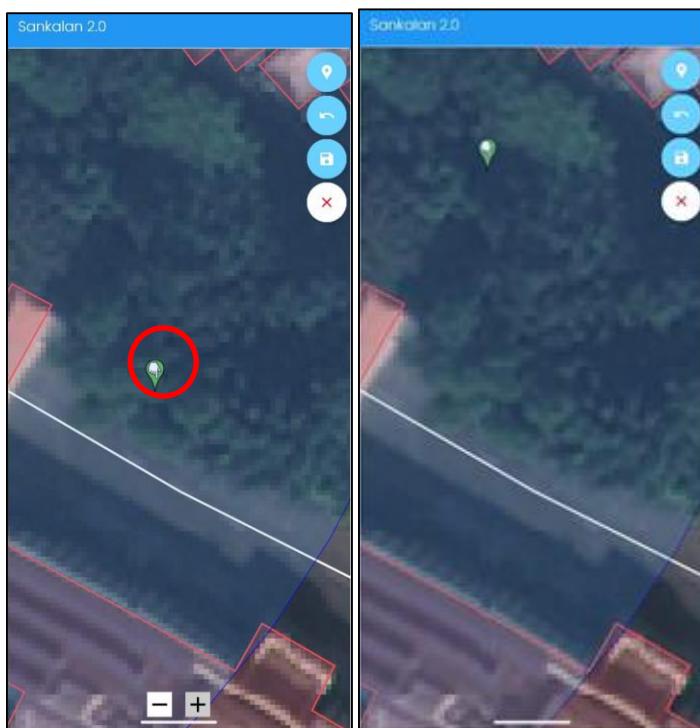


7. A multi-stage input form will appear. Fill out the form and click on the “Save” button at the end of the form. Post Saving the attributes, the geometry will appear in green.

The first screenshot shows a single-page input form for a 'House'. It includes fields for 'Area in sq. mt.', 'Name of the feature', 'Survey Date' (29012025), 'Metadata ID', and 'Additional Information'. The second screenshot shows a two-page input form. The first page has a 'Photograph' field containing an image of an office interior, a 'Ward Number' field (11), and a 'Road Id' field (NA). The second page has 'Road Name' (Vijay Colony) and 'Locality Name' (Vijay Colony). The third screenshot shows a map view of a residential area with numerous buildings outlined in red. A blue location marker is placed on the map, and a green polygon highlights a specific building. The map interface includes icons for 'Home', 'Previous', 'Next', and 'Search'.

## 7.6 Editing an existing Point Geometry

1. Follow the steps from section 7.4
2. Within the Geo-Fence, tap and hold a **point geometry** to select any geometry.
3. A pop-up will appear to choose between “**Edit Geometry**” or “**Edit Attributes**”. Choose “**Edit Geometry**” to edit the geometry.
4. Select the point to edit. The selected point will appear as  icon. To **change the location** of the selected point, **hold and drag** the  icon.



5. If needed, undo the current operation by clicking on the  icon in the top right menu of the home page.
6. Click on the  icon in the top right menu of the home page to finalize the changes.

## 7.7 Editing an existing Line Geometry

1. Follow the steps from section 7.4
2. Within the Geo-Fence, tap and hold a **line geometry** to select any geometry.

3. A pop-up will appear to choose between “**Edit Geometry**” or “**Edit Attributes**”. Choose “**Edit Geometry**” to geometry.
4. The Selected Line is highlighted in Blue and all the points of the line appear as  icon.
5. To change the location of the selected point, hold and drag the  icon.



6. To add a new point, tap on the desired location, and a new point will be added to the end of the line.



7. Undo on the current operation can be done by clicking on the  icon on the top right menu of the home page.
8. Click on the **save icon**  in the top right menu of the home page to finalize the changes.

## 7.8 Editing an existing Polygon Geometry

1. Follow the steps from section 7.4
2. Within the Geo-Fence, tap and hold a **Polygon geometry** to select any geometry.
3. A pop-up will appear to choose between “**Edit Geometry**” or “**Edit Attributes**”. Choose “**Edit Geometry**” to geometry.
4. The Selected Polygon is highlighted as blue and all the vertices of the polygon appear as  icon



5. To change the location of the selected point, hold and drag the  icon.



6. To add a new Vertex, tap on the desired Edge/Side of the Polygon, and a new Vertex to the given edge will be added.

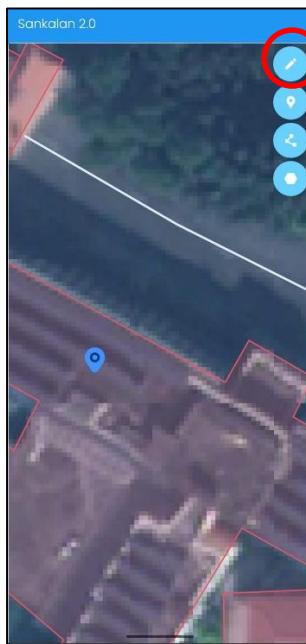


7. Undo on the current operation can be done by clicking on the undo icon on the top right menu of the home page.
8. Click on the **save icon**  in the top right menu of the home page to finalize the changes.

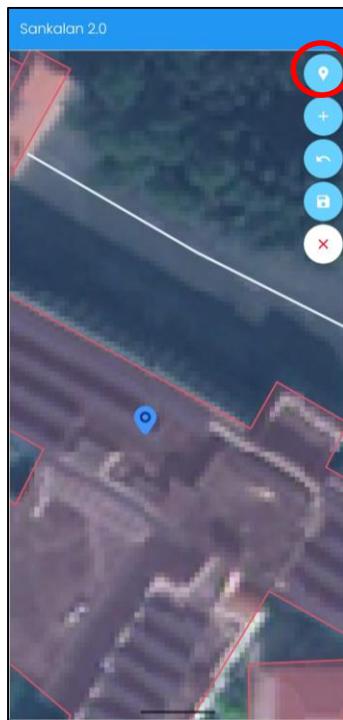


## 7.9 Adding a new Point Geometry

1. Follow the steps from section 7.4
2. On the top right of the screen, click the icon. A sub-menu will appear with additional options.



3. In the sub-menu, click on the icon. This will open an editing sub-menu.



4. Within the editing sub-menu, click the icon. Then, tap on any desired location on the map or interface where you want to add a point.
5. The newly added point will appear as a icon on the screen and will be highlighted in blue.



6. If you wish to move the point, hold and drag the icon to change its location.

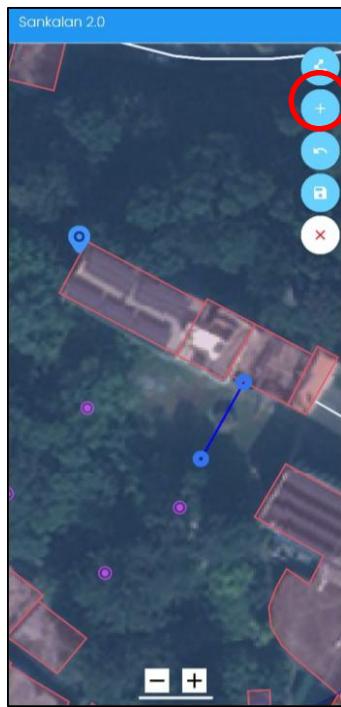
7. Once you're satisfied with the added or moved point, click the  icon on the top right menu of the home page to save your changes.

## 7.10 Adding a new Line Geometry

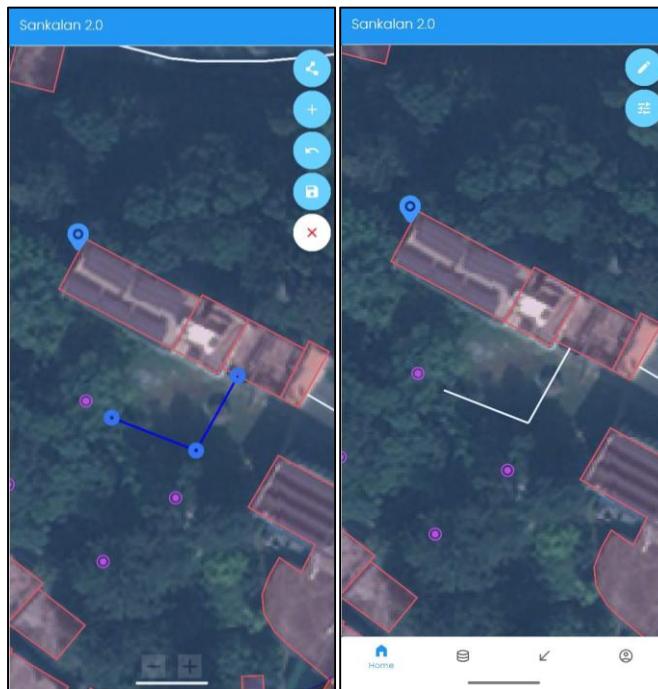
1. Follow the steps from section 7.4. On the top right of the screen, click the  icon. A sub-menu will appear with additional options.



2. Click the  icon to open the editing sub-menu. Click the  icon in the editing sub-menu, then tap on any location where you want to start adding a line.



3. Keep tapping on different locations to add as many points as needed.
4. The newly added points will be highlighted in blue and shown as icons, added to the end of the line.
5. To move a point, hold and drag any icon to change its location.
6. Click the icon in the top-right menu on the home page to save your changes.



## 7.11 Adding a new Polygon geometry

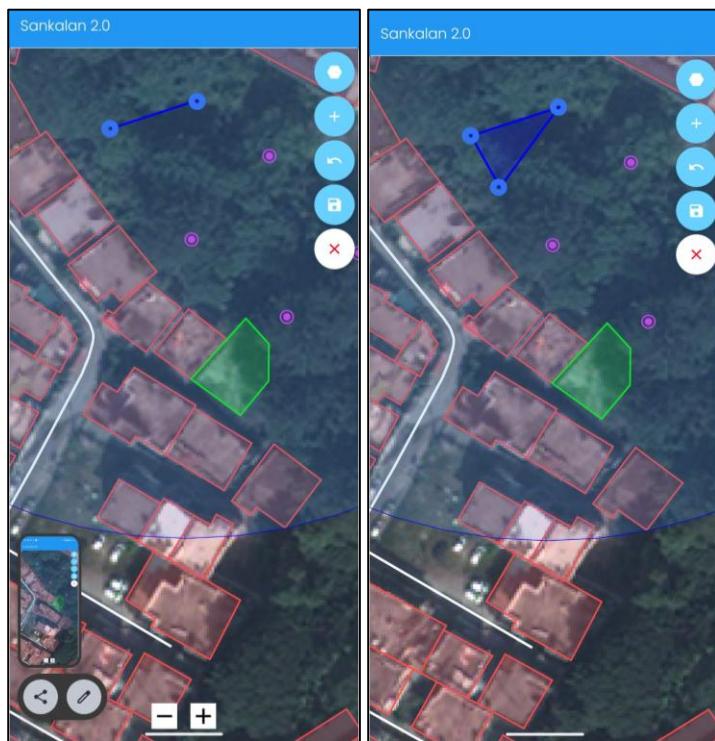
1. Follow the steps from section 7.4
2. On the top right of the screen, click the icon. A sub-menu will appear with additional options. Click the icon to open the editing sub-menu.



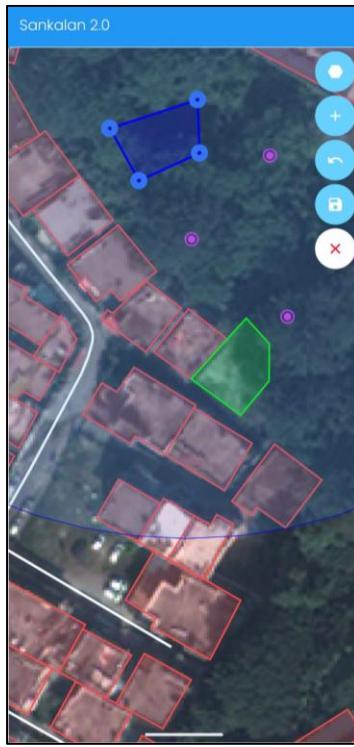
3. Click the icon in the editing sub-menu, then tap on any location where you want to start adding a polygon.



4. Keep tapping on different locations to add as many points as needed.



5. The newly added points will be highlighted in blue and shown as icons, attaching to the nearest edge.



6. To move a point, hold and drag any icon to change its location.
7. Click the icon in the top-right menu on the home page to save your changes.

## 7.12 Splitting of any feature in the application.

1. Follow the steps from section 7.4
2. Within the Geo-Fence, tap and hold a **geometry** to select any geometry to split.
3. A pop-up will appear to choose between “**Edit Geometry**” or “**Edit Attributes**”. Choose “**Edit Geometry**” to geometry.
4. The Selected Polygon is highlighted as blue and all the vertices of the polygon appear as icon



5. Click on the icon to split the geometry
6. The selected polygon will be highlighted in Green. Add points to mark the area from where you want to slit the selected feature. And tap the tick button to accept the change.



7. The feature is not split into two parts.



### 7.13 Merging of any feature in the application.

1. Follow the steps from section 7.4
2. Within the Geo-Fence, tap and hold a **geometry** to select any geometry to merge.
3. A pop-up will appear to choose between “**Edit Geometry**” or “**Edit Attributes**”. Choose “**Edit Geometry**” to geometry.
4. The Selected Polygon is highlighted as blue and all the vertices of the polygon appear as icon.



5. Click on the icon to merge the geometry.

6. The selected polygon will be highlighted in blue. Select the features you want to merge.



7. Click on the tick icon to accept the change in geometry. The two features would be merged now.

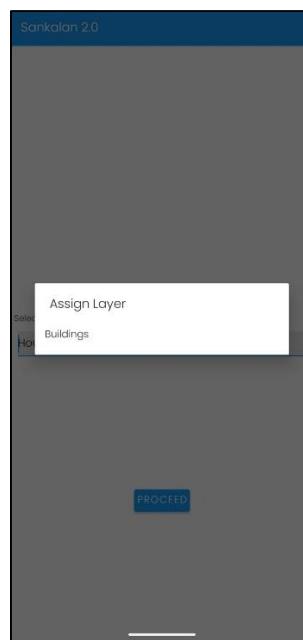


## 7.14 Vetting Data / Attribute Input of New Geometry

1. After adding the new feature, as demonstrated in the section 4.10 to 4.12, to edit the attributes tap and hold the newly added geometry inside the Geo-Fence.
2. A pop-up will appear with options to “**Edit Geometry**” or “**Edit Attributes**”. Choose “**Edit Attributes**”.
3. A page will appear to select a feature. Select a suitable feature and click on “**Proceed**”.



4. A dialog will appear to assign a relevant layer. Choose a suitable layer and proceed.



5. A multi-stage input form will appear. Fill out the form and click on the “Save” button at the end of the form.

Sankalan 2.0

House

Photograph

Ward Number

11

Road Id

NA

Road Name

Vijay Colony

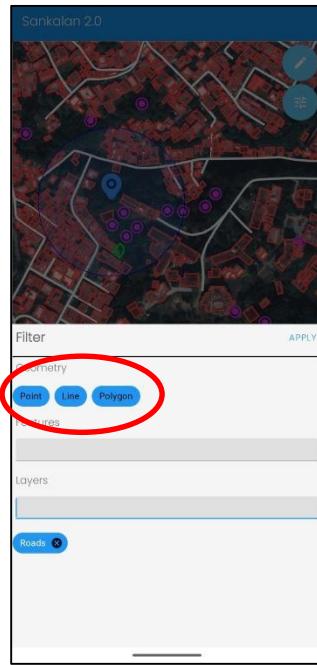
Locality Name

Vijay Colony

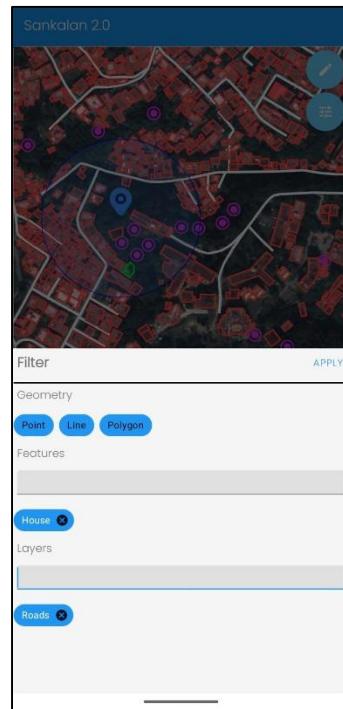
PREVIOUS      NEXT >

## 7.15 Filtering Features

1. Follow the steps from section 7.5
2. On the top left of the screen, click the icon
3. A Bottom Sheet Dialog will appear. Choose the geometry type (**Point, Line, or Polygon**) by tapping on your preferred option.



4. In the “**Feature**” selection box, choose features to filter. In the “**Layers**” selection box, choose layers to filter.

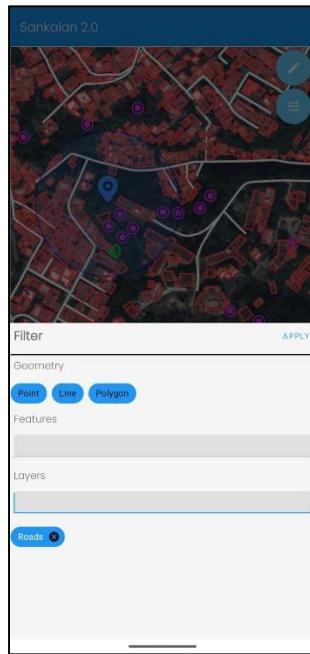


5. After setting your filter criteria, click “**Apply**” in the top-right corner of the Bottom Sheet Dialog.

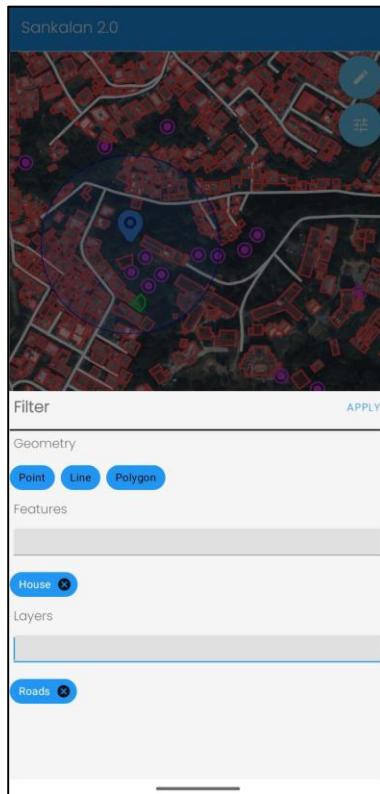
## 7.16 Removing Filter

1. Follow the steps from section 4.5 On the top left of the screen, click the icon.

2. A Bottom Sheet Dialog will appear. Tap on the geometry type (Point, Line, or Polygon) to remove it.



3. Tap on the  $\otimes$  of the feature chip to remove it. Tap on the  $\otimes$  of the layer chip to remove it.



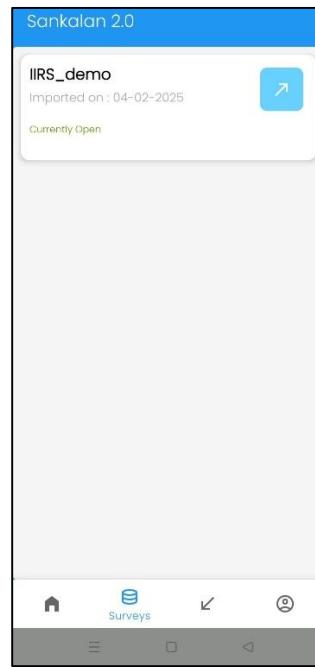
- After removing filter arguments, click “**Apply**” on the top right corner of the Bottom Sheet Dialog.

## 7.17 Exporting Data

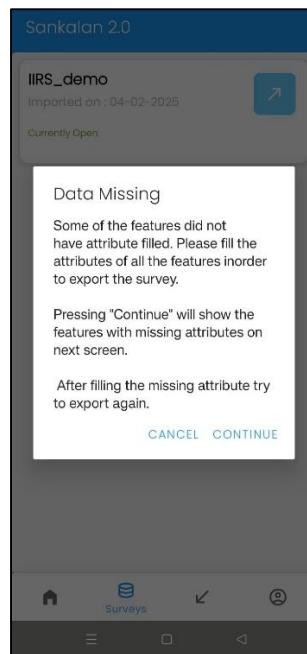
- Launch the app** from the icon. Navigate to the Surveys page by clicking the  icon in the Bottom Navigation Bar.



- A list of Imported Surveys will appear. Click the  icon next to the survey you wish to export. The export process will begin.

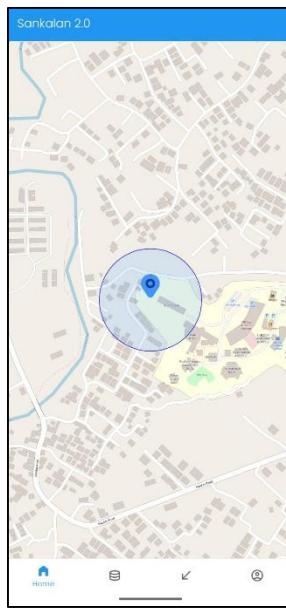


3. If all attributes of every feature are filled, the data will be exported as an AMRUT file in the Documents folder. The file will be named as: "grid\_<Number>\_vetted.amrut".
4. If any feature is missing required attributes, a dialog will appear informing you that not all attributes are filled and prompting you to complete them before export.

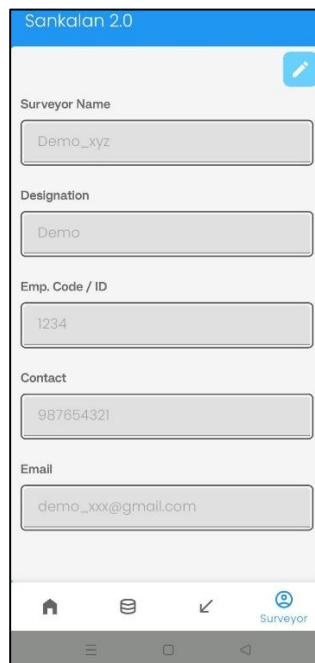


## 7.18 Editing/Displaying Surveyor Details

1. **Launch the app** from the icon.
2. Navigate to the **Surveyor** page by clicking the  icon in the **Bottom Navigation Bar**.



3. The Surveyor details will be displayed. To edit the details, click the icon in the top right corner of the screen.



4. All detail fields will become editable, allowing you to make changes.



5. Once editing is complete, click the “Save” button to save the changes.