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Excursion

In-situ sampling in QField

Learning objectives

Configure QGIS projects for mobile field data collection.

Set up attribute forms with proper field types and constraints.

Deploy projects to QField using both cloud and offline methods.

Collect spatial data with photos and GPS coordinates in the field.

Synchronize field-collected data back to QGIS desktop.

What is QField?

- Open-source mobile application for Android and iOS
- Enables editing QGIS projects on mobile devices
- Takes QGIS projects into the field for effective data collection
- Maintains QGIS styling and edit widgets

(opengisch n.d.)

QField workflow

1. Configure QGIS project (desktop)
2. Set up data layers and attributes
3. Deploy to QField
4. Collect data in the field
5. Synchronise back to QGIS

Configuring the QGIS project

Create the project

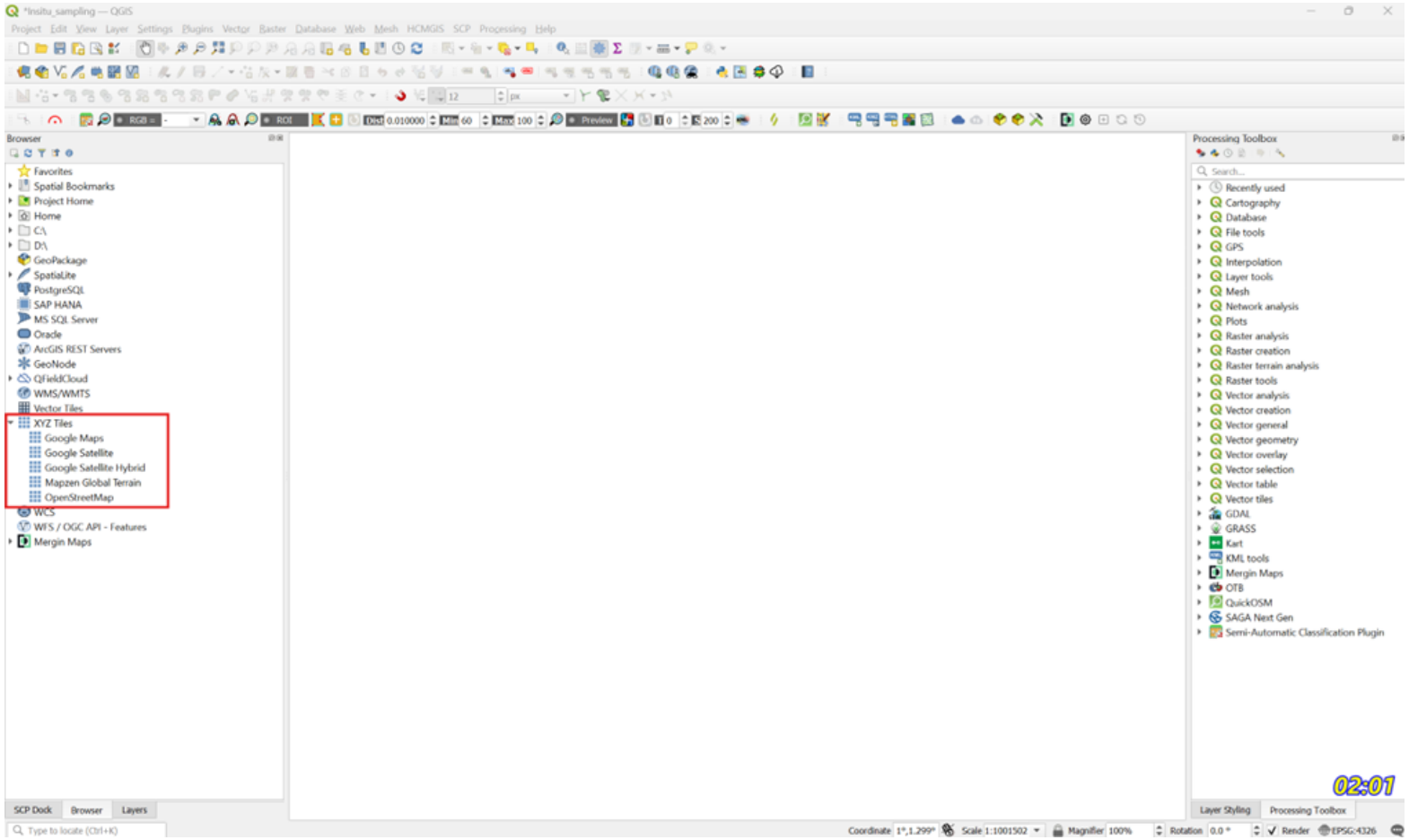
- Folder structure:
  - Project Folder
    - Your QGIS project
    - “ExportQField”
    - “ImportQField”

- Save project without spaces in filename

Configuring the QGIS project

In QGIS: Basemap

- Under the browser (top left) you will find the dropdown *XYZ Tiles*
- Use the OpenStreetMap basemap



Configuring the QGIS project

Area of Interest (AOI)

- QGIS plugin: OSM Place Search
  - Allows you to browse through the different place features available in the OpenStreetMap data

- Under *Plugins* in the Menu toolbar, click *Manage and Install Plugins*
- In the search bar, type OSM Place Search and install the plugin
- A new window should appear in the side panel where you can enter your AOI

Creating the GeoPackage

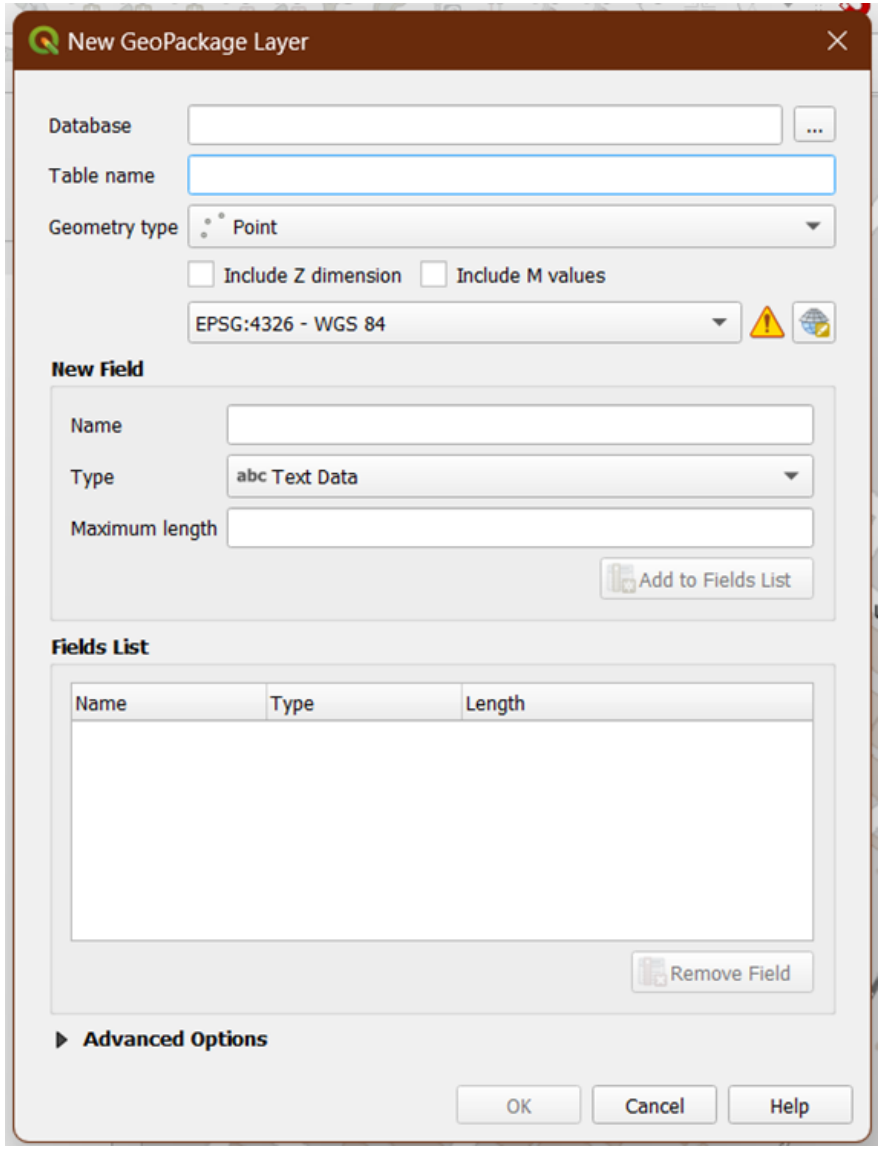
What is a GeoPackage?

- A file-based database where you can store multiple layers, including points, lines, polygons, and raster data
- Datasets are saved in one file, instead of multiple (shapefiles)
- Ends in .gpkg

Creating the GeoPackage

Create a GeoPackage

- Select Layer > *Create Layer* > *New Geopackage Layer*:
  - For *Database*, click on (…) and select your project folder and give a suitable name
  - Choose a *Table name*
  - For *Geometry type*, select points
  - Select the desired Coordinate Reference System (CRS) by clicking on the Globe icon



Creating the GeoPackage

Create a GeoPackage

- Under New Field add the following attribute columns:
  - **lulc_class:** Value Map widget with predefined options (Text)
  - **Date:** Auto-populated with now(), non-editable (Date and time)
  - **Photo:** Attachment widget with relative paths and document viewer (Text)
  - **Latitude/Longitude:** Auto-populated ($x, $y), non-editable (Decimal)

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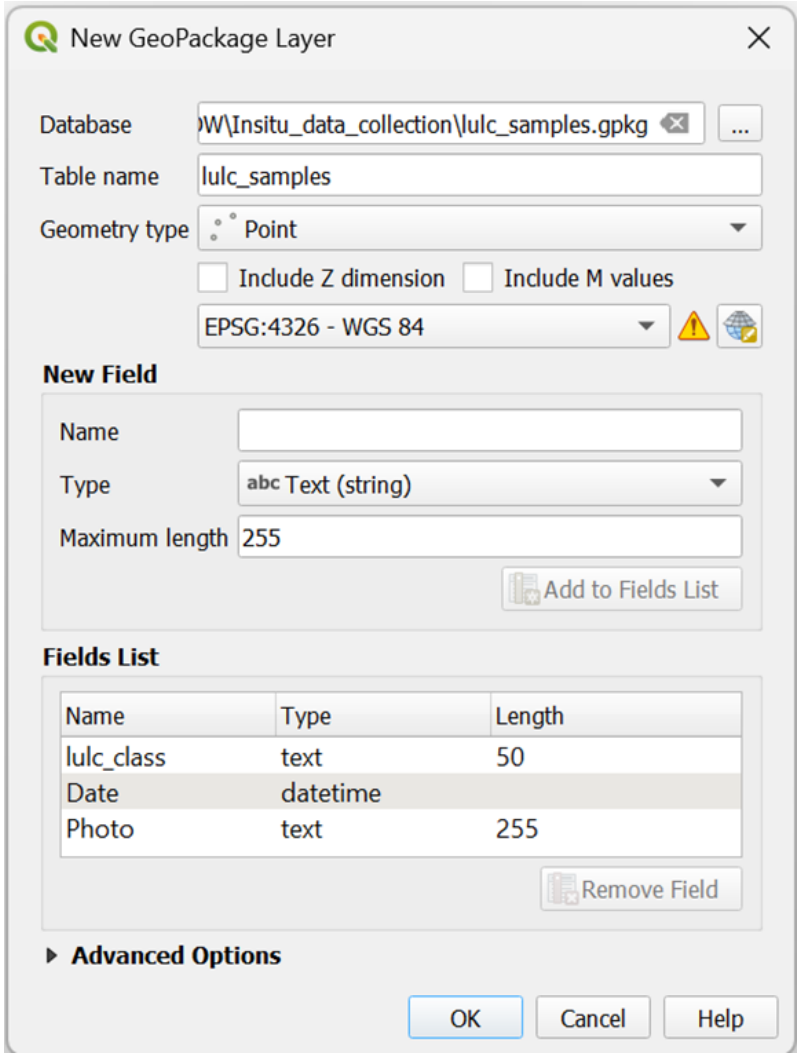

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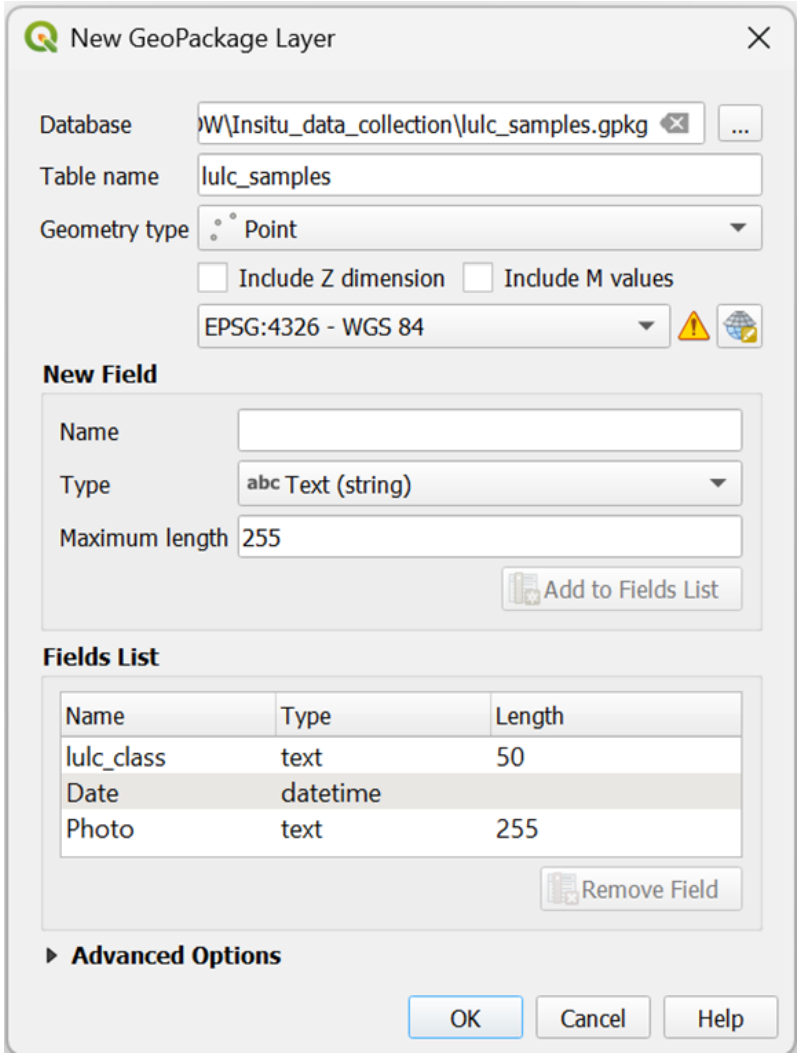
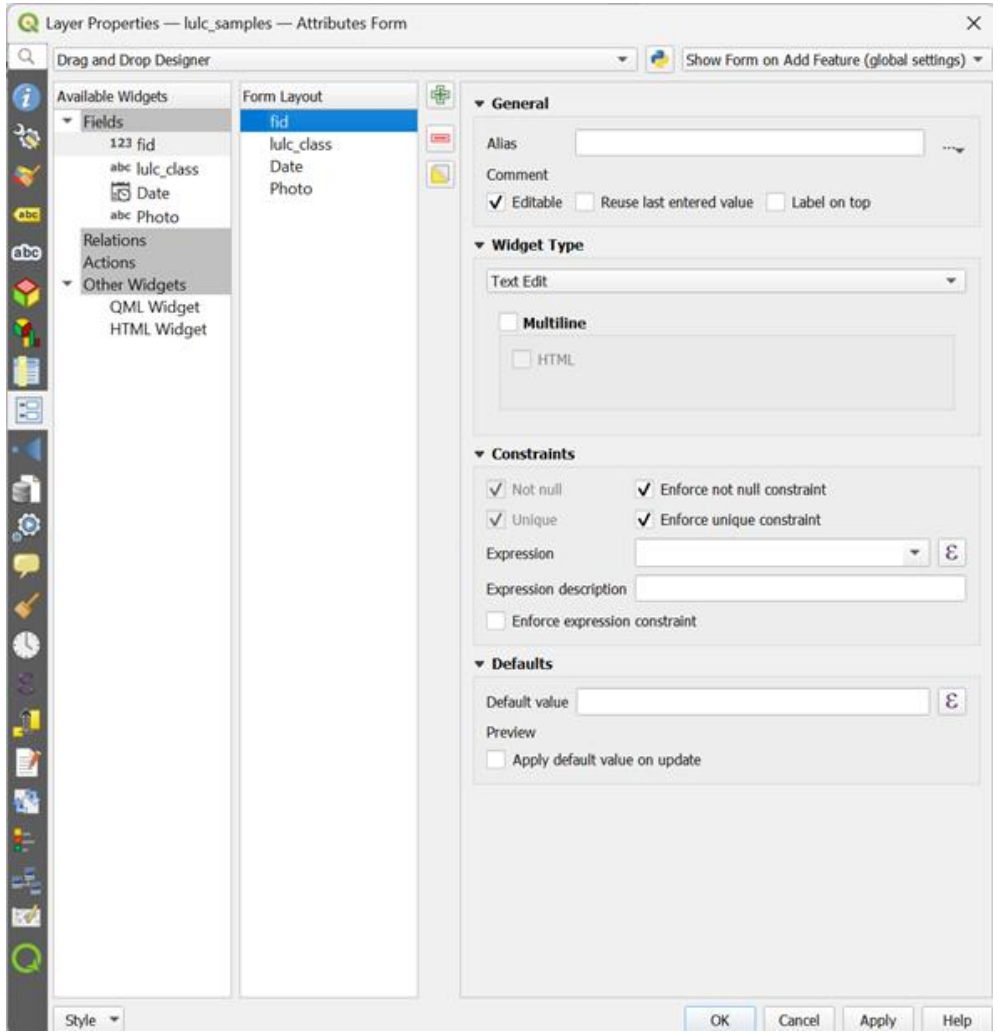


Attribute configuration

Edit file properties

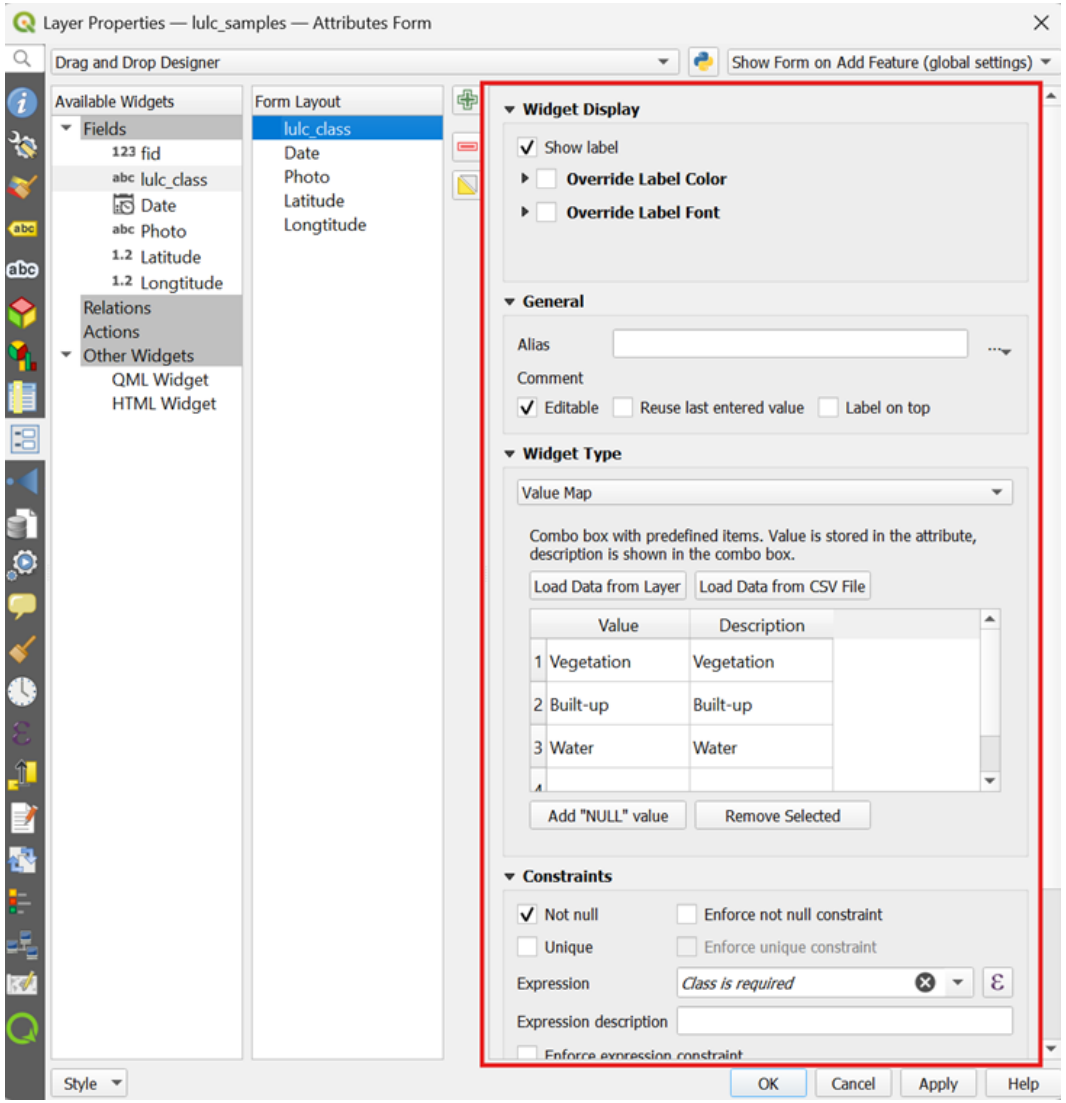
1. Go the sample layer: *Layer Properties > Attribute Form*
2. Select *Drag and Drop Designer* from the dropdown
   - Do not need to edit the *fid* field. QGIS creates this for every GeoPackage by default
3. Remove the *fid* field from the visible fields by pressing the -



Attribute configuration

LULC_class

- Select *lulc_class*:
  a. Change the *Widget type* from Text edit to Value Map
  b. Enter the Value and Description for your lulc classes
  c. Check the Not null button under the *Constraint*
  d. Click *Apply*



Attribute configuration

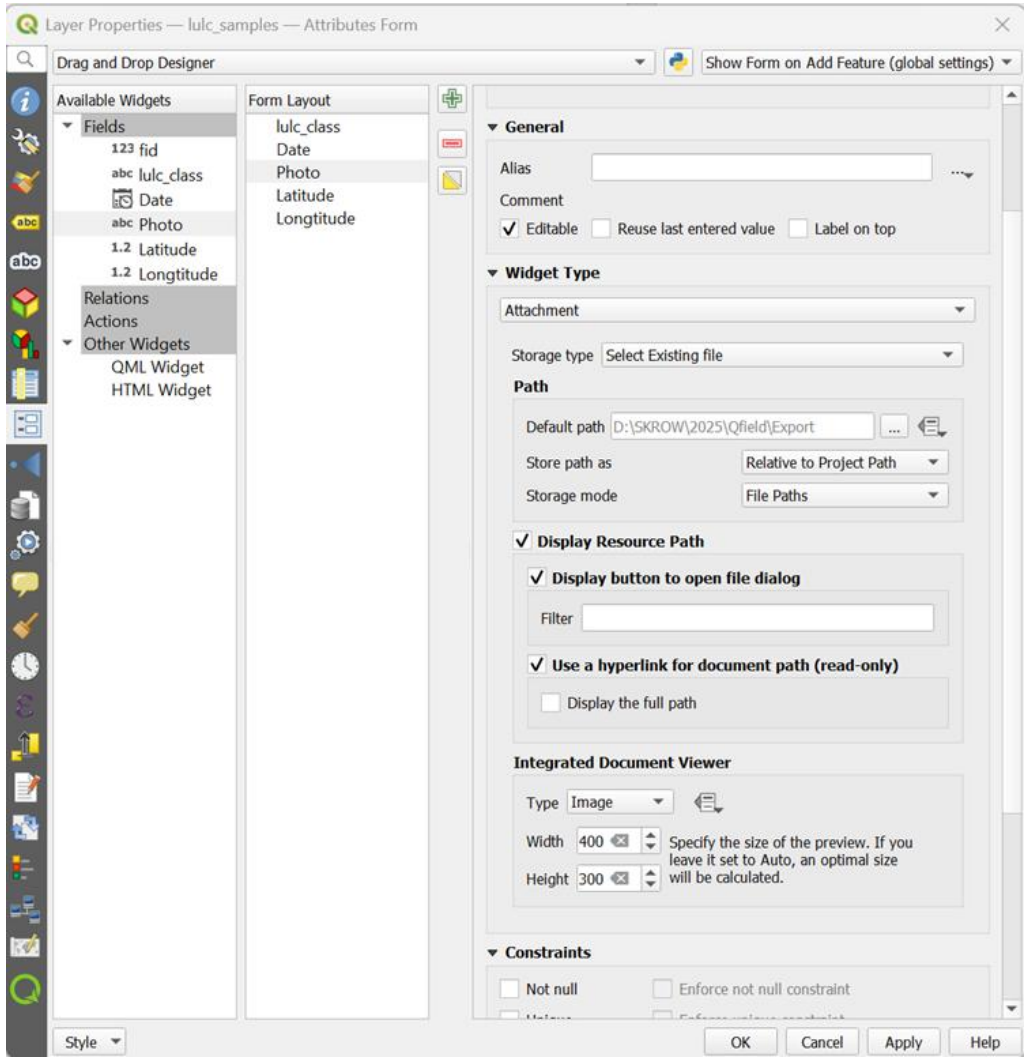
Date

- Select *date*:
  a. Make sure it has the Date/Time format under the Widget Type
  b. Under General, uncheck Editable
  c. Under Defaults, in the Default value type, use now()
  d. Click Apply

Attribute configuration

Photo

- Select *photo*:
  a. In the Widget Type section, select Attachment
  b. Check Relative paths and select Relative to Project Path
  c. Check the ‘Use a hyperlink for document path” box
  d. Select Image for the Type
  e. Set Width and Height to 400px and 300px
  f. Click Apply



Attribute configuration

Latitude and Longitude

- Edit latitude and longitude:
  a. Under General, uncheck Editable.
  b. In the Default value bar, type in $x for latitude and $y for longitude

QField synchronisation methods

Two methods:

QField cloud

QField offline

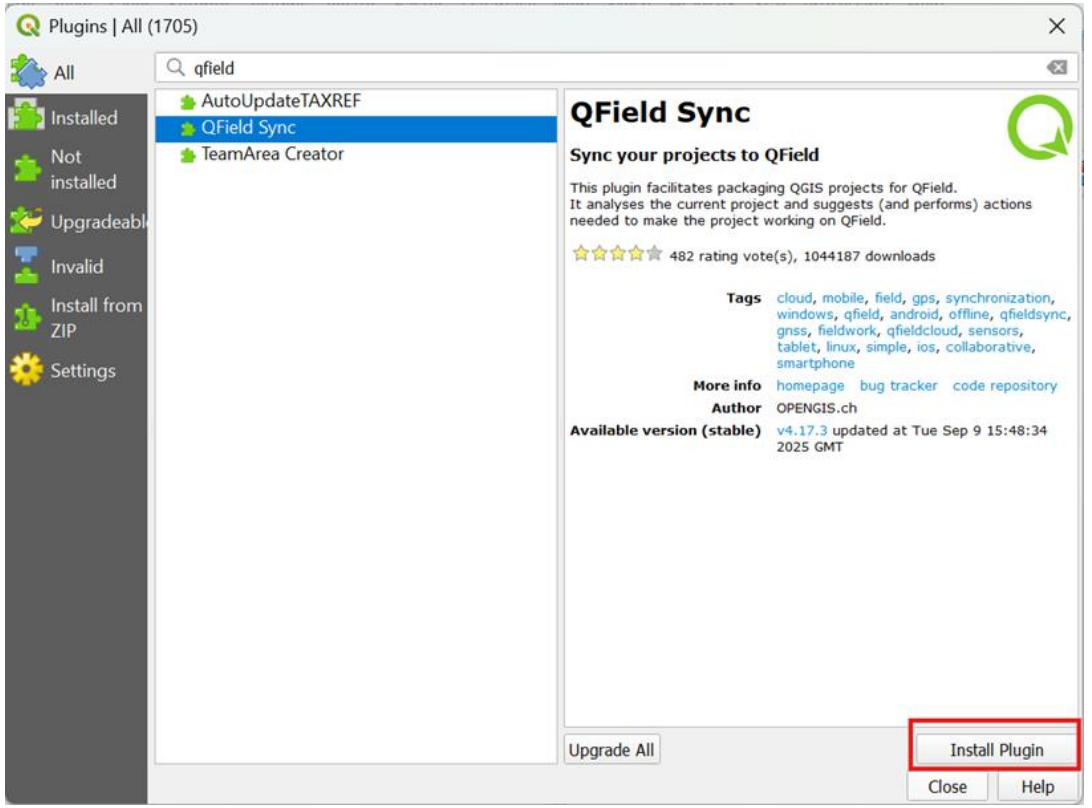
QField synchronisation methods

Cloud method	Offline method
Automatic synchronisation	Functions almost completely without Wi-Fi
Multiple users can work on the same project	Requires multiple manual steps (eg. USB transfer)
Easier setup	More complex
Best for: most cases, teams, projects with many changes	Best for: extremely remote studies, sensitive data

QField cloud

In QGIS: QField Sync Plugin

1. Direct to Plugins > Manage and Install Plugins > All
2. Search for QFieldSync and install it
3. In QGIS a new toolbar should appear
4. Start QField Sync
5. Login to QFieldCloud with your username and password. If you have no username you can directly register following the link

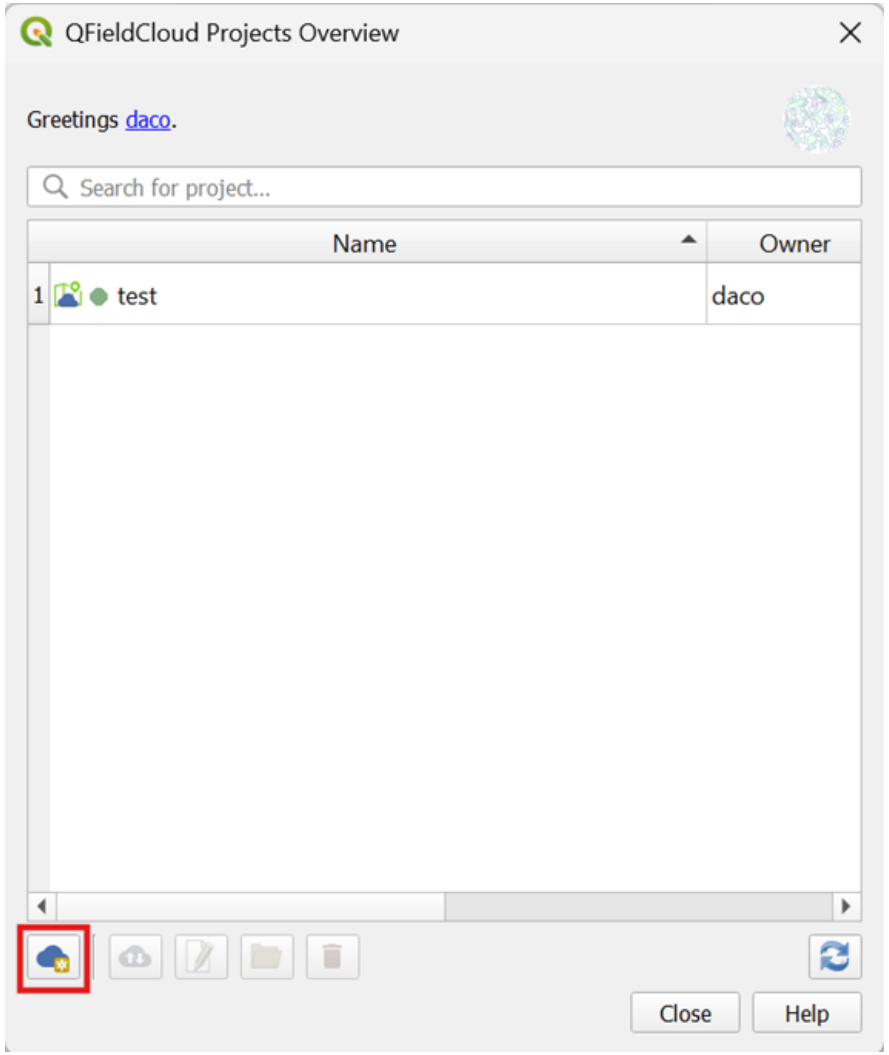


QField cloud

In QGIS: QField Sync Plugin

6. Click on Plugins > QFieldSync > QfieldCloud Projects Overview

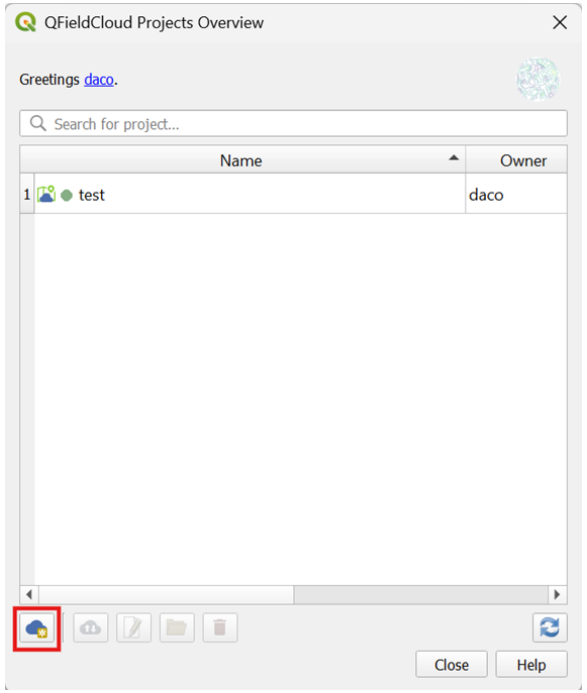
7. In the QFieldCloud Projects Overview window, click on the Create new Project

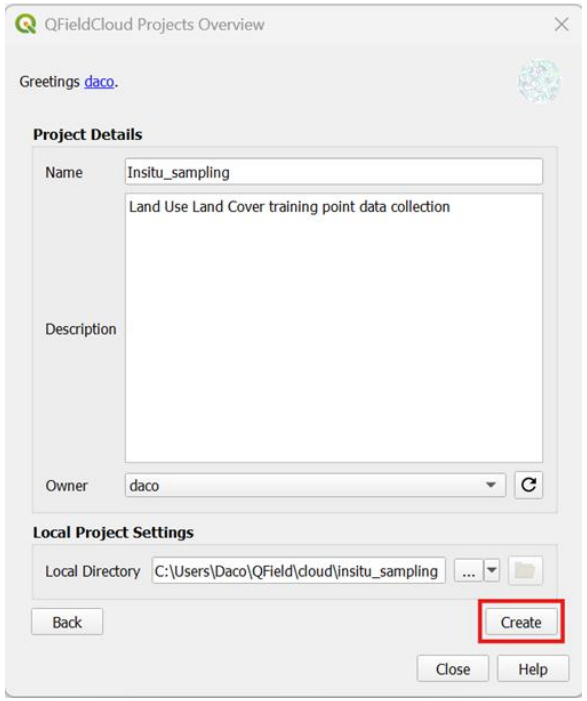


QField cloud

In QGIS: QField Sync Plugin

6. Click on Plugins > QFieldSync > QfieldCloud Projects Overview
7. Click on the Create new Project
8. Choose the recommended option and click Next
9. You can enter a description and click on *Create* and QFieldSync will package your project for the cloud

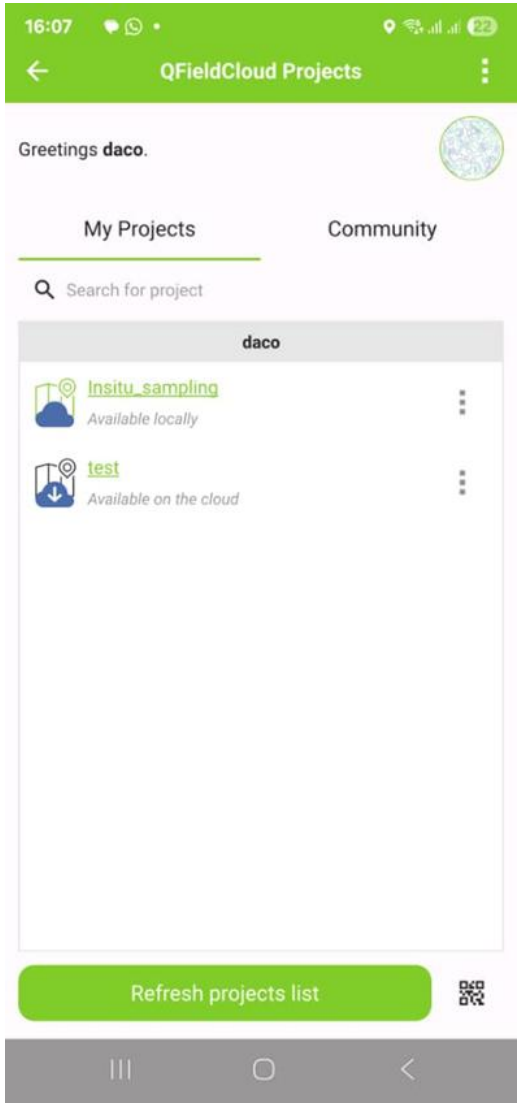




QField cloud

In QField: Synchronise in the app

1. On your mobile device open QField Application
2. Click on QFieldCloud Projects and sign in with the same credentials as before
3. Your project should already be available
4. Click on it and download the project



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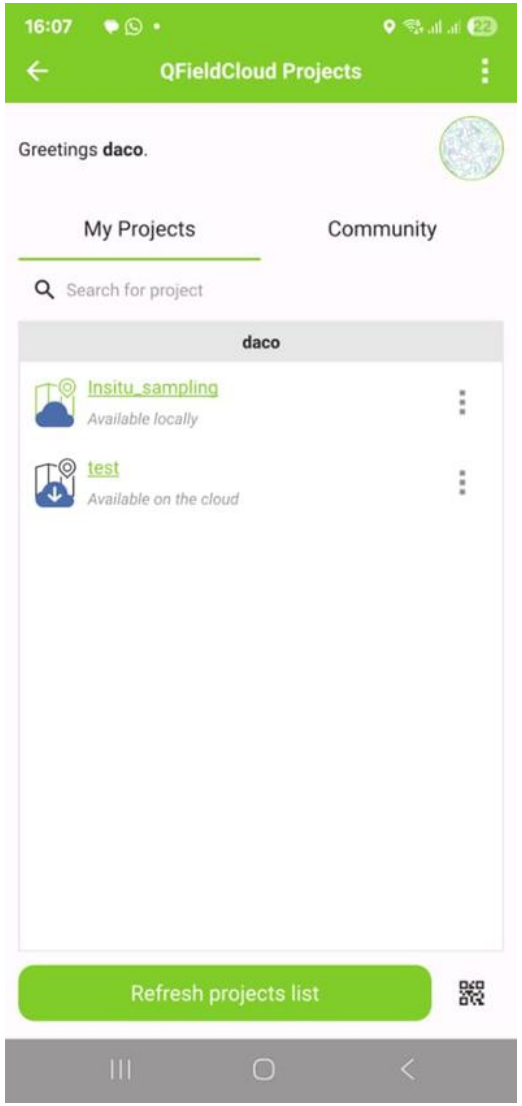
Now you can do field work!

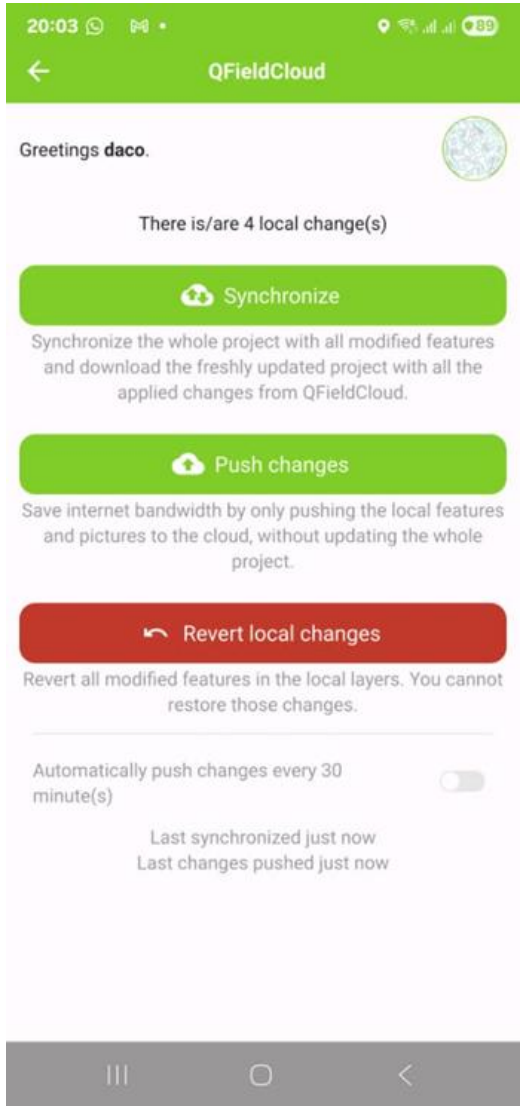


QField cloud

In QField: Synchronise back

Open the Side Dashboard:

- Click on the blue cloud, the number indicates how many changes you have made)
- Choose to push the changes if you are happy with your field work



QField offline

In QGIS: Prepare your project

Create an offline copy of your QGIS project as a new file by adding "*_offline.qgs*" into a new folder

QField offline

In QGIS: Layer packaging

- Each layer needs a "Layer Action" to define how QFieldSync handles it

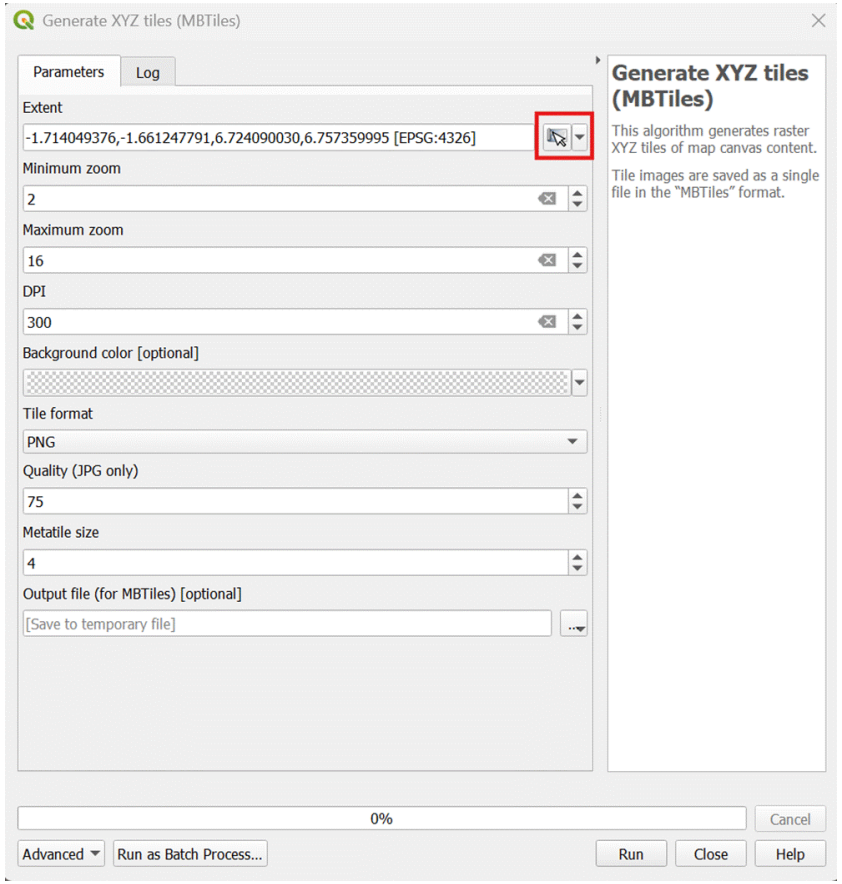
Available Action Types:

- **Copy**: Creates static copy, no change tracking (for reference data)
- **Keep existing (copy if missing)**: Avoids re-packaging, best for frequent syncs
- **Offline editing**: Full tracking with changelog, enables synchronisation (for the field)
- **Directly access data source**: Real-time access (requires internet)
- **Remove**: Excludes layer from mobile project

QField offline

In QGIS: Layer packaging

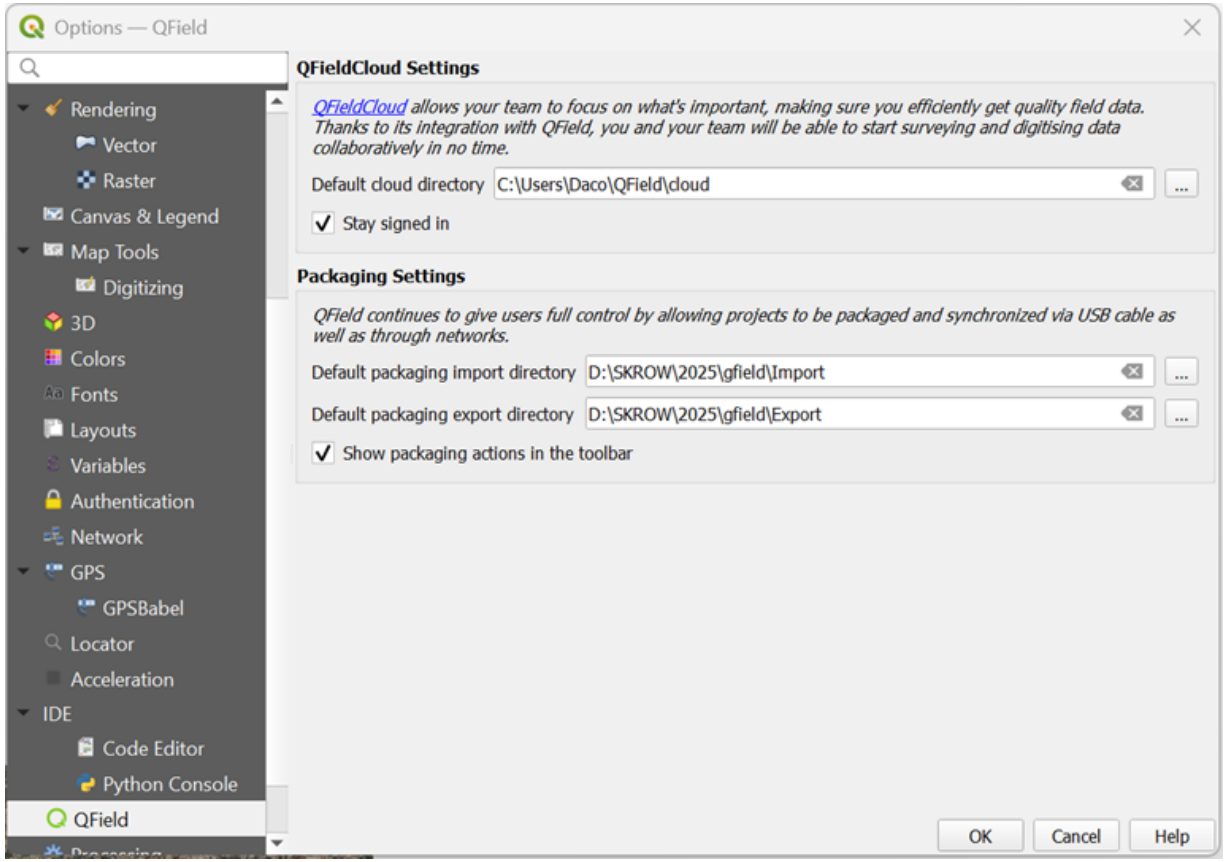
1. Add the Google Satellite basemap
2. Zoom into your area of interest using *OSM Place Search*
3. Toolbox > Raster tools > *Generate XYZ tiles*
4. Click Extent, select *Draw on Map Canvas* and draw AOI
5. Complete the dialog box as shown >
6. Save the file to the offline project folder created
7. Remove the Google Satellite basemap and add the saved MBTiles to the project



QField offline

In QGIS: Package for QField

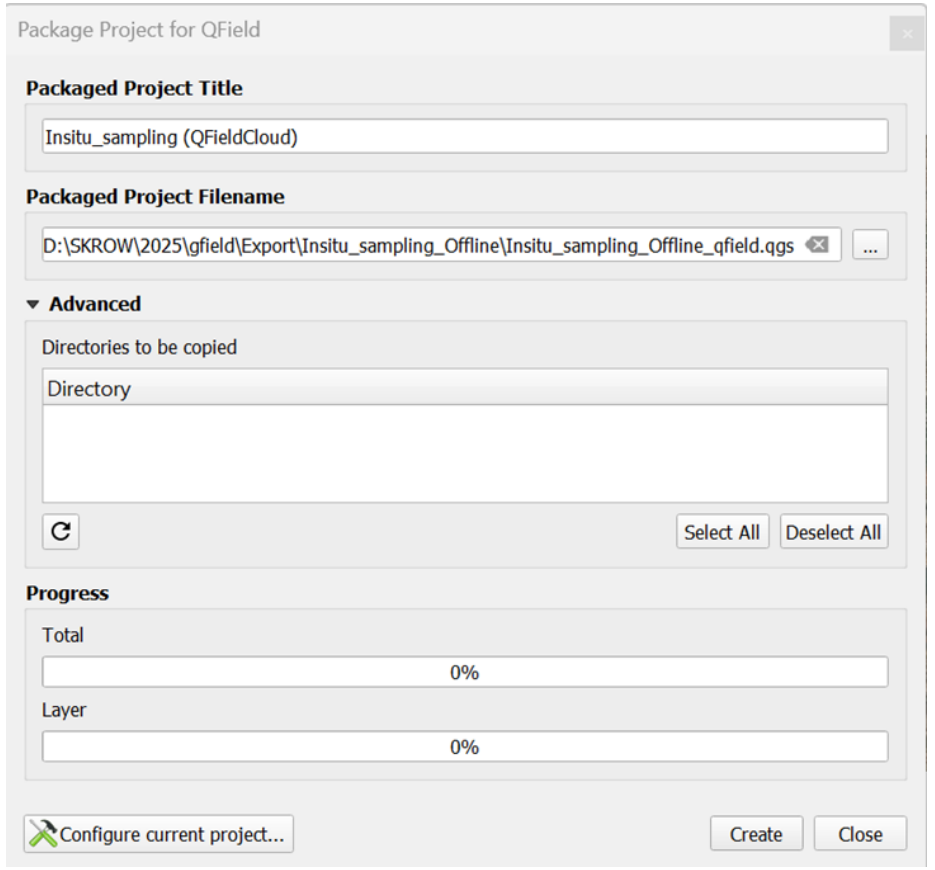
- Go to *Plugins* > *QFieldSync* > *Preference*
- Set the Default packaging import and export directory to the Import and Export Folders created on your local drive



QField offline

In QGIS: Package for QField

- Click on the MBTiles in your layers > Properties > QField
- Change the Cable packing action to "*Keep existent (Copy if missing)*"
- Repeat this change for the lulc_samples layer and any additional layer you may have
- On the Toolbar, click on the *Package for QField* icon and confirm the packaged project directory
- Click *Create* to complete



QField offline

In QField: Manually synchronise

- Copy the packaged folder into the *qfield* folder on your mobile device via USB, Mail, etc.
- Open QField App on your mobile device
- Select *Open local file*
- Add your project by clicking on the *green and white* + *icon* at the bottom left
- Select *Import project from folder* and navigate to the QField folder on your device

Now you can do field work!

QField offline

In QField: Synchronise back

Once done with your collection, it is time to synchronise the data with your Desktop project:

- Re-open the project in QGIS (the one you saved with a regular Save As) previously
- Copy the project folder from your mobile device to the Import folder on your computer
- Direct to Plugin > QFieldSync > Synchronise from QField menu to synchronise your changes from the QField project to the Desktop project

Summary & key takeaways

QField bridges desktop GIS and field data collection

Proper **QGIS project and layer configuration** is essential for success

Two deployment options: **Cloud** (internet required) or **offline**

Data synchronisation preserves all attributes and geometries

Sources

opengisch. (n.d.). *QField for QGIS* [GitHub repository]. Retrieved March 31, 2025, from https://github.com/opengisch/QField

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Thank you for your attention!

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