

# Implementing and using an open source farm survey and mapping system



# OLD METHOD



1. Paper based data collection.

2. Inserting data into Excel

3. Summary of area cultivated based on estimation of the officers.

FOOMU SAVEA NGOUE 2020 POTUNGAUE NGOUE

DATE: *ututes* *Lepin* VILLAGE:

HINGOA	KOLO	EKA	UFI	KAPE	TT	TF	ULEI	MNK	KUM	HOP	FAI	MLN	VEG
<i>Viliani Lahi ututes</i>		<i>103</i>											
		<i>275m<sup>2</sup></i>											
<i>Viliani Oti (Kipauu)</i>													
<i>Tuakula (Nani)</i>		<i>18917m<sup>2</sup></i>											
		<i>4.7</i>											
<i>Tali Waleho</i>		<i>1891m<sup>2</sup></i>											
<i>Iteni Maitai</i>		<i>938</i>											
<i>Ikale Na'aruli</i>		<i>2242m<sup>2</sup></i>											
		<i>0.6</i>											
<i>Uape</i>		<i>755m<sup>2</sup></i>											
<i>Samin Sam</i>													
<i>Nileo</i>		<i>3759</i>											
		<i>0.9</i>											
<i>Solomone</i>		<i>2560m<sup>2</sup></i>											
<i>Tokolahi</i>		<i>0.6</i>											
<i>Dofeti Sam</i>		<i>2562m<sup>2</sup></i>											
<i>Dofeti Sam</i>		<i>4265m<sup>2</sup></i>											
		<i>1.05</i>											
<i>666m<sup>2</sup></i>													

HINGOA	BLOCK	API	SAVEA	KAVA	VANILLA	FAINA	AAPULU	PULU_Nonoo	PULU_Tukuange
Saia Hakau Folau	217.157	90	Vaota/Palau	1					
	217.157	90	Faama/Toutuu	1					
	217.157	90	EKA	2.5					
	217.157	90	Tokolahi				5		
	217.157	90	Faahinga	1,3			1,2,3		
	217.157	90	Vaha	1.12					
	217.157	90	Ta'u Motu'a	1,2					
	217.157	90	Ngoue Tuifio	1					
	217.157	90	Lau Enga	2					
	217.158	55	Vaota/Palau	1					
	217.158	55	Faama/Toutuu	2					
	217.158	55	EKA	4					
	217.158	55	Tokolahi						
	217.158	55	Faahinga	1,3					
	217.158	55	Vaha	1.12					
	217.158	55	Ta'u Motu'a	2					
	217.158	55	Ngoue Tuifio	1					
	217.158	55	Lau Enga	2					
	217.157	80	Vaota/Palau	1	1		1		
	217.157	80	Faama/Toutuu	1	1		1		
	217.157	80	EKA	8	1.5		2		
	217.157	80	Tokolahi						
	217.157	80	Faahinga	1,3	1		1		
	217.157	80	Vaha	1.12	2.23		0.56		
	217.157	80	Ta'u Motu'a	1,2	1,2		1		
	217.157	80	Ngoue Tuifio	1.4	1		1		

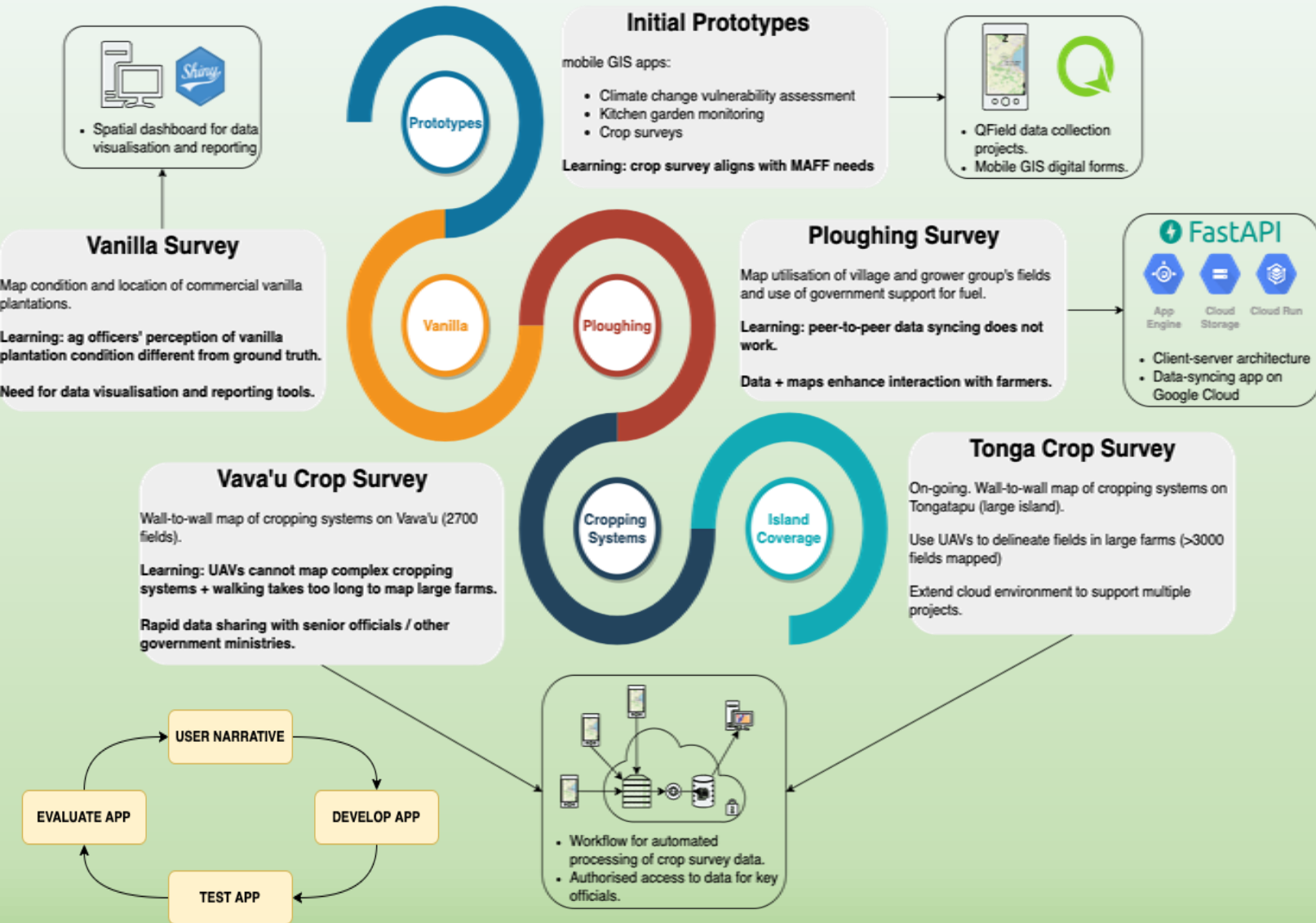
# HISTORY

- ❑ 2018 - testing on Tongatapu Island
- ❑ 2019 and 2020 – further development and testing with MAFF
- ❑ 2021 and 2022 – extensive data collection across several island groups

Project goal: co-develop a workflow to map Tonga's diverse agricultural systems.



# ITERATIVE AND AGILE DEVELOPMENT



## TONGA

1. Tsunami & Ashes Survey
2. Women Distribution Seedlings Database

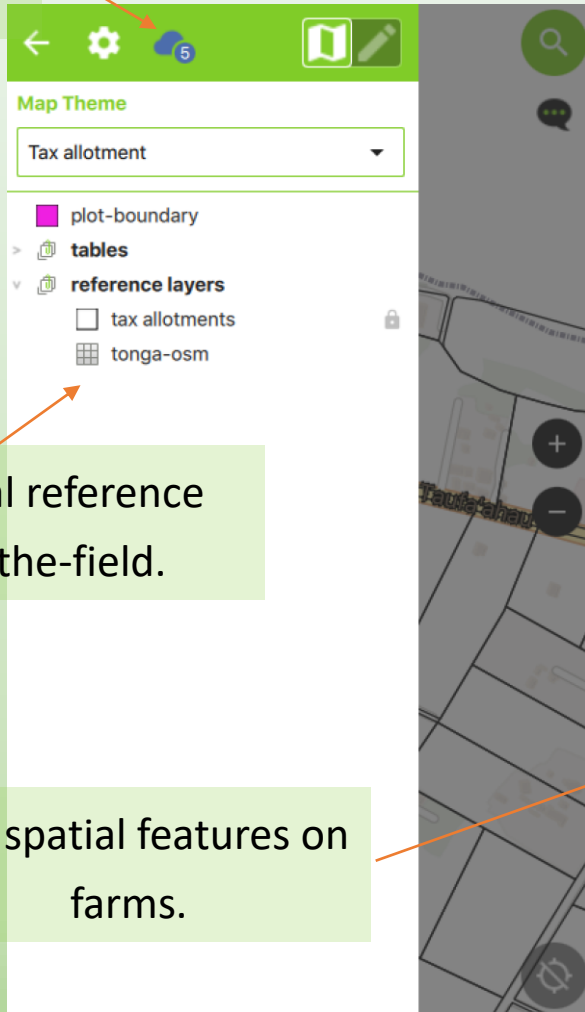
## NOW

### Annual Crop Survey 2022

- Eua
- Ha'apai
- Tongatapu
- Vava'u

# QField: on-the-farm spatial data collection

Online-offline data collection.



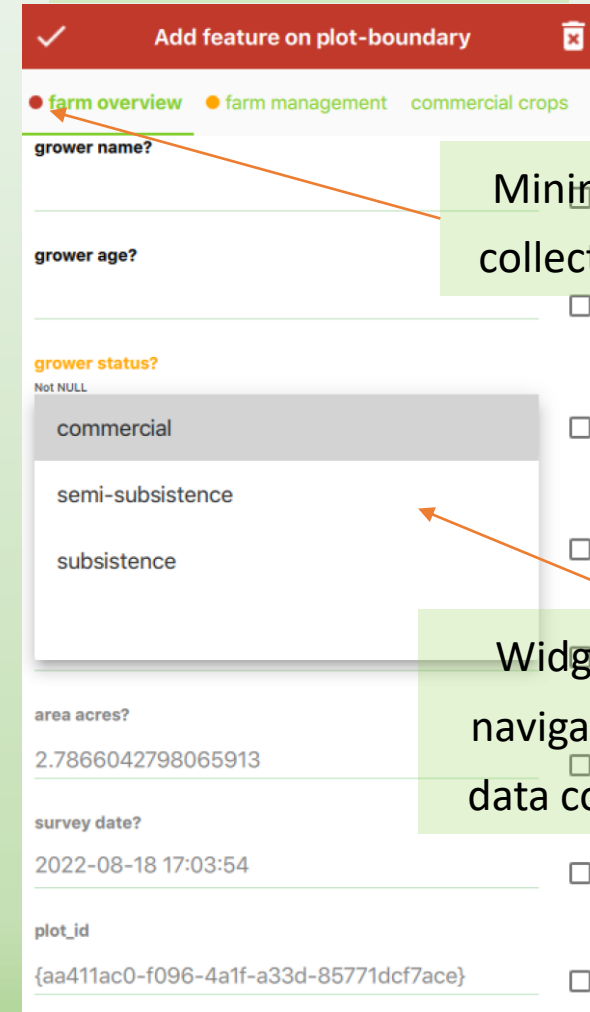
View spatial reference layers in-the-field.

Map spatial features on farms.

Easy to use for non-GIS experts.

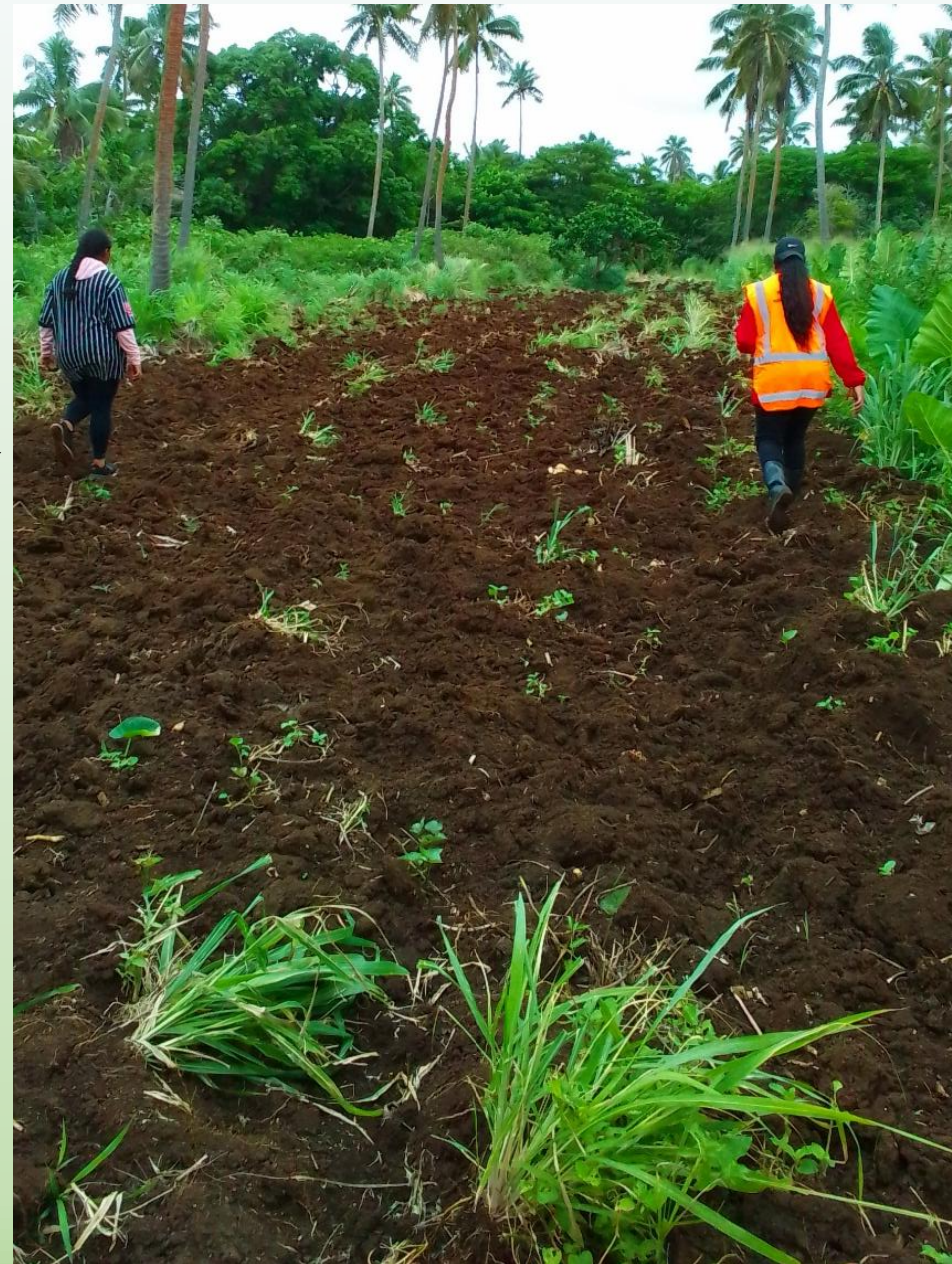
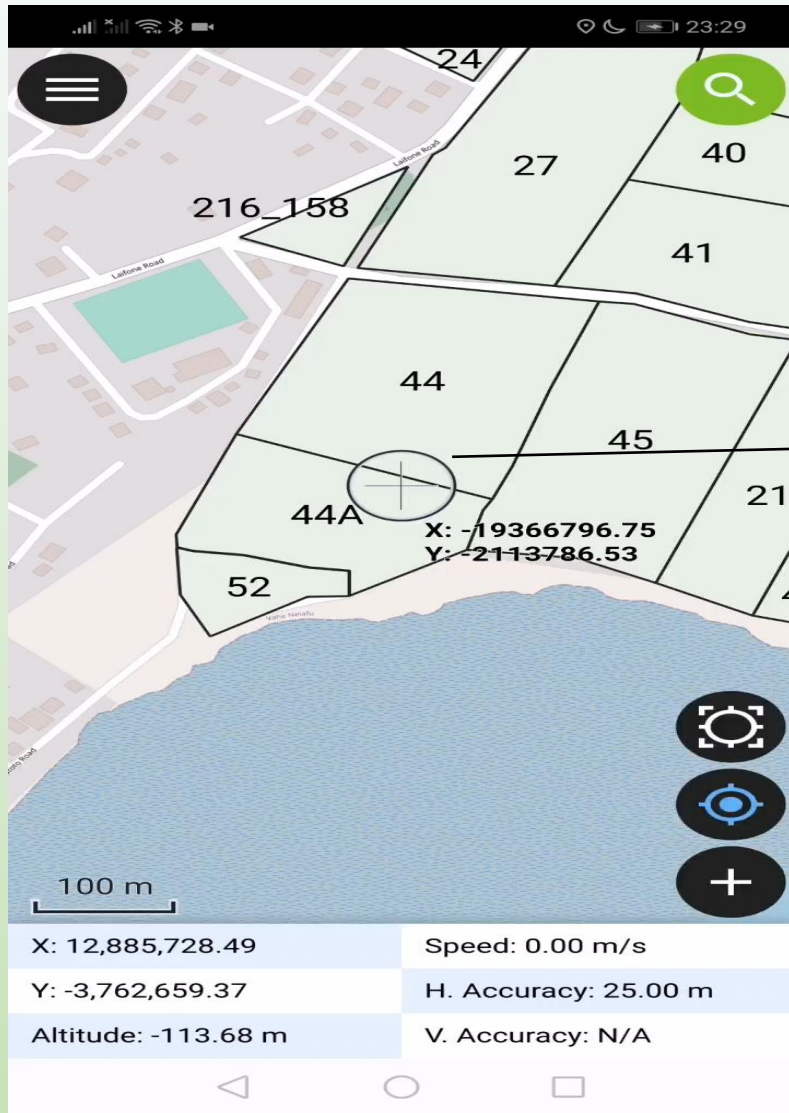


Capture non-spatial attribute information.



Minimise data collection error.

Widgets and form navigation for varied data collection tasks.



# QFieldCloud: large team data collection

**QFieldCloud Projects** ✕

Secure – authenticated access to projects and data.

Server URL  
(Leave empty to use the default server)

Username or email

Password

Sign in

New user? [Register an account.](#)

The easiest way to transfer you project from QGIS to your devices! [Learn more about QFieldCloud.](#)

Large team data collection.

**QFieldCloud**

Greetings [Avatar]

There is/are 1 local change(s)

**Synchronize**  
Synchronize the whole project with all modified features and download the freshly updated project with all the applied changes from QFieldCloud.

**Push changes**  
Save internet bandwidth by only pushing the local features and pictures to the cloud, without updating the whole project.

**Revert local changes**  
Revert all modified features in the local cloud layers. You cannot restore those changes.

Last synchronized on 29 July 2022 3:53:01 AM CEST  
Last changes pushed on 24 July 2022 1:19:36 PM CEST

Low bandwidth data syncing – “push changes”.

Swagger <https://sync.tonga-crop-survey.com/swagger/?format=openapi> Explore

### QFieldcloud REST API <sup>v1</sup>

[ Base URL: sync.tonga-crop-survey.com/api/v1 ]  
<https://sync.tonga-crop-survey.com/swagger/?format=openapi>

Test description  
[Terms of service](#)  
[Contact the developer](#)  
License

Schemes  
HTTP

[Django Login](#) [Authorize](#)

Build custom applications using QFieldCloud API for specific tasks / needs.

**deltas**

**POST** /deltas/apply/{projectid}/

**GET** /deltas/{projectid}/

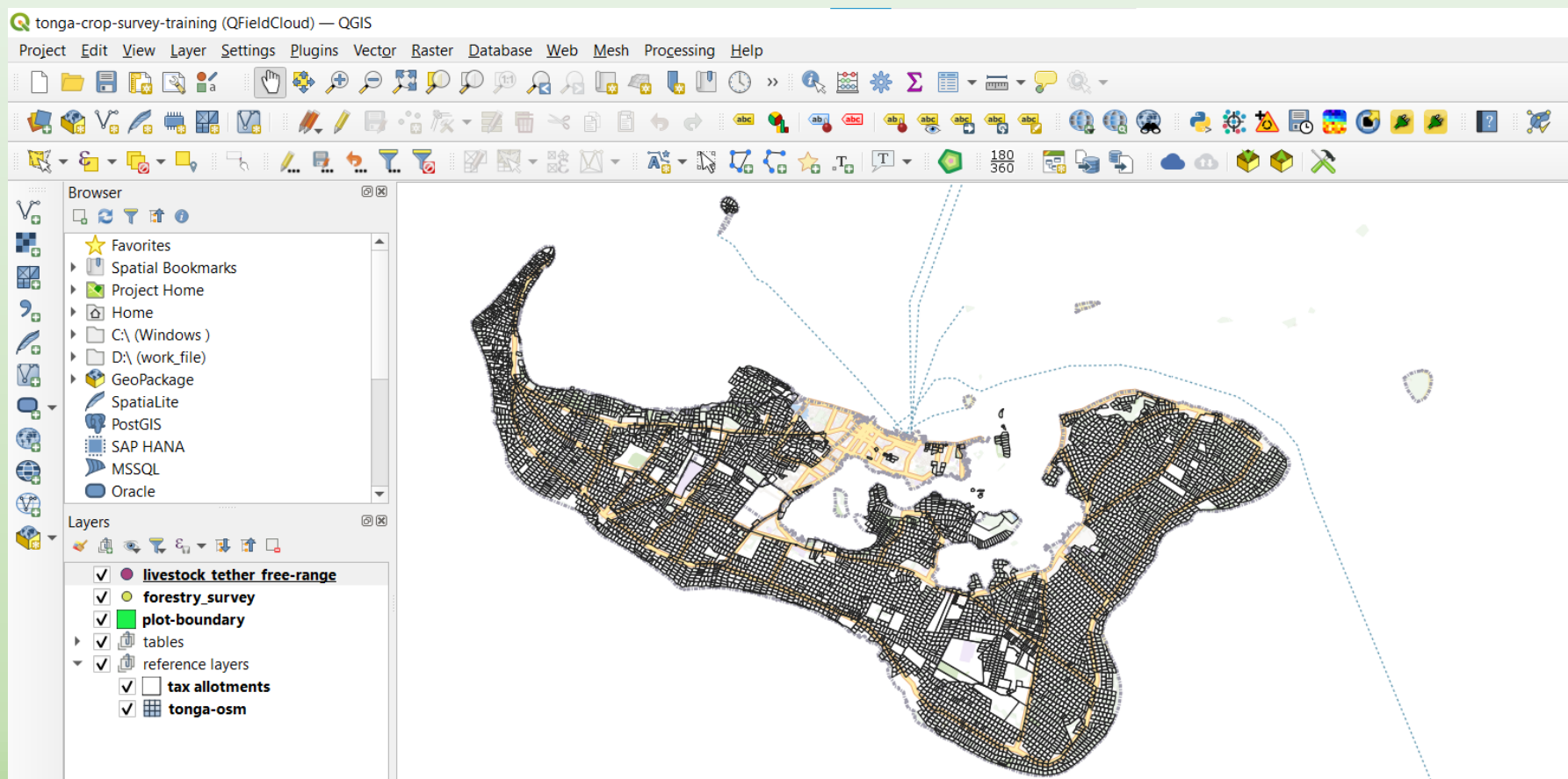
Deltas - records of data collectors surveys.



# QGIS – Project and form creation

Create projects and forms for each MAFF Division

- Domestic Market Survey (Planning Division)
- Soil Test Sample (Research Division)
- Food Inspection (Food Division)





# maplandscape: dashboards for spatial analysis

- Built on top of QFieldCloud API
- Automated reporting and interactive data exploration on web maps, data tables, and charts.
- Non-GIS experts can analyse QField data.
- Combine layers from different QFieldCloud projects or local data.

The screenshot displays the maplandscape dashboard interface, which is divided into several functional sections:

- Filter Options:** A panel on the left allows users to define filter conditions. The current condition is `kava_area_acres > 0`. It also includes a layer name field set to `kava` and a DEMO SNIPPET section with a list of filtering syntax tips (e.g., quotes for strings, escape apostrophes, and comparison operators).
- Data Table:** A central table displays filtered data with columns for `a_acres_sum`, `kava_plant_number_mean`, and `kava_plant_number`. The table shows 10 rows of data, with a total of 36 entries.
- Map View:** On the right, a satellite map shows the spatial distribution of the data. A popup window is visible over a specific area, displaying details for a village named Leimatu'a, including its district name, current area in acres, and various plant numbers.
- Map Controls:** Below the map, there are controls for drawing a map, recentering, and selecting a fill color palette (currently set to purple-red). There is also a checkbox for displaying a legend and a section for adding popup labels to the map.

# Tonga crop survey

Survey of all major farm operations across four island groups (Vava'u, Tongatapu, Ha'apai, 'Eua).

Crop, livestock, and forestry systems mapped on over 11,000 farms.

Team of over 40 data collectors.

Inform government resource allocation.

Location and growth stage of key food security and commercial crops.



# Hunga Tonga-Hunga Ha'apia volcanic eruption

Tonga crop survey data used in initial food security damage assessment analysis.

Interviews with community leaders post-eruption to identify loss and damage to crops and livestock, food supplies, and agricultural infrastructure  
→ inform relief payments.



# Monitoring seedling distribution

Started recording seeds and seedlings distributed to women farmers and kitchen gardeners.

Encourage and support more nutritious food crops.

Reduce time costs of travelling to fields far from home.



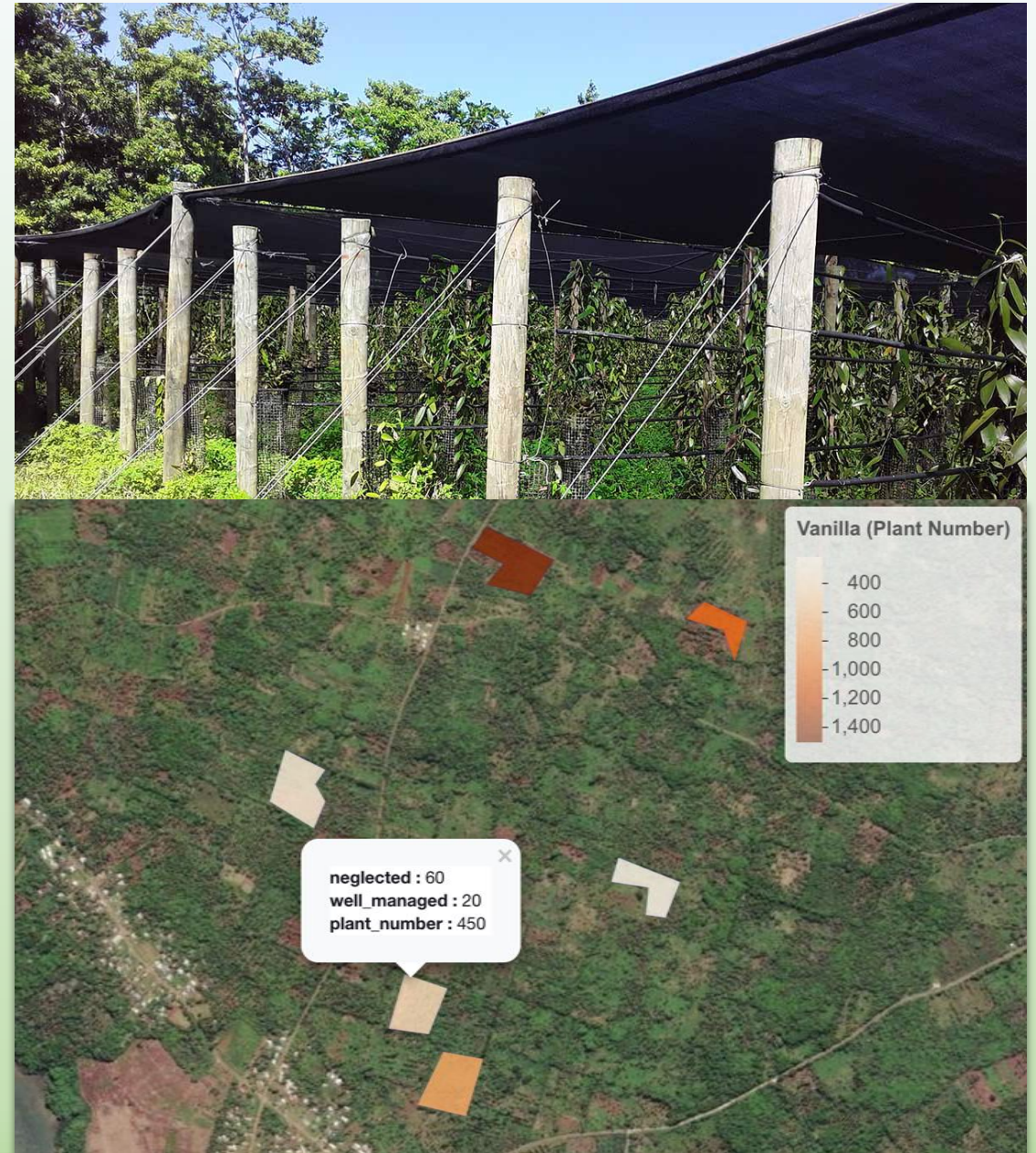
# Vava'u vanilla survey

Survey 120 vanilla plantations across the Vava'u island group.

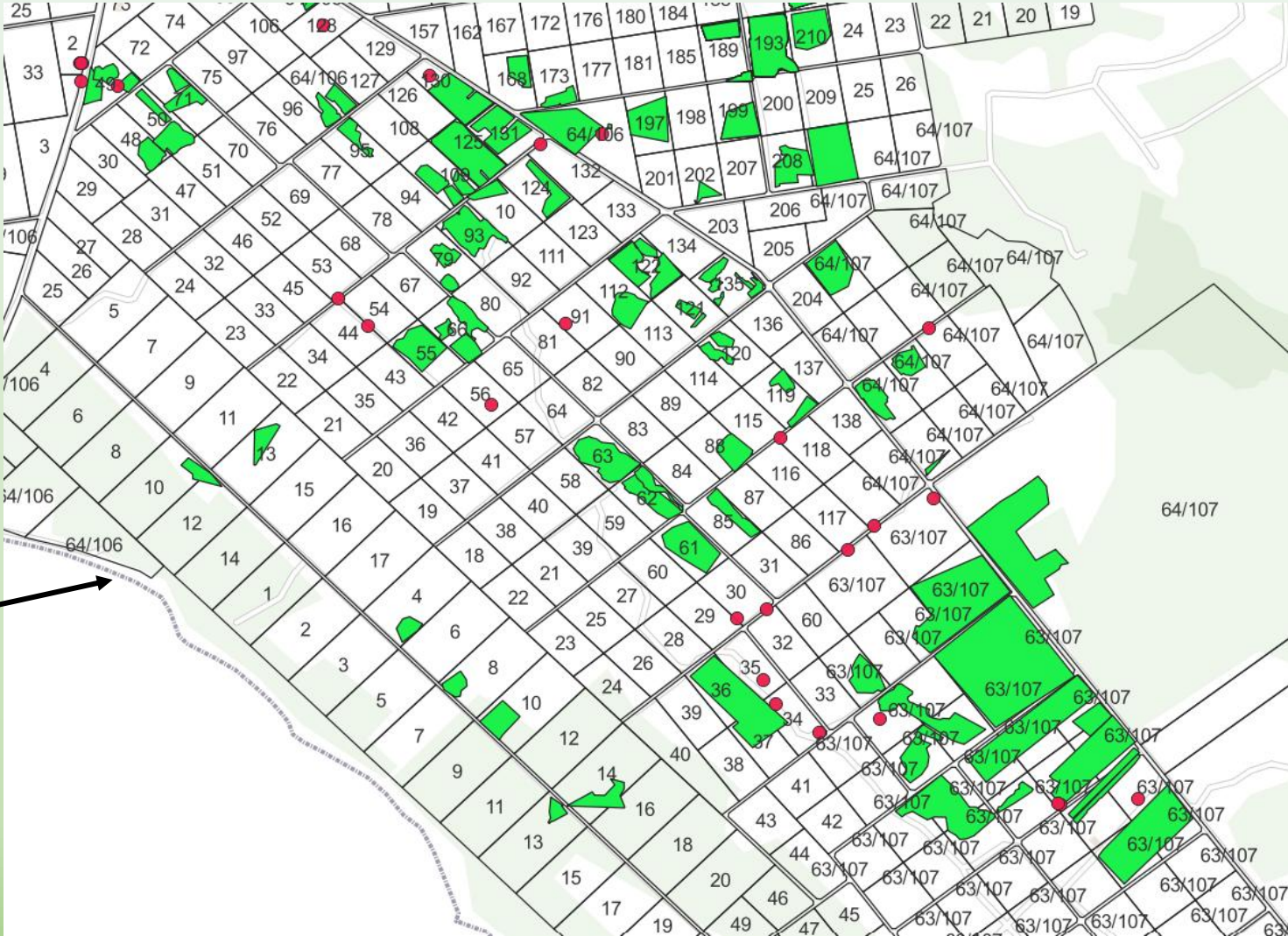
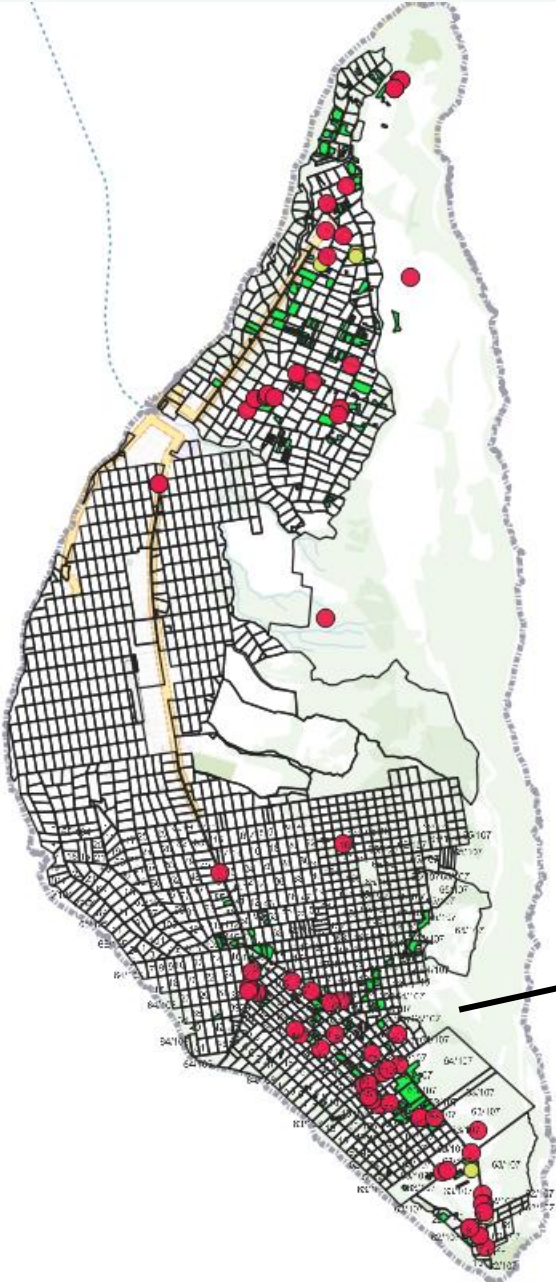
Maps of vanilla plantation management condition.

Unexpected large proportion of vanilla plantations in neglected condition.

Data stimulated further engagement with farmers and demonstrated value of detailed mapping with QField.



# Update on the survey for Eua Group



# Find out more

Visit our website:  
[www.livelihoods-and-landscapes.com](http://www.livelihoods-and-landscapes.com)

Come to our workshop  
on Thursday.

Test out the workflow  
and complete self  
guided tutorials and  
how-to guides.


Livelihoods and Landscapes About Research Examples Docs Outputs Team


Docs  
Tutorials  
Best Practice Guides  
Reference  
PacificGeoConf


## Documentation and tutorials

**maplandscape** is a workflow for:

1. field-based mapping and survey data collection.
2. using field data for monitoring, management, and decision making.

**In-the-field**  
  
Mobile geospatial data collection using QField

**Cloud**  
  
Cloud data syncing and user authentication via QFieldCloud

**Desktop**  
  
Query, analyse, and view geospatial data in a web browser

# MALO AUPITO

- ACIAR
- Livelihoods and Landscapes
- All participants helping our Ministry

