Implementing and using an open source farm survey and mapping system

THE UNIVERSITY OF WESTERN AUSTRALIA

Ministry of Agriculture & Food, Forests and Fisheries
KINGDOM OF TONGA

THE UNIVERSITY OF AUCKLAND
Te Whare Wānanga o Tāmaki Makaurau
NEW ZEALAND

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SEI STOCKHOLM ENVIRONMENT INSTITUTE

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ACIAR

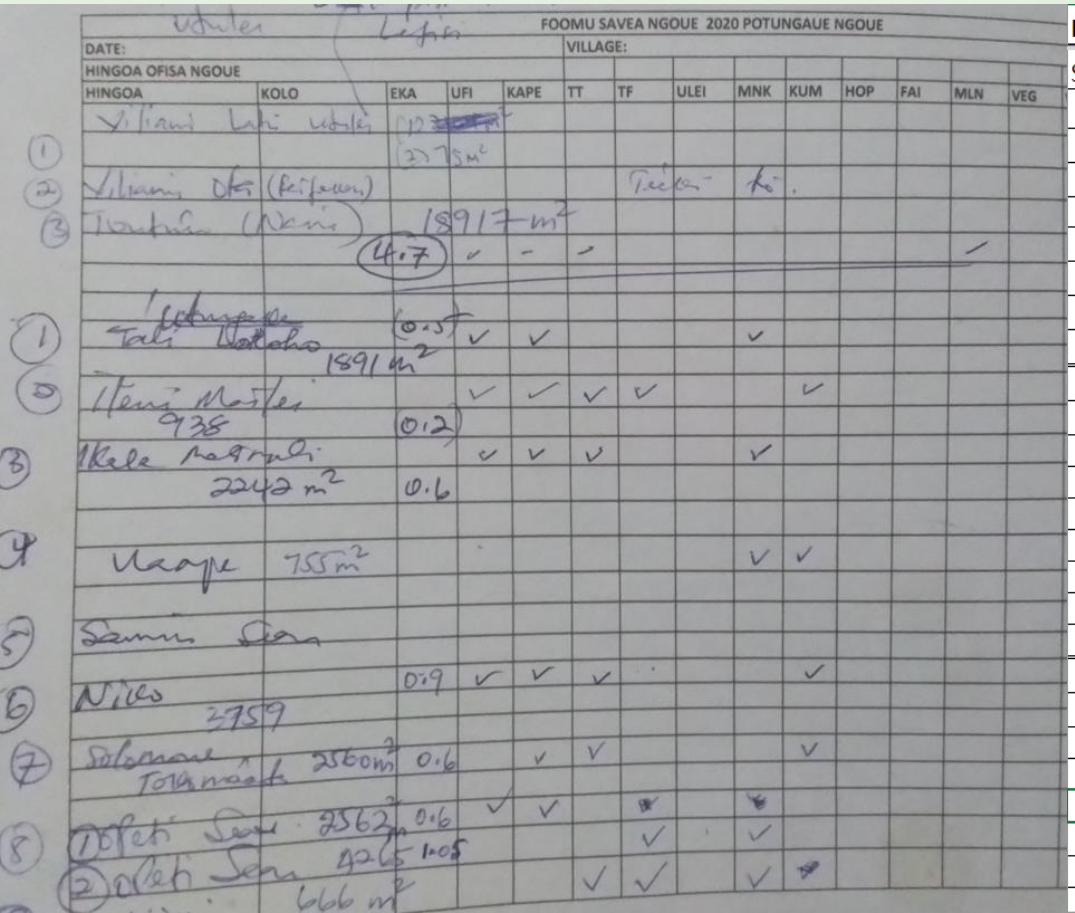
OLD METHOD

GOVERNMENT OF TONGA
MINISTRY OF AGRICULTURE & FOOD, FORESTS AND FISHERIES

1. Paper based data collection.

2. Inserting data into Excel

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



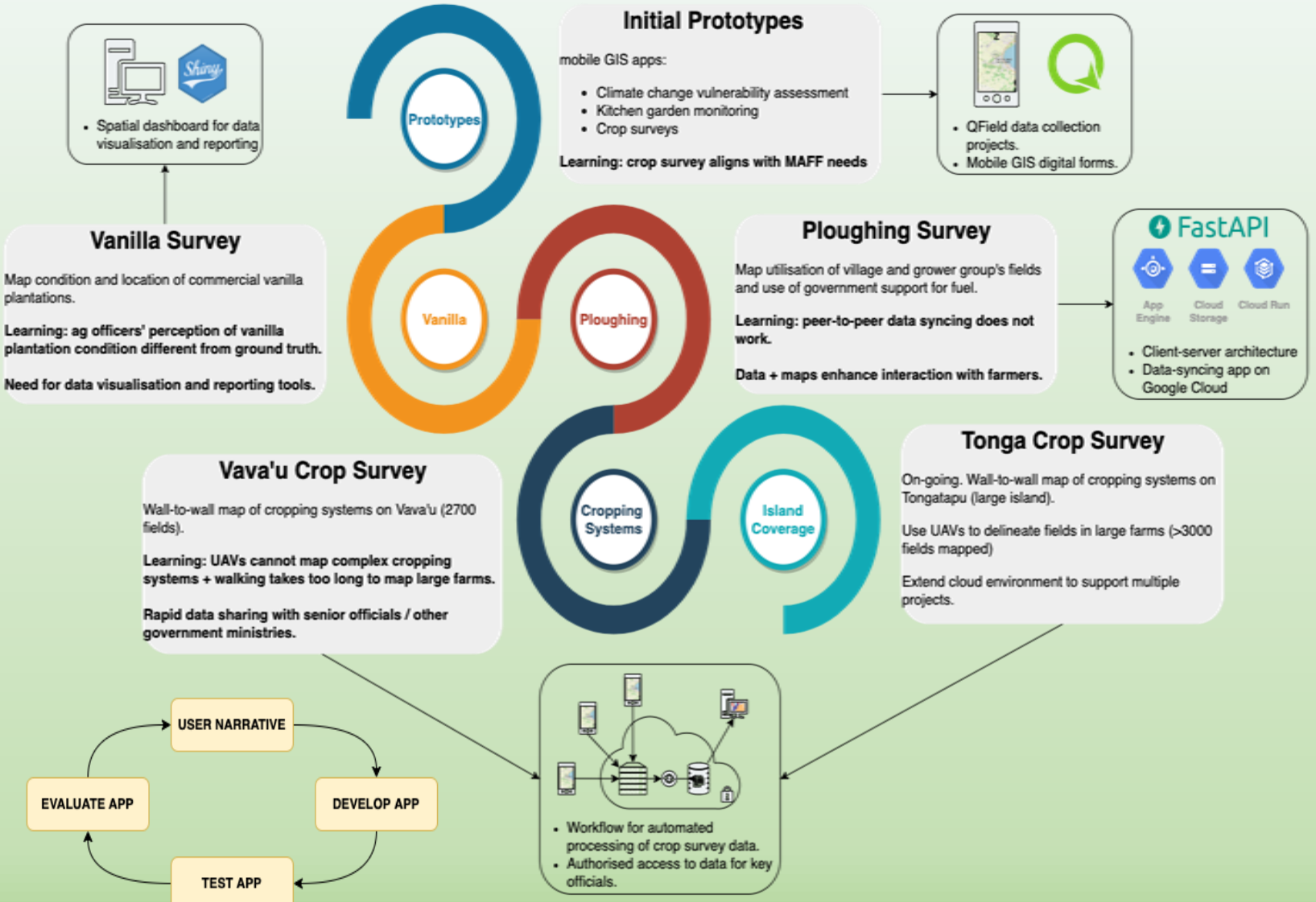
HINGOA	BLOCK	API	SAVEA	KAVA	VANILLA	FAINA	AAPULU	PULU_Nonoo	PULU Tukuange
Saia Hakau Folau	217.157	90	Vaota/Palau	1					
	217.157	90	Faama/Toutuu	1					
	217.157	90	EKA	2.5					
	217.157	90	Tokolahi				5		
	217.157	90	Faahinga	1,3			1,2,3		
	217.157	90	Vaha	1.12					
	217.157	90	Ta'u Motu'a	1,2					
	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

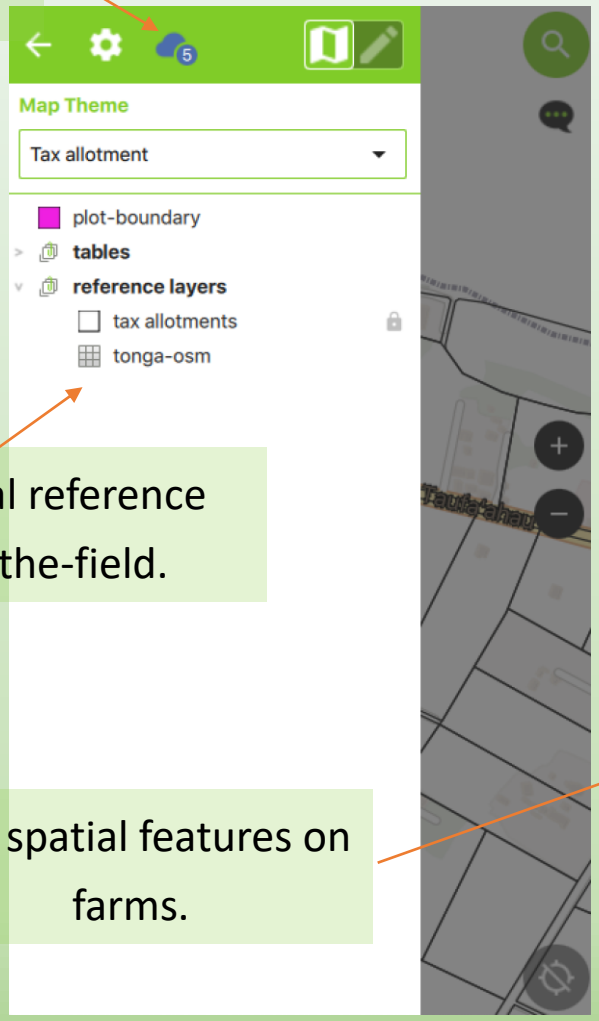
NOW

Annual Crop Survey 2022

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

QField: on-the-farm spatial data collection

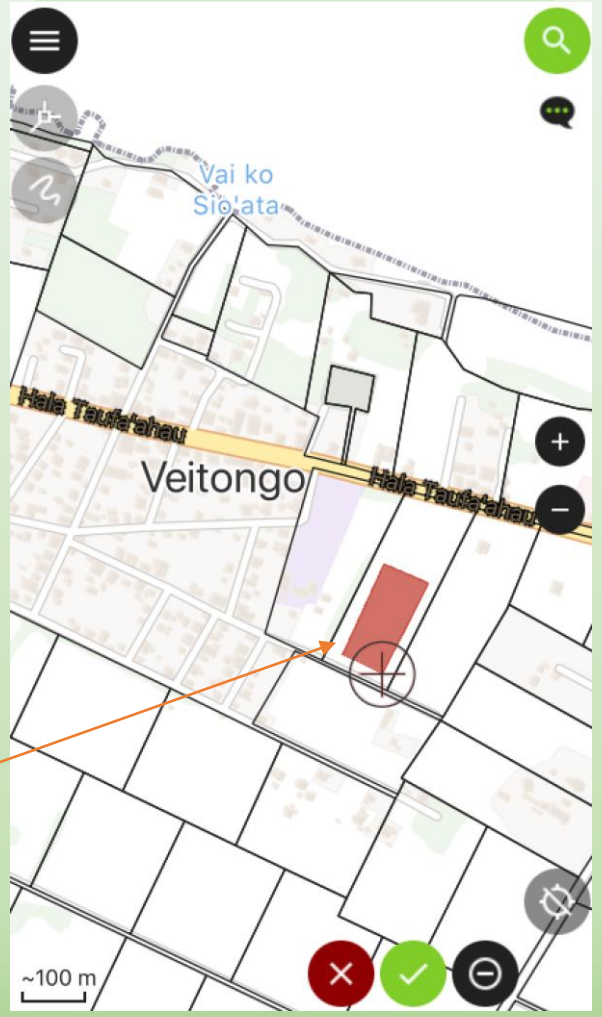
Online-offline data collection.



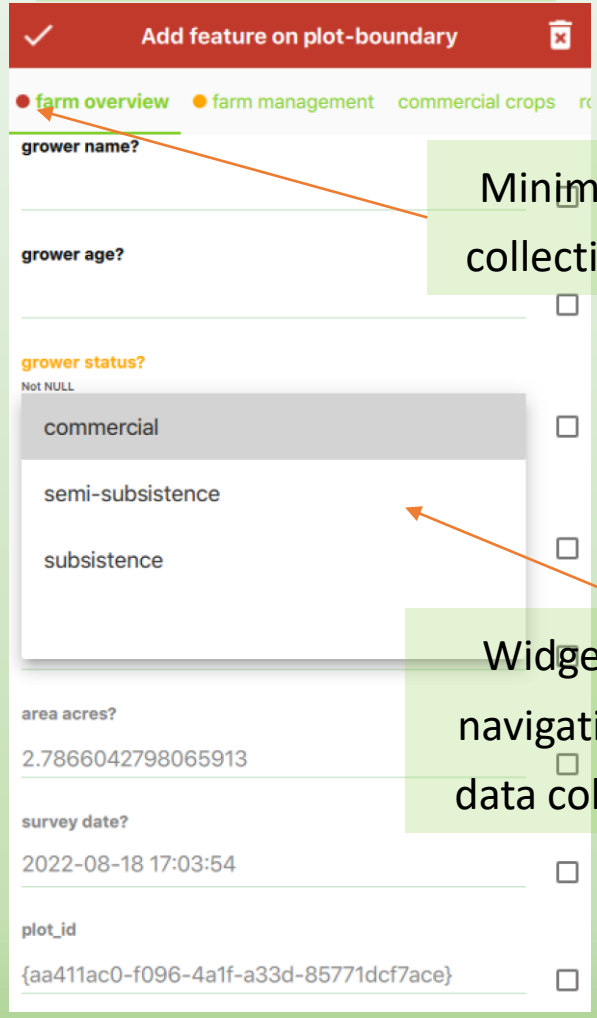
View spatial reference layers in-the-field.

Map spatial features on farms.

Easy to use for non-GIS experts.

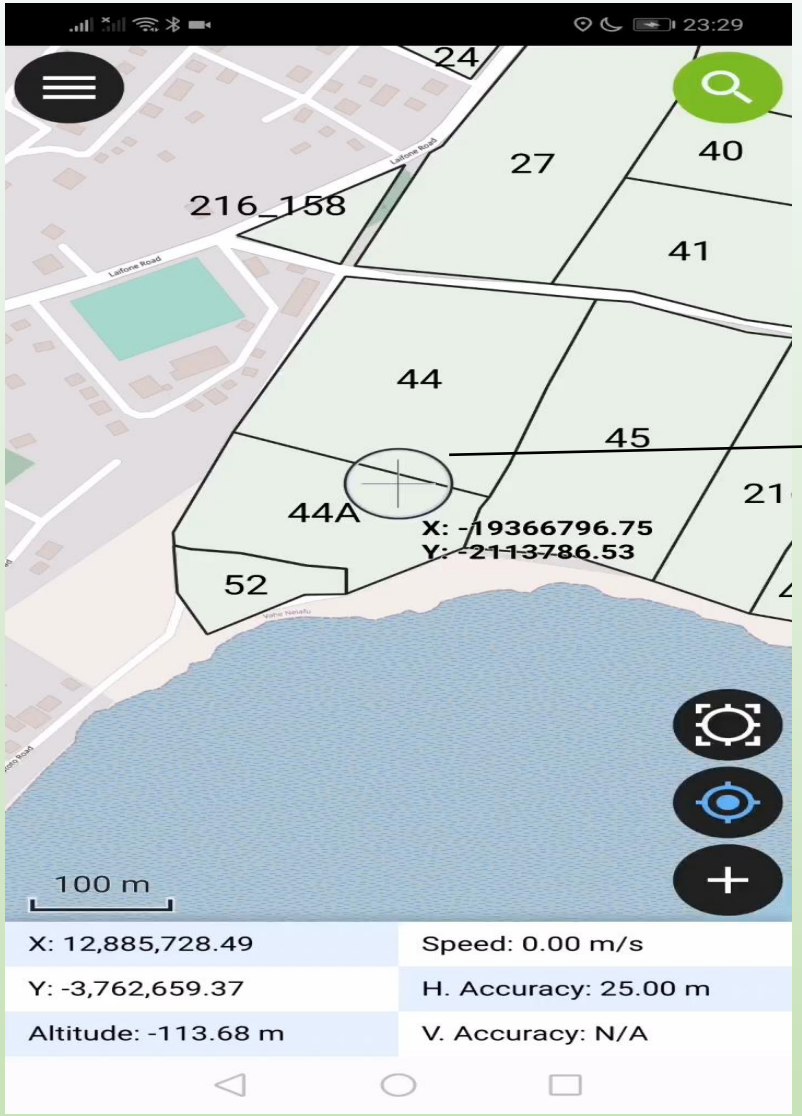


Capture non-spatial attribute information.

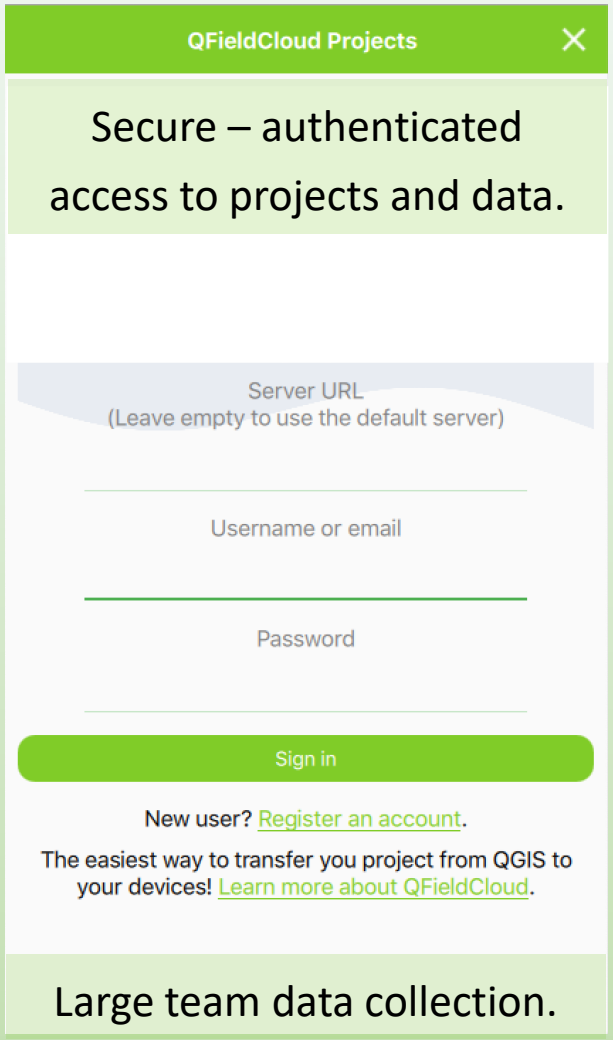


Minimise data collection error.

Widgets and form navigation for varied data collection tasks.

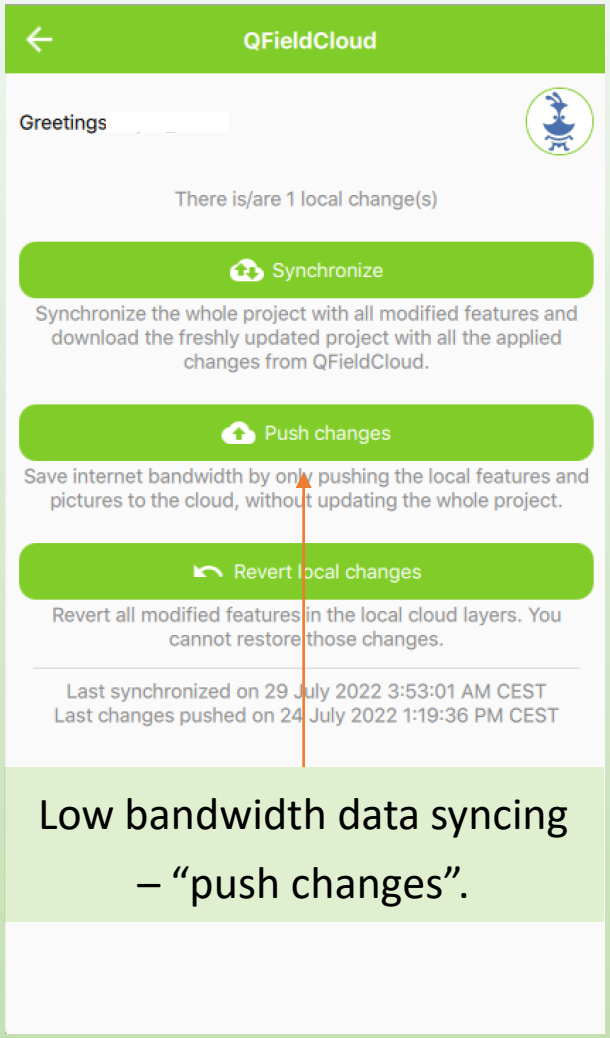

23:29
24
27
40
216_158
41
Laifone Road
44
45
44A
X: -19366796.75
Y: -2113786.53
52
100 m
X: 12,885,728.49
Speed: 0.00 m/s
Y: -3,762,659.37
H. Accuracy: 25.00 m
Altitude: -113.68 m
V. Accuracy: N/A

QFieldCloud: large team data collection

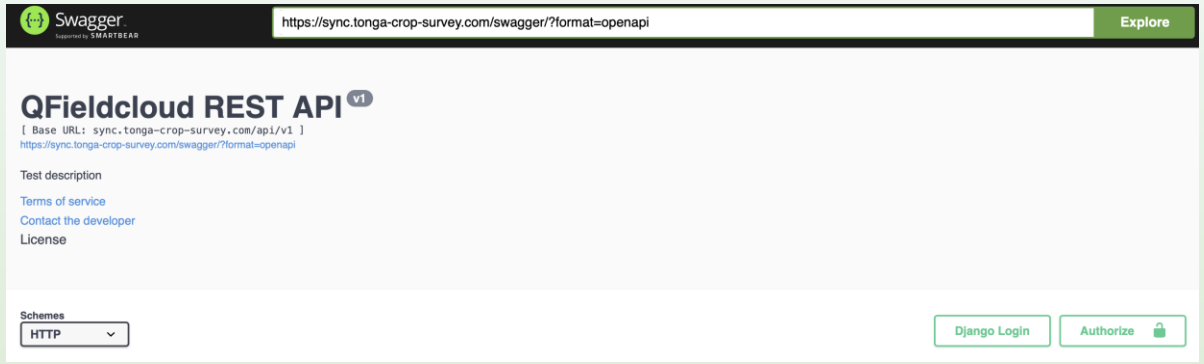


Secure – authenticated access to projects and data.

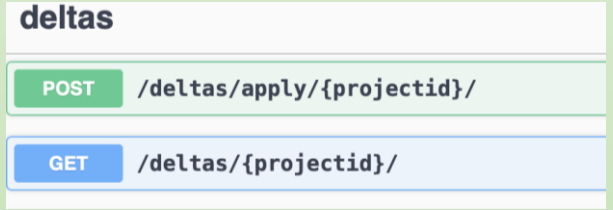
Large team data collection.



Low bandwidth data syncing – “push changes”.



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

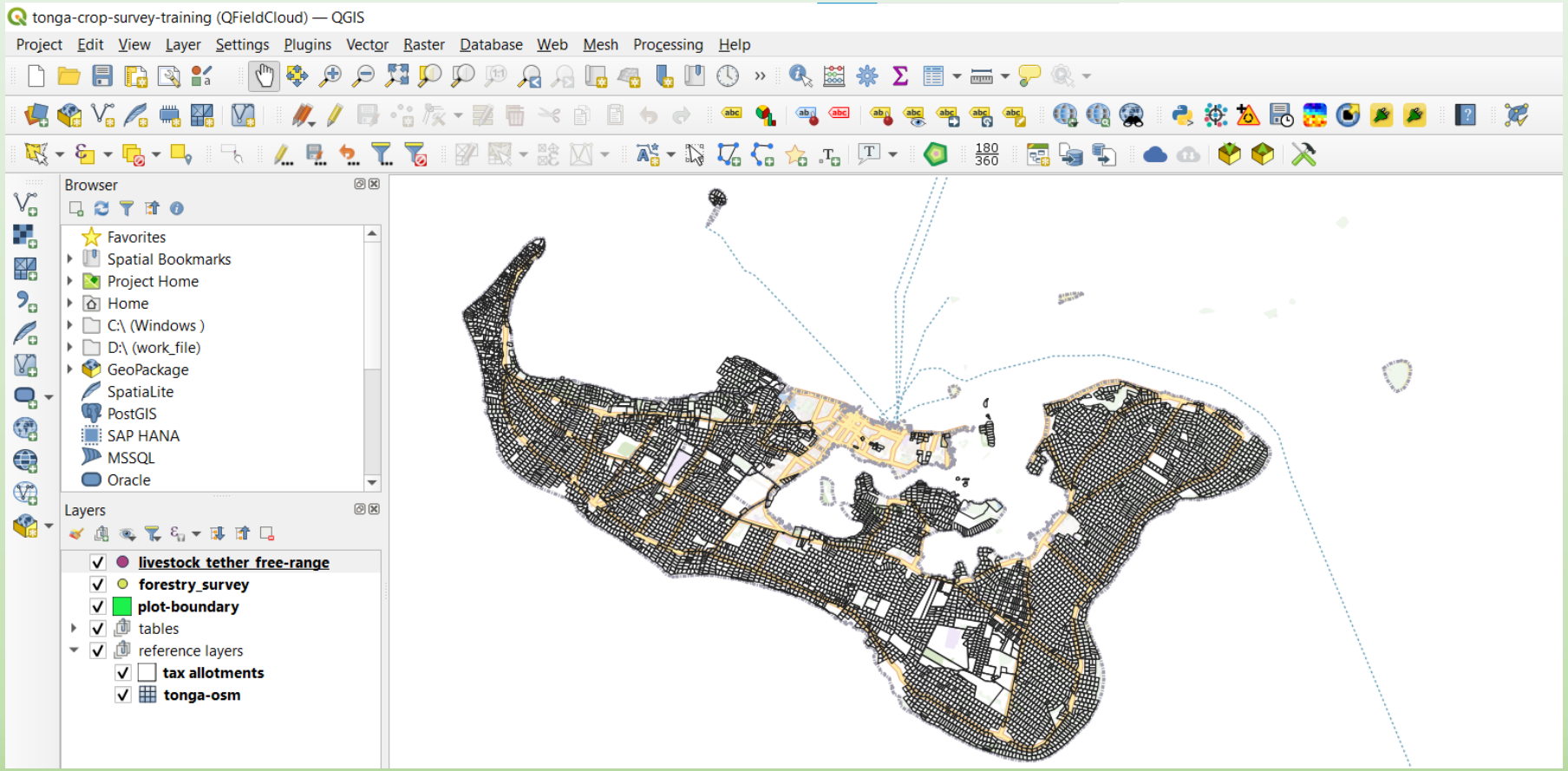


Deltas - records of data collectors surveys.

QGIS – Project and form creation

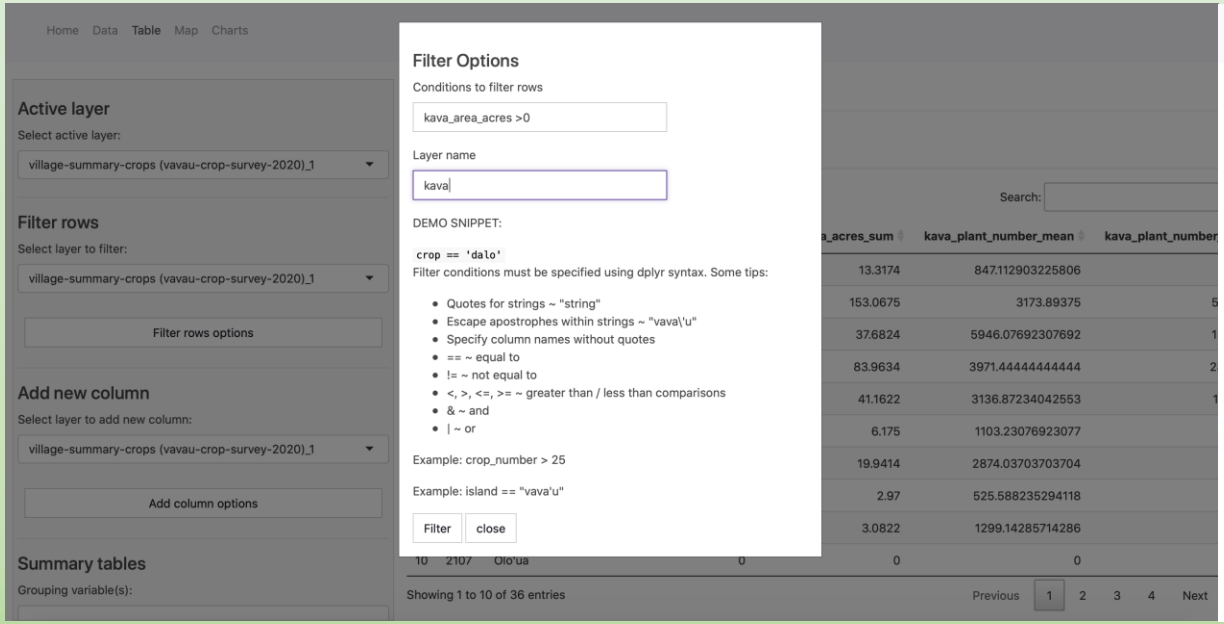
Create projects and forms for each MAFF Division

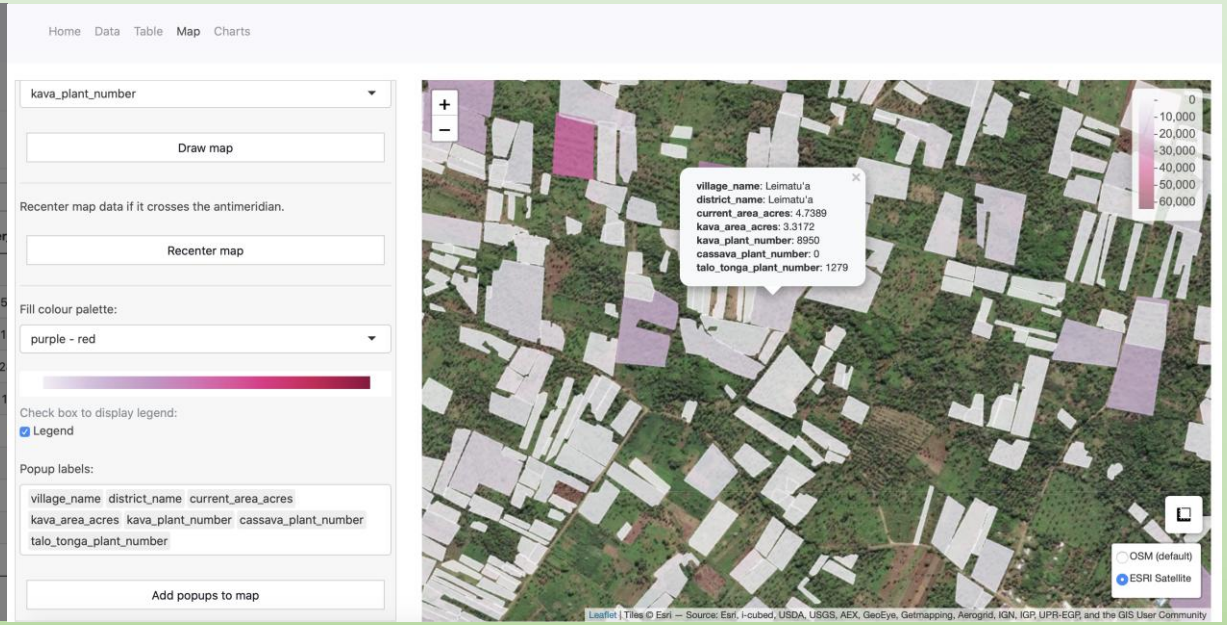
- Domestic Market Survey (Planning Division)
- Soil Test Sample (Research Division)
- Food Inspection (Food Division)



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.





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.

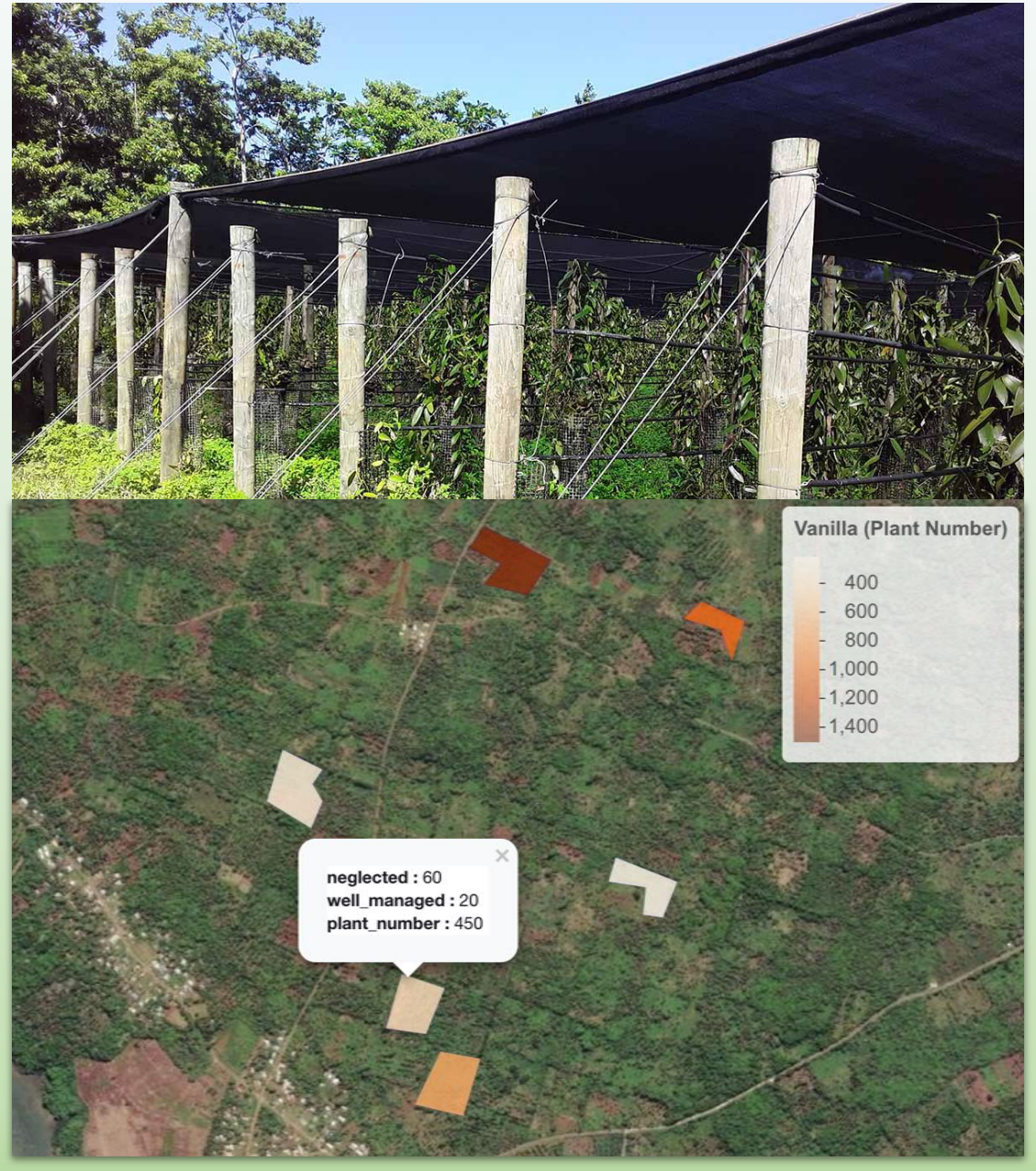
Vava’u vanilla survey

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

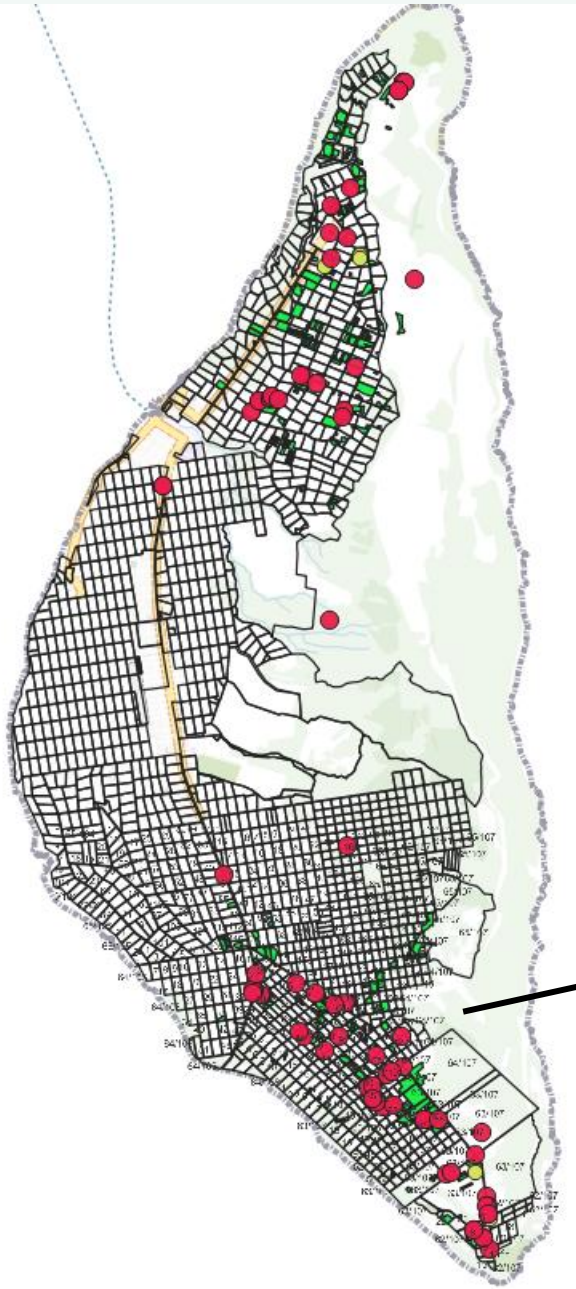
Maps of vanilla plantation management condition.

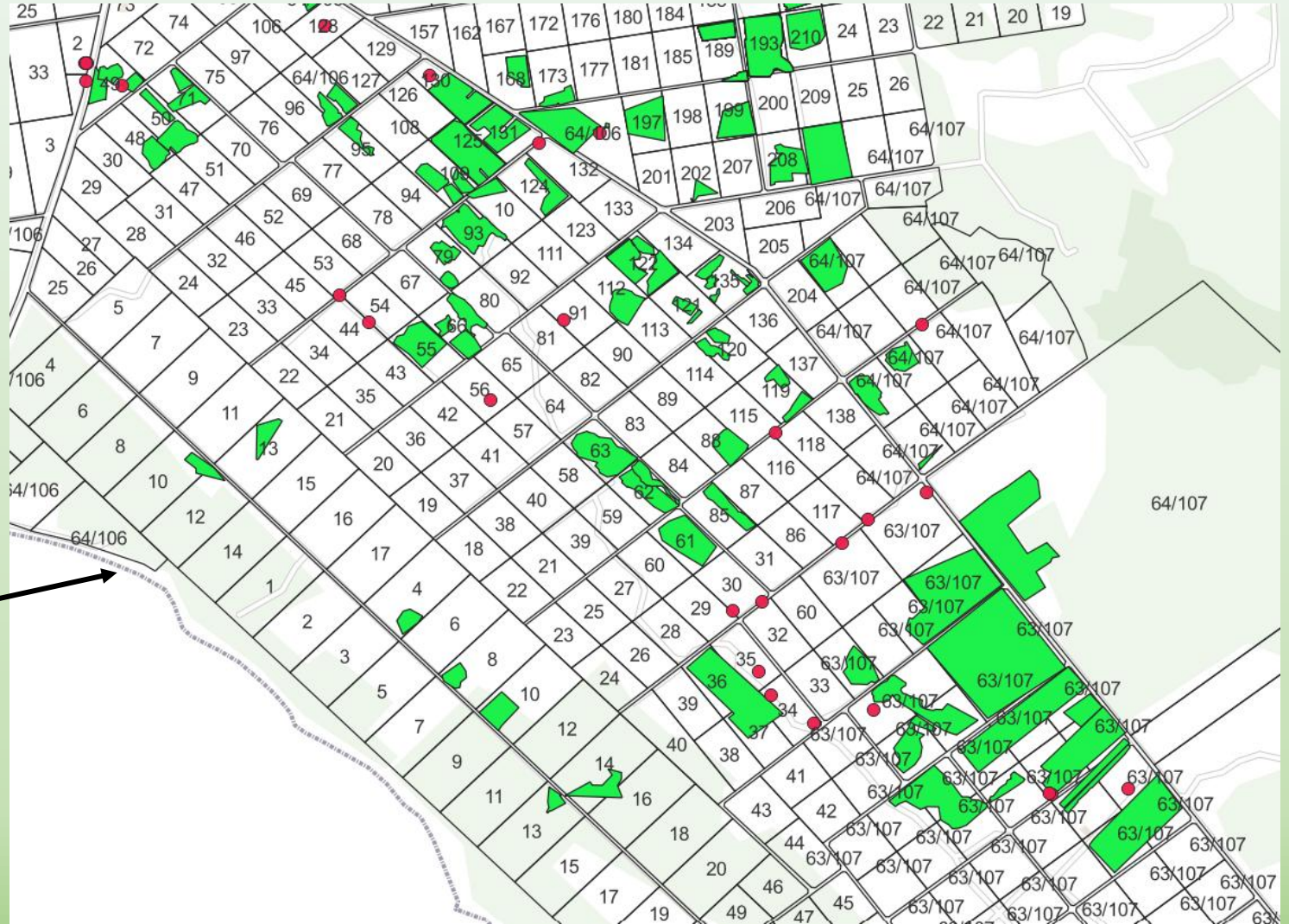
Unexpected large proportion of vanilla plantations in neglected condition.

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



Update on the survey for Eua Group



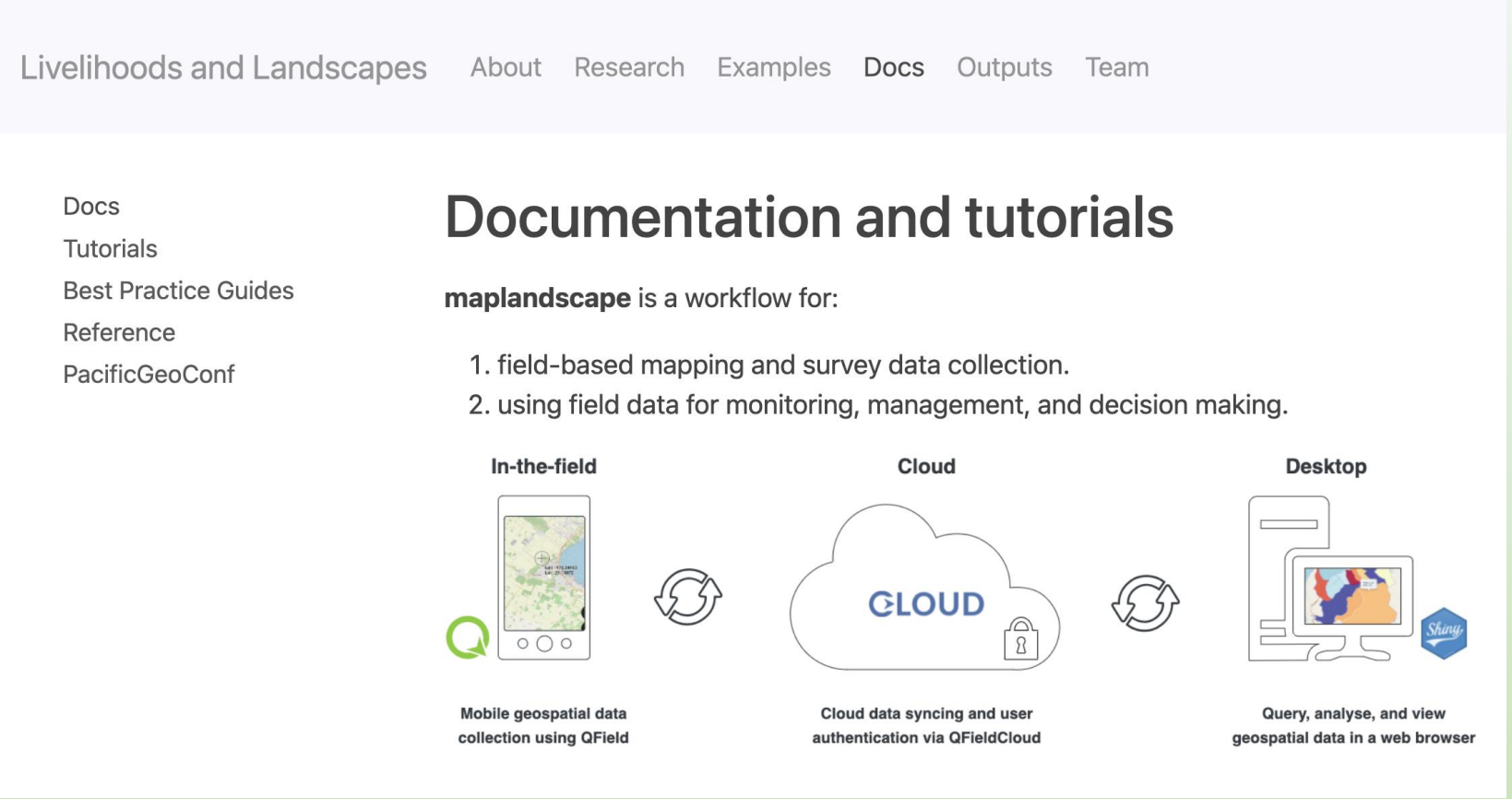


Find out more

Visit our website: www.livelihoods-and-landscapes.com

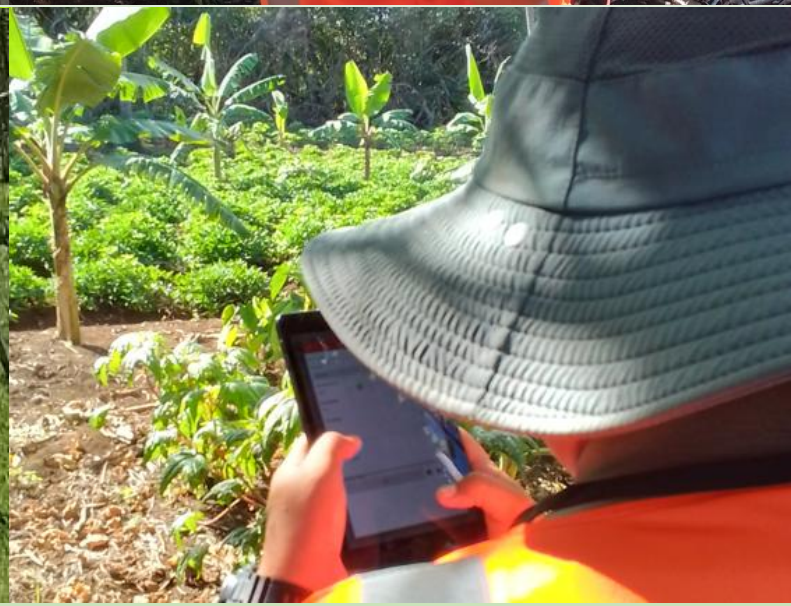
Come to our workshop on Thursday.

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



MALO AUPITO

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



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