

Digital data collection methods in ecology

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ENKÉTO

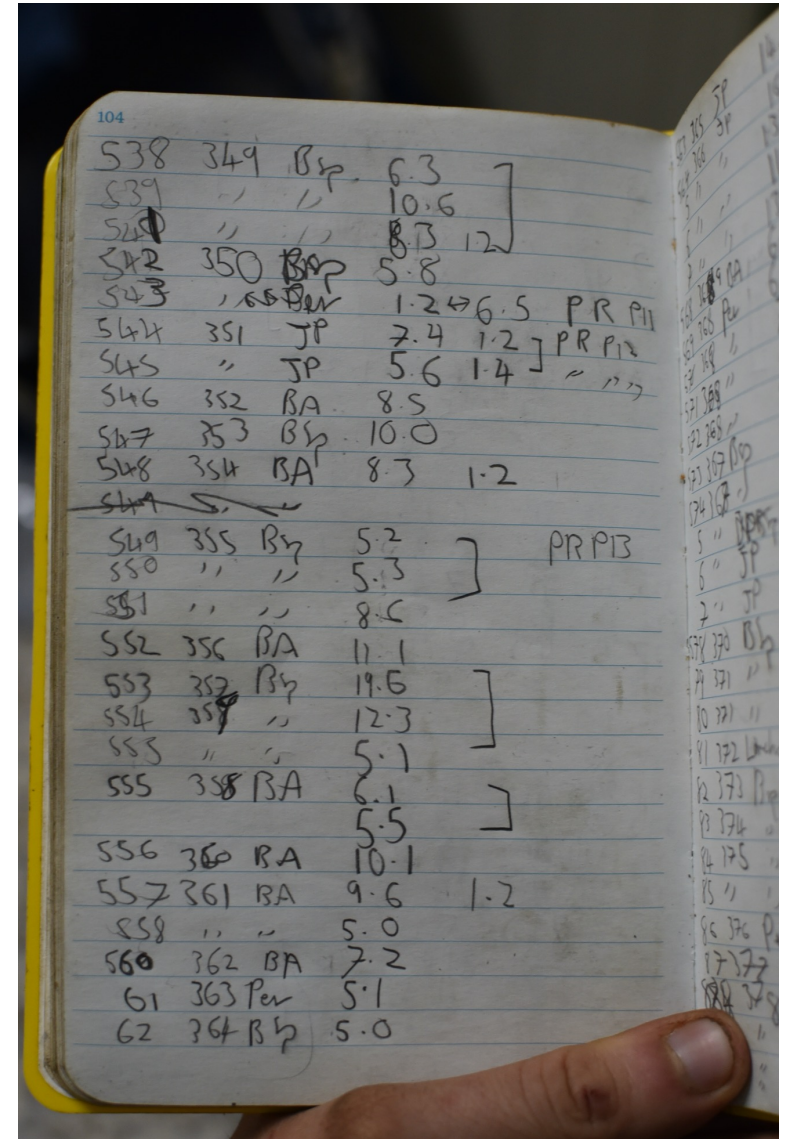
ONLINE

 KoBo toolbox



Notebook data

- + Flexible, create tables easily
- + Easy to record non textual data like diagrams
- + Doesn't require electricity
- + Doesn't require expensive equipment
- + Data transcription can help identify errors
- Manual data transcription required
- Easy to record "messy" data
- Printed datasheets are bulky
- Inconsistent data validation in the field
- ± Less chance of data loss?
- ± Quicker data entry in the field?
- ± Scribe requires less training?



Digital forms: The ODK ecosystem

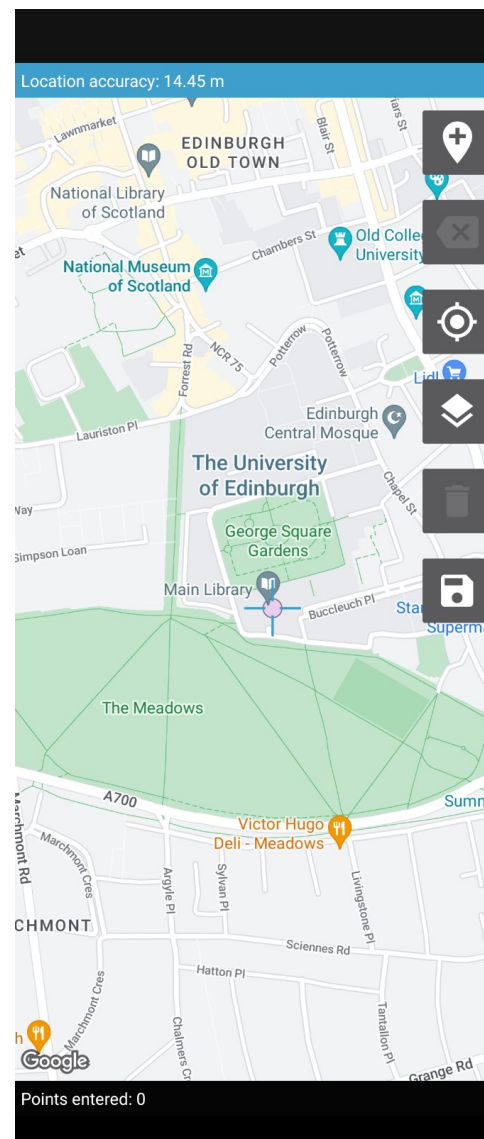
- **XForms** – XML standard for authoring web-forms
- **ODK (Open Data Kit)** – Project, maintains software for mobile data collection.
- **KoboToolbox** – Project “competing” with ODK with its own tools for mobile data collection. See also **ONA**.
- **XLSForms** – A form authoring standard which uses .xls files.
- **Enketo** – A web-app which can render ODK Xforms on the web and collect form submissions.

XLSForms



Digital forms: Features of ODK XForms

- Various question types:
 - numeric, text, date, photo/audio/video, GPS points/walks/shapes, checkboxes, radio buttons.
- Skip logic.
- Repeating groups.
- Data validation.
- Mandatory and optional questions.
- Load external data from CSV or JSON.



SEOSAW - stem rec... + 📄 ↶ ⋮

Stem/tree > 1 > Mortality and mode

Stem status

Alive

Resprouting

Dead

Stem mode: TRUE FALSE

Fallen TRUE FALSE
Stem is not supporting its own weight.

Uprooted TRUE FALSE
Root tips showing above the ground.

Leaning TRUE FALSE
Stem leaning >10%.

Snapped TRUE FALSE
Stem snapped? Material above snap is attached to stem.

Broken TRUE FALSE
Material above break not attached to stem.

Broken below standard POM TRUE FALSE

Climbers TRUE FALSE
Does the stem have other climbing plants in the canopy?

Liana TRUE FALSE

< BACK NEXT >

Digital forms: ODK XForms with XLSForms

- Each row is a question.
- Named columns define question attributes.

1	type	name	label	hint	required	relevant	appearance	media::image	calculator
31	select_one opt_boolean	subplots	Are there subplots?		yes			subplot.png	
32	begin_group	subplot_group	Subplots			\${subplots} = "TRUE"			
33	integer	subplot_n	How many subplots?		yes				
34	select_one opt_plot_shape	subplot_shape	Subplot shape		yes				
35	decimal	subplot_length	Subplot length	10 cm, e.g. 10.2	yes	\${subplot_shape} = "rectangle"			
36	decimal	subplot_width	Subplot width	10 cm, e.g. 50.0	yes	\${subplot_shape} = "rectangle"			
37	decimal	subplot_diameter	Subplot diameter	10 cm, e.g. 5.0	yes	\${subplot_shape} = "circle"			
38	end_group								
39	select_one opt_nested	nested	How many levels of nesting are there?		yes			nested.png	
40	begin_group	nested_1_group	First-level nesting information			\${nested} = "1" or \${nested} = "2" or \${nested} = "3"			
41	decimal	n1_min_diam_thresh	N1 minimum diameter thresh	cm, e.g. 5					
42	decimal	n1_min_height_thresh	N1 minimum height threshol	10 cm, e.g. 2.5					
43	select_one opt_plot_shape	n1_plot_shape	N1 Plot shape		yes				
44	decimal	n1_plot_length	N1 Plot length	10 cm, e.g. 10.5	yes	\${n1_plot_shape} = "rectangle"			
45	decimal	n1_plot_width	N1 Plot width	10 cm, e.g. 40.0	yes	\${n1_plot_shape} = "rectangle"			
46	decimal	n1_plot_diameter	N1 Plot diameter	10 cm, e.g. 15.5	yes	\${n1_plot_shape} = "circle"			
47	end_group								
48	begin_group	nested_2_group	Second-level nesting information			\${nested} = "2" or \${nested} = "3"			
49	decimal	n2_min_diam_thresh	N2 minimum diameter thresh	cm, e.g. 5					
50	decimal	n2_min_height_thresh	N2 minimum height threshol	10 cm, e.g. 2.5					
51	select_one opt_plot_shape	n2_plot_shape	N2 Plot shape		yes				
52	decimal	n2_plot_length	N2 Plot length	10 cm, e.g. 10.5	yes	\${n2_plot_shape} = "rectangle"			
53	decimal	n2_plot_width	N2 Plot width	10 cm, e.g. 40.0	yes	\${n2_plot_shape} = "rectangle"			
54	decimal	n2_plot_diameter	N2 Plot diameter	10 cm, e.g. 15.5	yes	\${n2_plot_shape} = "circle"			
55	end_group								
56	begin_group	nested_3_group	Third-level nesting information			\${nested} = "3"			
57	decimal	n3_min_diam_thresh	N3 minimum diameter thresh	cm, e.g. 5					
58	decimal	n3_min_height_thresh	N3 minimum height threshol	10 cm, e.g. 2.5					
59	select_one opt_plot_shape	n3_plot_shape	N3 Plot shape		yes				

Digital forms: Workflow using KoboToolbox

1. Create form in Excel using XLSForm standard.
2. Validate form using XLSForm Online
<https://getodk.org/xlsform/>
3. Upload to KoboToolbox and deploy.
4. Download form using KoboCollect on Android device.
5. Collect form submissions using KoboCollect.
6. Download form submissions from KoboToolbox as a CSV.
7. Analyse data in R.



XLSForm Online v2.x

Convert an XLSForm into a validated ODK XForm.

Still converting XLSForms manually? [ODK Cloud](#) has built-in XLSForm support and other features designed for professionals. [Request a demo](#) to learn more.

File: No file chosen

By using this web app, you agree to our [Terms of Service](#) and [Privacy Policy](#).



Digital tables

- Many options
- Most popular are:
 - Numbers (iOS)
 - Google Sheets (iOS, Android)
 - Microsoft Excel (iOS, Android)
- Auto-fill
- Data validation
- Reduce transcription errors
- Faster in the field??



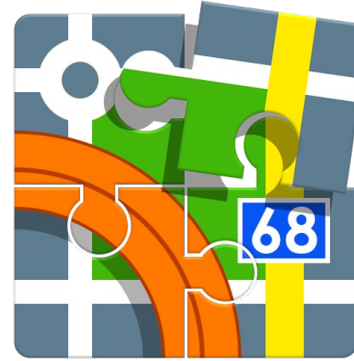
	AZ	BA	BB	BC	BD	BE
1	gr species	crown_ar	ba	diam_adj	agb	wood_de
2	Burkea a	NA	0.005410	8.247948	0.015448	0.646666
3	st Combret	NA	0.003956	7.169014	0.014745	0.9145
4	a Burkea a	NA	0.006792	9.247948	0.020790	0.646666
5	a Julbernar	NA	0.062015	27.90975	0.356386	0.673077
6	st Combret	NA	0.003318	6.447948	0.011171	0.9145
7	st Combret	NA	0.007389	9.647948	0.031912	0.9145
8	ac Strychno	NA	0.003015	6.147948	0.007885	0.7175
9	ac Strychno	NA	0.001963	4.947948	0.004447	0.7175
10	a Julbernar	NA	0.084496	32.60975	0.524352	0.673077
11	a Erythroph	NA	0.003956	7.418977	0.015532	0.878
12	a Erythroph	NA	0.002206	5.247948	0.006257	0.878
13	a Albizia ar	NA	0.049087	24.89705	0.224067	0.553954
14	NA	NA	0.004300	7.347948	0.012838	0.733573
15	NA	NA	0.004901	7.847948	0.015243	0.733573
16	a Burkea a	NA	0.002375	5.447948	0.005212	0.646666
17	a Burkea a	NA	0.002375	5.447948	0.005212	0.646666
18	ac Strychno	NA	0.007238	9.669014	0.025671	0.7175
19	NA	NA	0.002642	5.747948	0.006742	0.733573
20	st Combret	NA	0.004536	7.547948	0.016867	0.9145
21	a Burkea a	NA	0.002827	5.947948	0.006565	0.646666
22	a Burkea a	NA	0.002375	5.447948	0.005212	0.646666
23	st Combret	NA	0.006082	8.869014	0.025660	0.9145
24	st Combret	NA	0.002922	6.047948	0.009441	0.9145
25	a Julbernar	NA	0.004071	17.147948	0.011035	0.673077
26	a Pterocarp	NA	0.010935	11.74794	0.033785	0.5606
27	st Combret	NA	0.006082	8.747948	0.024761	0.9145
28	a Burkea a	NA	0.010028	11.24794	0.034466	0.646666
29	ac Strychno	NA	0.003318	6.447948	0.008935	0.7175
30	ac Strychno	NA	0.002123	5.147948	0.004938	0.7175
31	ai Diplorhyr	NA	0.019855	15.9	0.086361	0.671
32	ai Diplorhyr	NA	0.012271	12.44794	0.046245	0.671
33	ai Diplorhyr	118.7522	0.006503	9.047948	0.020324	0.671
34	ai Diplorhyr	NA	0.003845	7.069014	0.010685	0.671
35	a Burkea a	NA	0.011689	12.14794	0.041993	0.646666

	AV	AW	AX	AY	AZ	BA	BB
1	taxon_ran	taxon_gnr	base_ra	family_gn	species_n	crown_ar	ba
2	r superkin	Eukaryot	species	Fabaceae	Burkea afr	NA	0.00541
3	r superkin	Eukaryot	species	Combreta	Combretu	NA	0.00396
4	r superkin	Eukaryot	species	Fabaceae	Burkea afr	NA	0.00679
5	c superkin	Eukaryot	species	Fabaceae	Julbernar	NA	0.06202
6	r superkin	Eukaryot	species	Combreta	Combretu	NA	0.00332
7	r superkin	Eukaryot	species	Combreta	Combretu	NA	0.00739
8	r superkin	Eukaryot	species	Loganiace	Strychnos	NA	0.00302
9	r superkin	Eukaryot	species	Loganiace	Strychnos	NA	0.00196
10	c superkin	Eukaryot	species	Fabaceae	Julbernar	NA	0.0845
11	r superkin	Eukaryot	species	Fabaceae	Erythroph	NA	0.00396
12	r superkin	Eukaryot	species	Fabaceae	Erythroph	NA	0.00221
13	no rank n	Eukaryot	species	Fabaceae	Albizia a	NA	0.04909
14	NA	NA	NA	NA	NA	NA	0.0043
17	r superkin	Eukaryot	species	Fabaceae	Burkea afr	NA	0.00238
18	r superkin	Eukaryot	species	Loganiace	Strychnos	NA	0.00724
19	NA	NA	NA	NA	NA	NA	0.00264
20	r superkin	Eukaryot	species	Combreta	Combretu	NA	0.00454
21	r superkin	Eukaryot	species	Fabaceae	Burkea afr	NA	0.00283
22	r superkin	Eukaryot	species	Fabaceae	Burkea afr	NA	0.00238
23	r superkin	Eukaryot	species	Combreta	Combretu	NA	0.00608
24	r superkin	Eukaryot	species	Combreta	Combretu	NA	0.00292
25	c superkin	Eukaryot	species	Fabaceae	Julbernar	NA	0.00407
26	r superkin	Eukaryot	species	Fabaceae	Pterocarp	NA	0.01094
27	r superkin	Eukaryot	species	Combreta	Combretu	NA	0.00608
28	r superkin	Eukaryot	species	Fabaceae	Burkea afr	NA	0.01003
29	r superkin	Eukaryot	species	Loganiace	Strychnos	NA	0.00332
30	r superkin	Eukaryot	species	Loganiace	Strychnos	NA	0.00212
31	r superkin	Eukaryot	species	Apocynaci	Diplorhyr	NA	0.01986
32	r superkin	Eukaryot	species	Apocynaci	Diplorhyr	NA	0.01227
33	r superkin	Eukaryot	species	Apocynaci	Diplorhyr	118.752	0.0065
34	r superkin	Eukaryot	species	Apocynaci	Diplorhyr	NA	0.00385
35	r superkin	Eukaryot	species	Fabaceae	Burkea afr	NA	0.01169
36	r superkin	Eukaryot	species	Combreta	Combretu	NA	0.00196
37	r superkin	Eukaryot	species	Ebenaceae	Diospyros	NA	0.00636
38	c superkin	Eukaryot	species	Fabaceae	Julbernar	NA	0.07596
39	r superkin	Eukaryot	species	Fabaceae	Burkea afr	NA	0.0043
40	r superkin	Eukaryot	species	Fabaceae	Burkea afr	NA	0.0065
41	r superkin	Eukaryot	species	Fabaceae	Pterocarp	NA	0.00754
42	r superkin	Eukaryot	species	Fabaceae	Bobgunni	17.1531	0.00528

Digital mapping

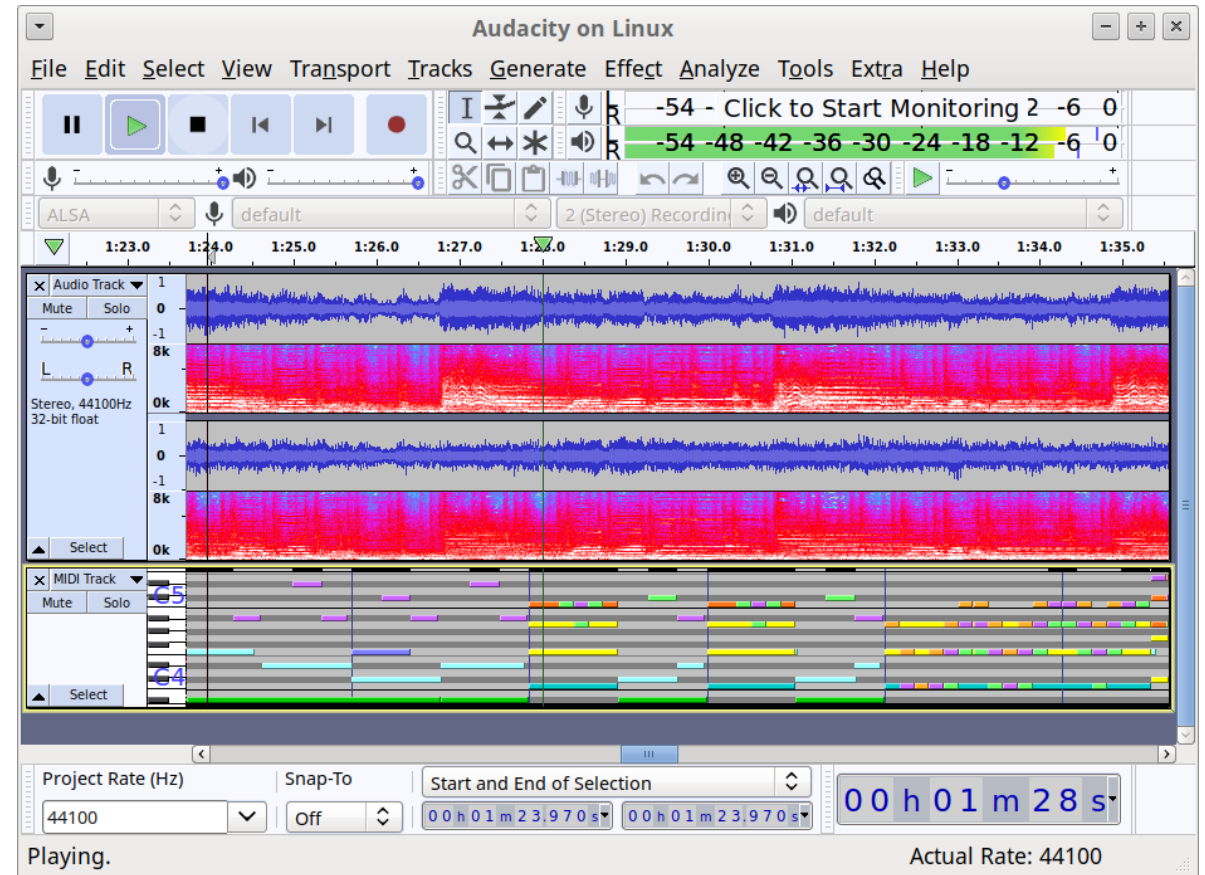
Locus maps *classic* (£8.99)

- Custom map tiles
- GPS points/tracks with text annotation
- Has gone downhill since Locus Maps 4 released
- Useful for site locations, routes
- **Does anybody know alternatives?**



Dictation?

- Still requires transcription.
- Much quicker in the field.
- Smaller field team?
- Everybody else in the team must be quiet.
- Works best with only one person.
- May require paper sheet to remind which measurements to take.



Logistics: backups and electricity

- Backup every day, if possible.
- Keep digital backups in separate locations (e.g. one in the car, one at camp).
- Take photos of any paper (before “taking boots off”).
- Don’t throw away any paper.
- Try to transcribe paper data soon after collection.

- Generator - inverter generators provide cleaner power waveform. Less likely to damage electronics
- Solar charger – requires planning.

