

Using Ona and Open Data Kit to Build Mobile-based EMMA Market Assessment Questionnaires



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Rationale

Transitioning from paper to mobile data collection is an escalating trend within humanitarian organizations. Basic cost-benefit analysis shows the use of mobile-based data collection tools can drastically reduce administrative overhead and operational complexity. While there is inherent value in gathering structured data using mobile technologies, one should always be aware of local capacity to support a data collection project in the medium and long term. In addition, it is supremely important to understand why you are collecting data and how you actually intend to use it. It is encouraged to see the use of mobile technology as an M&E support system – not an end all solution. This requires identifying areas of added value outside of simply improving workflow efficiency and, perhaps more importantly, ensuring proper support structures are in place to manage the mobile deployment. The most successful projects are those that incorporate a broader picture and programme design, also taking into account the importance of building local ICT capacity to actually manage mobile deployments.

Non-Endorsement

At the time of this project's conception (2013-2014), Open Data Kit (ODK) was the prevailing option for quick, easy, and free mobile data collection startup. As an open source framework, ODK has inspired a variety of non-profit initiatives and for-profit service providers to emerge, giving organizations a plethora of options to choose from. IRC originally chose to use "FormHub," a university-led ODK development project as it provided the basic functionality needed to upload forms and collect data for free. FormHub has since transitioned to Ona (as of July 2014) a soon to be pay-for- service model that utilizes a mirrored instance of FormHub. **The use of Ona is not a formal endorsement of the tool**, but rather a coincidental circumstance given the eventual dissolution of the FormHub academic project.

To learn more about what mobile data collection platform is appropriate for your organization, it is highly encouraged to reference the Humanitarian NOMAD Selection Tool (<http://humanitarian-nomad.org/online-selection-tool-2/>).

Introduction

Purpose of this document

- To build a mobile data collection system to improve the speed and quality of market assessment data collection and analysis.
- To provide field assessment teams with ready-to-use guidance on developing and/or adapting market questionnaires without the need for in-person technical support. Pre-built questionnaires can be used as is, or adapted using this document and/or associated resources referenced herein.

Limitations

- There are a range of mobile data collection systems available¹. This document provides information on using Ona² to build the assessment questionnaire and Open Data Kit to collect the information using an Android-enabled smartphone or tablet. Both these tools are free and available for anyone to use. **To see what other options are available, see www.apit-info.org or <http://www.humanitarian-nomad.org>.**
- Similarly Ona (previously known as formhub) has its own guidance on building mobile surveys available at <https://ona.io/syntax/>. Although this document provides information using Ona, the approach and syntax used in building each form is based on a universally recognized XML framework. As such, the template forms can be uploaded to utilize across other mobile data collection systems and platforms (though depending on the tool chosen, the document may need a small amount of refinement to ensure compatibility).
- This document focuses only on the process of building a mobile market questionnaire and does not get involved with the analysis component.
- Due to the evolving nature of open source software development, the systems procedures and platforms and their functionality as described in this guidance may change over time. This document is intended to provide instructions based on the current functionality of the Ona, formhub and ODK platforms as of July 2014.

Structure

This document can be used two ways to support field-level assessments:

1. **The detailed approach:** This takes approximate 2-3hrs and will take you through a process of building an assessment using Ona and exporting this into Open Data Kit (steps 1 to 4). Step 5 concludes by providing succinct guidance to assist with adapting a pre-built market assessment questionnaire to your individual context, key analytical questions, and information needs. If you have time available, following the detailed approach from steps 1 to 5 is the preferred approach.
2. **The light approach:** This approach will show you how to quickly modify a pre-built market assessment questionnaire using a Youtube tutorial. If the pre-built questionnaires are adequate for your assessment purposes, or if you have less time, we suggest following the light approach, going straight to step 5.

¹ For an introductory video about Open Data Kit see <https://speakerdeck.com/mberg/Ona-setting-up-odk-collect>

² For an introduction about Formhub (now Ona) see <http://www.youtube.com/watch?v=jqpmMpkIXSQ>

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Step 1: Content of an EMMA market assessment

Step 1: Content of an EMMA market assessment

Step 2: Build your questionnaire in Excel saving it as an XLS format

Step 3: Upload your questionnaire from Excel onto the Ona website

Step 4: Upload your questionnaire from Ona to ODK Collect

Step 5: Modifying a pre-built assessment

This manual provides guidance to develop a market assessment questionnaire to be used during with Step 5 of the EMMA process – ‘Fieldwork activities and interviews’. Prior to developing the questionnaire, assessment teams should have completed the following steps:

- Secondary information review
- Identified the target population
- Identified the critical market systems
- Identified key analytical questions
- Started preliminary mapping with an idea of the market actors, potential interviewees, and what information you need to receive from each actor

Similar to developing paper-based questionnaires, only after identifying the potential actors your team will talk to, and the specific information you will need to obtain from each actor, do you proceed to developing the mobile assessment questionnaire. For more information on specific information needs from different levels of market actors, please see EMMA toolkit p 34.

For each assessment, multiple questionnaires may be developed in order to appropriately address questions to different actors within a market system. In most cases, at least two questionnaires are used – one for market actors and one for the target population. However, it may be important to use different questionnaires for different categories of market actors, (such as wholesalers, retailers, etc.) or for different actors supporting the market systems (such as credit providers, transporters, etc.).

This document provides guidance on developing questionnaires for market assessments and the steps described below will need to be replicated for each questionnaire you need. However, there is no reason why the guidance provided cannot be used to build any other type of mobile questionnaire using Ona and ODK.

Step 2: Build your questionnaire in Excel and save it as an XLS file (e.g. formname.xls)

Step 1: Content of an EMMA market assessment

Step 2: Build your questionnaire in Excel saving it in an XLS format

Step 3: Upload your questionnaire from Excel onto the Ona website

Step 4: Upload your questionnaire from Ona to ODK Collect

Step 5: Modifying a pre-built assessment

2.1 Design your market assessment questionnaire: You should first design your assessment on pen and paper, testing and refining it before translating into a mobile format. We recommend first reading through this document to understand what functions are available, though.

2.2 Types of templates available: Two pre-built questionnaire to simplify the process available at <http://emma-toolkit.org/practice/mobile-data-collection/>. These include:

1. **Blank_EMMA_Template.xls** - This is a blank template with headings which you can use to build your own assessment.
2. **Rapid_Market_Assessment_Questionnaire_EMMA.xls** - This is a pre-built questionnaire for collecting information on different market actors. If this meets your needs you can use this as it, or this document and the associated Youtube tutorial to tailor it to your needs.

2.3 Blank template: Open the file 'Blank_EMMA_Template.xls' (available at <http://emma-toolkit.org/practice/mobile-data-collection/>). This provides a blank template in which can be used to build the mobile market assessment questionnaire. When you open the 'Blank_EMMA_Template.xls', you will be presented with an excel page with eleven headings along the top of the sheet named 'survey'. All market assessments questionnaires should have these headings, in this order - all in lower case with no spaces. (Only the 'label' and 'hints' columns are able to contain upper case text and spaces, as these are what will be visible on the smartphone.) The main fields to be aware of when using a blank template to create a questionnaire are:

- The 'type' column describes the question type (text, number, photo, etc.).
- The 'name' column assigns a unique variable ('name') that will serve as a reference to the survey question (the name must be unique, must begin with a letter, and can only contain letters, numbers, dashes (-) and underscores (_), all in lower case).
- The 'label' column contains the text that will actually be presented on the Android smartphone.

Requirements for adding a heading to the survey sheet

- Column headings must but be in lower case, spelt correctly with no spaces either end.
- No spaces are allowed between words only underscores (_).
- Only text located under the label and hint heading can have uppercase text or spaces.

Table 1: Description of headings (columns A to K on the 'survey' sheet)

Column Headings	Explanation	Example
type (column a)	type relates to the type of question you are asking and the type of response the enumerator is able to use.	E.g open text, single answer or multiple answer. Table 2 below provides lists the 'type' of questions available.
name (column b)	name provides a heading under which responses sit after they have been collected in the results table.	E.g. if you write 'interviewee_gender' under 'name', the responses under this would be either male or female.
label (column c)	label provides the same information as the 'name' and is what will be visible on the mobile.	E.g. 'What is the interviewees gender'.
hint (column d)	hint provides an opportunity to expand on the label, adding a hint about the question.	E.g. 'Select the top three' if you used a 'select_multiple' question 'type'.
required (column e)	required provides the opportunity to ensure certain questions are mandatory.	E.g. you might want to make sure the survey location is a mandatory question. This means the questionnaire cannot be finished without filling in this question.
constraint (column f)	constraint provides the opportunity to limit the type of response using a formula.	E.g. when asking someone's age you could use a formula ensuring that the response cannot exceed 100 (years old). This follows normal excel formula rules. A constraint can only be used to numeric responses (e.g. integer or decimal question types).
constraint message (column g)	constraint message provides the opportunity to add a message should data entry not fit within the assigned constraint (formula). The constraint message you assign will be shown under the question on the smartphone.	E.g. if someone enters 1000, the constraint message could say 'That's not a valid age'.
relevant (column h)	relevant provides the opportunity to add pathway dependent questions.	E.g. the survey asks a different set of questions depending on the response to the previous question.
default (column j)	default provides the opportunity to change been languages.	E.g. you want to be able to view the assessment in both French and English.
appearance (column k)	appearance provides the opportunity to chose how you want group questions.	E.g you might want to be able to scroll down and fill in different questions in line with how the conversations moves. Alternatively you might want to group questions into lists.
calculation (column L)	calculation provides the opportunity to add an automatic calculation to the question.	E.g you might want to automatically convert food units into their kilo-calorific equivalent.

2.4 Adding questions under the ‘label’ heading (column C): In Ona, each row represents one question. Next you need to add your questions under the heading ‘label’ (column C), row by row, in the same order you want them asked. What you put here is what will be seen by the enumerator on the smartphone. You may want to think about grouping questions into discrete sets e.g. introduction, information on critical markets and sub-groups breaking this down. You will need to group these in the same order as you want them asked as the grouping will impact the way the questions show up on the smartphone and on the order of the columns in which the raw data is presented.

Requirements for adding a ‘label’

- The label must be unique, no other question can have the same label.
- Must begin with a letter and be 52 characters or less.
- Can contain letters, spaces and numbers.
- Is allowed to use upper and lower case text.

2.5 Adding a ‘name’ to each question (column B): For each question, you then need to create a shortened version it, adding this under the heading ‘name’, (column B.) This ‘name’ assigns a unique variable that will serve as a reference to the survey question (the name must be unique, must begin with a letter, and can only contain letters, numbers, dashes (-) and underscores. It cannot be over 52 characters, should all be in lower case and no spaces are allowed. For example, if the question under ‘label’ heading is *‘What is your age’*, the equivalent under the ‘name’ heading could be *‘respondent_age’*. Thus if you collect information from 4 people, you will have 4 sets of age’s in your results table under a column titled *‘respondent_age’*. The shorter you are able to keep the ‘name’, the easier it will be to navigate after you have collected the data.

Requirements for adding a ‘name’

- The name must begin with a letter, be unique - no other question can have the same name.
- Can only contain letters, numbers, dashes and underscores.
- Must be 52 characters or less, all lower case.
- No spaces are allowed, only underscores.

2.6 Adding a ‘type’, to each question (column A): After naming your question, you will need to select a ‘type’ to correspond to each question and which describes the format of the data which will be entered into the questionnaire from respondents. These ‘type’ classifications tell Ona what ‘type’ of question you are asking and how you want it answered. The types are also a way of controlling answers respondents offer for each question, for example if the ‘type’ is numeric, the response must be a number, etc. Table 2 below presents a list of question ‘types’. You will need to assign one for each question (row) under the heading ‘type’, (column A) on the ‘survey’ sheet.

Requirements for adding a 'type'

- Only one 'type' is allowed to be used for each question (row).
- Each question 'type' must be spelt correctly, all in lower case.
- Every question (row) must have a 'type' assigned from the list below.
- No spaces are allowed, only underscores.

Table 2: Description of question 'type' (to be assigned for each question under the 'type' column a)

type	Explanation
text	Text input.
integer	Integer (ie, whole number) input.
decimal	Decimal input.
select_one	Multiple choice question; only one answer can be selected.
select_multiple	Multiple choice question; multiple answers can be selected.
note	Display a note on the screen, takes no input.
geopoint	Collect GPS coordinates.
image	Take a photograph.
barcode	Scan a barcode, requires the barcode scanner app is installed.
date	Date input.
datetime	Accepts a date and a time input.
audio	Take an audio recording.
video	Take a video recording.
calculate	Perform a calculation.
begin_group	Begins group.
end_group	Ends group
begin_repeat	Begins repeat.
end_repeat	Ends repeat.
today	Day of the survey.
imei	Records the individual imei code of the smartphone (unique identifier)
deviceid	Records the IMEI (International Mobile Equipment Identity)
subscriberid	Records the IMSI (International Mobile Subscriber Identity)
imei	Records the SIM serial number (if available).
phonenumber	Records phone number

2.7 Adding the 'choices' for 'select_one' or 'select_multiple' question 'types': If you have included either a 'select_one' or 'select_multiple' question 'type', you now need to add the corresponding 'choices' for each of these questions. By 'choices' we mean the options an enumerator is able to select for a single or multiple choice question. First you need create a new spreadsheet tab in the same workbook next to the spreadsheet named 'survey'. This is located at the bottom of the page.

Requirements for adding a 'choices' sheet

- Add or re-name a tab at the bottom of the spreadsheet and label it 'choices'.
- The choices label must all be in lower case without any spaces at the start or end.
- You only need one 'choices' tab in which to add the corresponding options or 'choices' for all the 'select_one' or 'select_multiple' questions.
- Each set of choices will be given a unique label so Ona knows how to group choices. You will be shown how to do this in the next steps (2.7.1 to 2.7.4)

2.7.1 Naming column headings on 'choices' tab, (columns A to D): Next you need to add the column headings to the choices sheet. Column A should be labeled list 'list name'; Column B, 'name' and column C 'label'. You only need one column with the heading 'label'. The template provided has added fourth column and called it 'label:French'. This allows you for easier comparison between languages.

2.7.2 Inserting 'choice's under the heading 'label', (column C): Next you need to insert the choices for each 'select_one' and 'select_multiple' question 'type' on the choices sheet. For example, if you ask *'Select the traders gender'*, you will need to tell Ona what the choices are, which in this case would be 'male' or 'female'. To do this, you simply list the different choices for each 'select_one' or 'select_multiple' question in the 'choices' tab under the heading 'label', (column C). Each 'choice' or potential answer to the question, should be one row. The position of the 'choices' does not matter, however it is very important that all corresponding 'choices' sit next to each other in one group.

Requirements for inserting 'choices' in the choices sheet

- Make sure you have added all the choices for each 'select_one' or 'select_multiple' question type.
- Make sure the choices have been added under the heading 'label' column C.
- Make sure each list of choices sit next to each other.

2.7.3 Adding a 'name' under the heading 'name', (column B): Like in the 'survey' sheet, you need to add an abbreviated 'name' for each 'choice' in the choices sheet. The abbreviated 'name' provides a shorter version of the 'label' name should reflect the question, not the choice or answer. All information under the 'name' heading must be lower case, using an underscore (_) instead of a space and should be less than 52 characters. The 'name' is what will be displayed in the table of raw data resulting from the questionnaire, however the 'label' is what will be displayed on the questionnaire form itself.

Requirements for adding a 'name'

- The name must be unique, must begin with a letter, be 52 characters or less, and all in lower case.
- Can only contain letters, numbers, dashes and underscores.

2.7.4 Adding a 'list name' under the heading 'list name', (column A): For all those 'choices' which correspond to the same question, you must assign each of them the same 'list name' under (column A). By giving different 'choices' the same 'list name' you are telling Ona that these choices are grouped or are one 'list'. In the example below (screen shot 1), the question was 'Name the type of market actor you are collecting information on?' The 'choices' (rows 2-9) include: Importer; Provincial Trader; District Trader down to Wholesaler (row 9). Ona knows that rows 2 to 9 are one list because the 'list name' 'market_actors' is repeated from row 2 down to row 9. Each list of choices must have a unique 'list name'

	A	B	C	D	E	F
1	list name	name	label:English			
2	market_actors	importer	Importer			
3	market_actors	provincial_trader	Provincial Trader			
4	market_actors	district_trader	District Trader			
5	market_actors	urban_retailer	Urban Retailer			
6	market_actors	village_trader	Village Trader			
7	market_actors	individuel_farmer	Individual Farmer			
8	market_actors	commercial_farmer	Commercial Farmer			
9	market_actors	wholesaler	Wholesaler			
10	replenish_supply_issues	transportation_issue	Transportation			
11	replenish_supply_issues	supply_shortage	Supply Shortages			
12	replenish_supply_issues	lack_of_demand	Insufficient Demand			
13	replenish_supply_issues	credit_access	Credit Access			
14	replenish_supply_issues	storage_issue	Storage			

Screen shot 1: Adding a 'list name' to a list of choices for select_one or select_multiple question types

Requirements for adding a 'list name'

- The 'list name' must be unique and identical for each list of questions.
- Must begin with a letter and be 52 characters or less.
- Can only contain letters, numbers, dashes and underscores.
- Must all be in lower case - no spaces are allowed, only underscores.

2.8 Linking the 'list name' to 'select_one' or 'select_multiple' questions: After completing the 'choices' information, the next step is to link the responses for each 'select_one' or 'select_multiple' to the original question on the 'survey' tab of the workbook. Screen shot 2 below shows how to link the list name 'market_actors' against the question 'What type of market actor are you interviewing.' You will see it as **select_one market_actors**. By adding the list name 'market_actors' after select_one, we have told Ona that the interviewer can select_one choice from the list name 'market_actors'. Repeat this process for all the 'select_one' or 'select_multiple' questions you have created.

Requirements for linking the 'list name' to 'select_one' or 'select_multiple' questions

- The appropriate 'list name' should be copy/pasted next to each 'select_one' or 'select_multiple' question types under the heading 'type' (column A in the survey tab).
- There should be a space between the 'select_one' or 'select_multiple' question type and the list name. The rest should all use underscores (_) instead of spaces.
- All characters must be in lower case starting with a letter.

type	name	label
text	no_of_days_since_shock	How many days ago was the shock / emergency?
end group		
begin repeat	trader_information	Trader Information
begin group	trader_information	Trader Information
select_one market_actors	type_of_market_actor	Type of trader
integer	number_of_employees	Number of Employees?
select_one business_history	number_of_years_of_trading	When did you start your business?
select_one yes_no_only	trader_licensed_with_gov	Are you registered with the government?
select_one yes_no_only	trader_pays_formal_gov_tax	Do you have to pay contributions / tax's to the government?
text	currency_used_throughout_survey	What currency do you buy and sell in?
end group		
end repeat		
begin group	cumulative_income_information	Cumulative Income Information
select_one number_of_customers	total_number_of_customers_in_last_week	Please provide an estimate of the number of customers in the last week
select_one higher_lower	customer_increase_or_decrease	These indicate if the number of customers is higher or lower than last week

Screen shot 2: Linking the 'list name' to 'select_one' and/or 'select_multiple' questions types

2.9 Naming the questionnaire in Ona: The next step is to name the questionnaire, giving it a unique reference which will be used to navigate and find it in Ona and ODK. To do this you will need to create a new sheet in the same workbook and label it 'settings', placing it to the right of the 'choices' sheet. In the 'settings' sheet you need to copy the headings 'form_title' and 'default_language' into row 1, columns A and B. We have already done this for you in the template. Next add the assessment name in row 2 under the heading 'form_title'. The name given here is what will be presented when navigating the questionnaire in Ona and ODK. You should now label it, chaining it from the current name. You should think about how to name and organise your questionnaire as you are likely to have revisions based on learning from the field. In the same row add your default language under the heading 'default_language'.

2.9.1 Naming the questionnaire in Excel: As well as naming the survey in Ona you need to give the excel file its own name. This should be the same or similar to the name given for Ona. This is what will be used when navigating when building your questionnaire in Excel and navigating questionnaires after they have been filled in ODK and downloaded back to Excel - or which every program you're using to analyse the data.

Requirements for naming your questionnaire

- Make sure you have given the questionnaire a name in Ona in the settings sheet.
- The save the questionnaire as an XSL file, giving it a name.
- The Excel name must, use underscores (_) not spaces and be less than 52 characters.
- The name should be designed in such a way that modifications can easily be understood.

You are now at the end of the mandatory steps required to build a questionnaire.

The following points (2.10 to 2.18) provide additional guidance about structuring and building in more complex functions into your questionnaire.

You can either follow these or jump to STEP 3 (page 18) and upload your questionnaire onto the Ona website. For additional support material see Appendix 1 (page 27).

2.10 Making certain questions mandatory by adding ‘yes’ under the heading ‘required’, (column E): In Ona all questions are optional by default. However, you can make questions mandatory, meaning the enumerator cannot finish the survey without entering responses for the required questions. To do this, navigate on the survey tab of the workbook to the first question (row) you want to be mandatory. To make that question (row) mandatory, insert ‘yes’ (in lower-case) under column E, ‘required’. In the example below, the ‘assessors_name’ and ‘survey_introduction’ have been made mandatory. Be careful about making questions mandatory, as your enumerator will not be able to finish/submit the survey without filling them in.

Screen shot 3: Making questions (rows) mandatory by adding ‘yes’ under the required column

	A	B	C	D	E
	type	name	label	hint	required
2	begin group	introduction	Introduction		
3	text	assessor_name	Assessor Name	Type in your name	yes
4	text	assessor_contact_cumber	Assessor Contact Number	Type in your contact number	
			HHello my name is _____ and I am from an NGO _____. We have come to assess conditions in the market. I would like to talk with you for about 30 minutes. However you are not obligated to talk with me. I assure you that all information will remain confidential. May I talk with you? (If the answer is yes collect their metadata and begin.	If no, thank them, move on and ask another trader	
5	select_one yes_only	survey_introduction			yes
6	datetime	date	Date		
7	geopoint	location	Location		
8	text	interviewee_name	Interviewee Name		
9	select_one gender	interviewee_gender	Interviewee Gender		
10	text	interviewee_contact_number	Interviewee Contact Number		
11	text	business_location	Business Location	If possible, get the interviewee (trader) contact number	
12	text	no_of_days_since_shock	town/city, province		
13	end group		How many days ago was the shock / emergency?		

2.11 Adding a ‘begin group’ and ‘end group’ row under the ‘type’ heading, (column A): The next option is to decide how the questions will be grouped or presented on the smartphone and/or results table. This helps categorise information, making it easier to navigate after it has been collected. For example, you might want to group questions into discrete sets. E.g. Introduction, information on supply, information on demand, stocks, credit, source markets, competition and so on. By grouping questions and then using a ‘field-list’ function, you will be able to present each group of questions on one page on the smartphone. Similarly the groups you provide will separate questions into discrete sets in the results table. We will explain how to use a ‘field-list’ later on under 2.12.2.

First you need to decide on your groups. Next you need insert a new row above your first group, writing ‘begin group’ in this new row under the heading ‘type’ (column A). To tell Ona where that group finishes, you insert another row at the end of the group, writing ‘end group’ under the same heading ‘type’ (column A). You have now told Ona where the first group of questions starts and ends, the second group of questions starts and ends and so on. Highlighting ‘begin group’ and ‘end group’ makes it easier to navigate groups but is not mandatory. Please repeat this process for all your groups.

Requirements for grouping questions

- Insert a new row at the start and end of each group.
- Every 'begin group' and 'end group' must all be in lower case.
- Every 'begin group' must have an 'end group'

type	name	label
begin group	introduction	Introduction
text	assessor_name	Assessor Name
text	assessor_contact_cumber	Assessor Contact Number
		Hello my name is ____ and I am from an NGO _____. We have come to assess conditions in talk with you for about 30 minutes. However you are not obligated to talk with me. I assure remain confidential. May I talk with you? (If the answer is yes collect their metadata and b
select_one yes_only	survey_introduction	
datetime	date	Date
geopoint	location	Location
text	interviewee_name	Interviewee Name
select_one gender	interviewee_gender	Interviewee Gender
text	interviewee_contact_number	Interviewee Contact Number
text	business_location	Business Location
text	no_of_days_since_shock	How many days ago was the shock / emergency?
end group		
end group		
begin group	trader_information	Trader Information
select_one	type_of_market_actor	Type of trader
integer	number_of_employees	Number of Employees?

Screen shot 4: Adding groups

2.12.1 Adding a 'name' and 'label' to each 'group', (columns B and C): Next, organise the groups by giving each a 'name' and 'label'. In the example above we have added two 'label's under column C. The first is 'Introduction' (row 2) and the second is 'Trader Information' (row 15). For each we have also added an abbreviated version of the 'label' under the heading 'name', (column B). Please repeat this for all your groups.

2.12.2 Adding a 'field-list', (column J): After adding 'name' and 'label' decide how the questionnaire will be presented on the smartphone. You have two options. The first is to have continuous scrolling, which gives the option to easily move back and forth between questions, filling them in as the conversation naturally flows. For this no action is needed. The second option is to present each group of questions separately as a 'field-list', meaning that each group of questions located between 'begin group' and 'end group' will be visible at the same time on the smartphone. To make a 'field-list', make sure you're on the 'survey' sheet. Navigate to the first row titled 'begin group' and pan right until you see the heading 'appearance', (column J). To have that group of questions visible at the same time on the smartphone, write 'field-list' under the heading 'appearance' (column J). In the example above (screen shot 4), both the 'introduction' and 'trader_information' will be presented as a separate 'field-list'.

Requirements for adding a 'field-list' to group headings

- The 'field-list' should be added in the same row as 'begin group', written in lower case as 'field-list'.
- Make sure 'field-list' is spelt correctly with no spaces either end.
- Make sure you have an 'end group' row inserted to tell Ona where that 'field-list' stops.

2.13 Adding a looped field (column A): Adding a looped field is one way to present and collect information on groups of questions - question located between 'begin group' and 'end group'. For example, you may only want to ask the trader information about his name, location etc once. However, you might want to repeat or loop certain groups of questions. E.g. you have collected information on rice and now you want to collect the information on beans, without having to ask the trader her name, location etc again. To do this, make sure you are on the survey sheet. After your introductory information (information you only want to collect once), you need to insert two new rows. The first should be placed before the first 'begin group' and the second after the last 'end group'. Next write 'begin repeat' in the first newly inserted row and 'end repeat' in the last newly inserted row under the 'label' heading, (column A). This tells Ona where to start and stop the loop. You are able to have multiple 'groups' located within one loop. This means you can have different groups of questions on the smartphone on different pages within one loop process. Similarly you're able to have multiple loop processes within the same questionnaire. When viewing this on the smartphone, the enumerator will be taken through each group of questions. Once (s)he has got to the end of the loop, (s)he will be presented (+) button, giving the option to repeat the loop, (for example, to collect information on a different market item). Using this format can be useful for collecting information on different products from the same trader. However, you will have to do some additional formatting of the raw data after it has been collected in order to analyse it. This is explained later on in section 4.

Requirements for adding a 'looped field'

- Decide on which group or sets of groups you want to loop. Noting your able to have multiple groups within one loop process and how many loop processes you need.
- Questions you want to be able to repeat should be placed within the loop process. Questions you only want to ask once should not sit within the loop process.
- Insert a new row where you want the loop to start and end, writing 'begin repeat' and 'end repeat' in each new row under the heading 'type', column, all in lower case.

2.13.1 Having separate questionnaires: An alternative to using a looped field is to run different questionnaires for each product, market or actor. The advantage of this is that it makes it easier to build and format the questionnaire. The negative is that you will have to ask introductory information again if you are collecting information on a second product from the same trader. To have separate questionnaires make sure you don't use the 'begin repeat' function. However, you can still use the 'group' function to organise data in the results table without using the looping function. This will become more clear once you have collected information and viewed it in a results table - later explained in sections 3 and 4 of this document.

2.14 Adding 'hint' to a question, (column D): Next we are going to add a 'hint' to help the enumerator better understand the question or guide the respondents about what each question means. For example, if you ask *'Have you every participated in a voucher system before?'* The 'hint' could be *'If the trader does not know about vouchers, explain what a voucher system is'*. To do this, all you need to do is add the 'hint' for each question on a row by row basis under the heading 'hint', column D in the survey sheet.

Requirements for adding a 'hint'

- The 'hint' should be short located in the same row as the question.
- It can use upper and lower case text and spaces and will be positioned below the question on the smartphone.

2.15 Adding a 'constraint' to a question (column F): Certain questions only have a limited range of possible answers that can be considered as valid. E.g. if you ask a household how many days of the week they have to fetch water, the response can only be a number between 0 and 7. Ona handles this type of data validation

with the use of the 'constraint' column. For the case above you would want to make sure that the response cannot exceed 7. To tell Ona this you need to add an excel formula in the same row as the question under the heading 'constraint' - which in this case would be (. >= 0 and .<=7). By doing so, we have told Ona that the response must be higher or equal to 0 or lower or equal to 7. For more info on formulas see: <http://office.microsoft.com/en-001/excel-help/create-conditional-formulas-to-find-data-or-apply-formatting-HA102809769.aspx>.

2.16 Adding a 'constraint message' to a question (column G): If you have used a constraint, Ona gives you the opportunity to add a 'constraint message' should the response given not sit within the constraint given. To add a constraint message simply add it in the same row as the constraint under column G.

Requirements for adding a 'constraint message'

- The constraint message can only be used for a constraint formula using an integer and decimal question type.
- The constraint message must be in the same row as the question and associated constraint formula.
- The constraint message can contain upper and lower case text, spaces and numbers.

2.17 Adding a 'calculation' to a question (column K): Your questionnaire can perform dynamic calculations using the values of preceding questions. Ona allows the use of a 'calculate' type, similar to any other question type but acts as a hidden field that will not show on the Android smartphone screen. You could use this for example to convert food units into the kilocalorie equivalent. This is quite an advanced function. If you are interested in being able to use this function see: <https://ona.io/syntax/#4-making-dynamic-calculations>. We recommend trying to use the calculation function once you have run a number of questionnaires and come accustomed with how Ona works.

Requirements for adding a 'calculation'

- Make sure you adding a calculation to a integer or decimal question type.
- Make sure your calculation is correct, added to the right question (row) under column K.

2.18 Adding 'relevant' to a question (column H):

Requirements for adding a 'constraint'

- The question 'type' must be numeric e.g. an integer or decimal.
- The constraint must follow excel formula rules.

Many questionnaires have questions that should be asked depending on the answer given to previous questions. One great feature of Ona is the ability to only present a question to the enumerator if a condition, based on the response to a previous question, is true. For example, if you presented a multiple choice question and the answer by the interviewee does not correspond to any of the pre-programmed choices, you might want to offer 'Other' as an alternative taking you to a new question. If this is the case you would need to ask the interviewee to specify what 'other' means. If you are interested in being able to use this function see: <https://ona.io/syntax/#33-asking-relevant-questions>. Like the calculation function, we recommend only trying to use this function once you have run a number of questionnaires and have become accustomed to how Ona works.

Step 3: Upload your questionnaire from Excel onto the Ona website

Step 1: Content of an EMMA market assessment

Step 2: Build your questionnaire in Excel saving it in an XLS format

Step 3: Upload your questionnaire from Excel onto Ona the website

Step 4: Upload your questionnaire from Ona to ODK Collect

Step 5: Modifying a pre-built assessment

3.1 What is Ona: Ona is a free online software evolved from its predecessor Formhub. It is specifically designed to provide an easy to use system for building questionnaires or surveys. First you build the questionnaire in Microsoft Excel saving it in an XLS format (as described in Step 2 of this document). You then upload it onto the Ona website where you are able to convert it into a format that can be used by Open Data Kit (ODK) - the software you download onto the smartphone to collect the information. All you need is an internet connection, Microsoft Excel and a free Ona account and you are able to start building the questionnaire. Later in this manual we provide a second option for building a survey without an internet connection (see section 4.9). However, you can also use ODK Briefcase to support offline data collection which is a different system to Ona, available at: <http://opendatakit.org/use/briefcase/>. This is a little more complex and may require technical expertise.

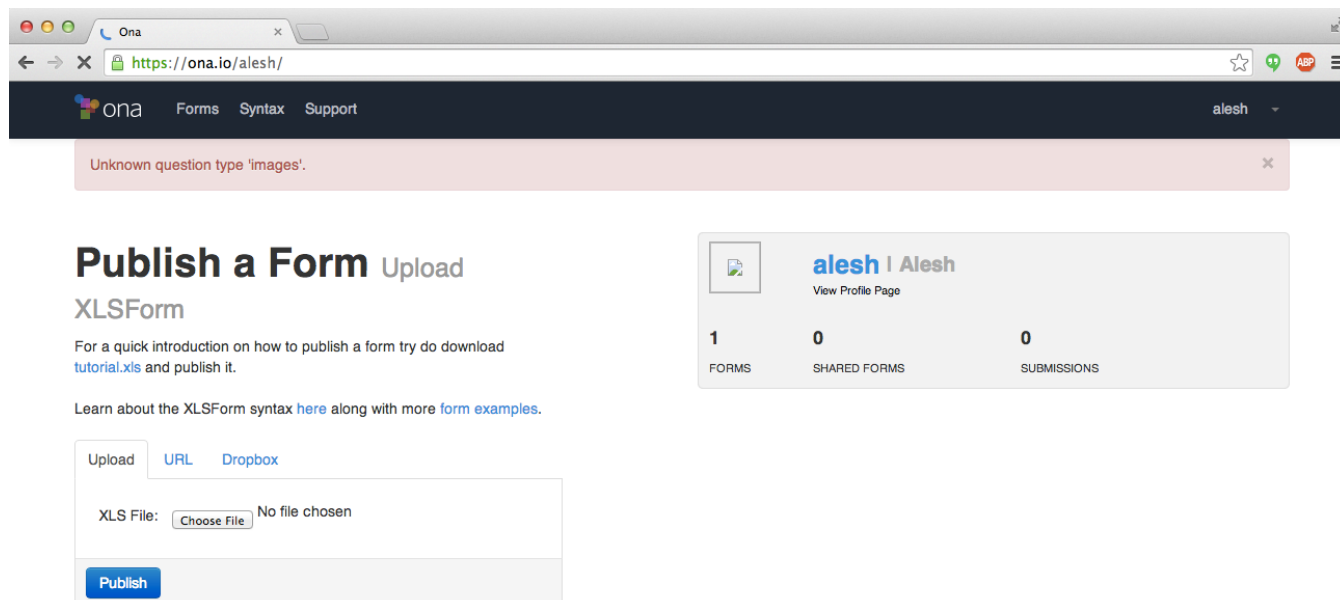
3.2 Why Ona: Although ODK has its own tools for building and storing surveys, we choose to pilot Ona because the platform seems to provide better guidance to non-technical users while building surveys. It's also free and designed to work specifically with ODK Collect, a standard requirement for most Android-based mobile data collection.

3.3 Creating an Ona account: Log onto <https://ona.io> and create a free account. After doing this you can try uploading your survey by clicking on the 'choose file' button and selecting the appropriate Excel file which you named in step 2.19 saved in .XLS format. You might want to create an account for each project or you might want to create an account as an organisation. Doing it on a project basis will make it easier to manage information but more difficult to share information. Doing on an organisational basis will make it easier to share information but more difficult to manage information. We do not go into detail about information management but suggest speaking to your IT department to understand the best options / protocols.

Requirements for uploading a questionnaire from Excel to Ona's online website

- Make sure the Excel file name is saved in the .XLS format and contains no spaces or special characters. Dashes '-' and underscores '_' are allowed.
- Make sure that your column headers are in lowercase (e.g. "label" or "name", not "Label" or "Name")
- Make sure that your sheet names are appropriately named (e.g. "survey" not "Sheet 1", "Survey" or "surveys")
- Make sure that the question names on each row are unique and are not the same as other rows in the document, and do not contain spaces or special characters (dashes '-' and underscores '_' are allowed).

3.4 Debugging: The process of uploading forms to Ona and correcting errors is called debugging. Because the XLS language requires a very specific set of instructions, it is quite easy to make errors in the Excel file. Screen shot 5 below shows what happens if we misspelled the ‘image’ and wrote ‘images’ instead. When uploading a form with errors, Ona will show an error message that will give you an idea of what the error was. In this case Ona is telling us it does not recognise ‘images’ as a valid question ‘type’. If you don’t have any errors you would see a green box with ‘successfully published ‘The_name_of_your_file.xls’.



Screen shot 5: Publishing a blank assessment form from Excel onto Ona - example of an error message

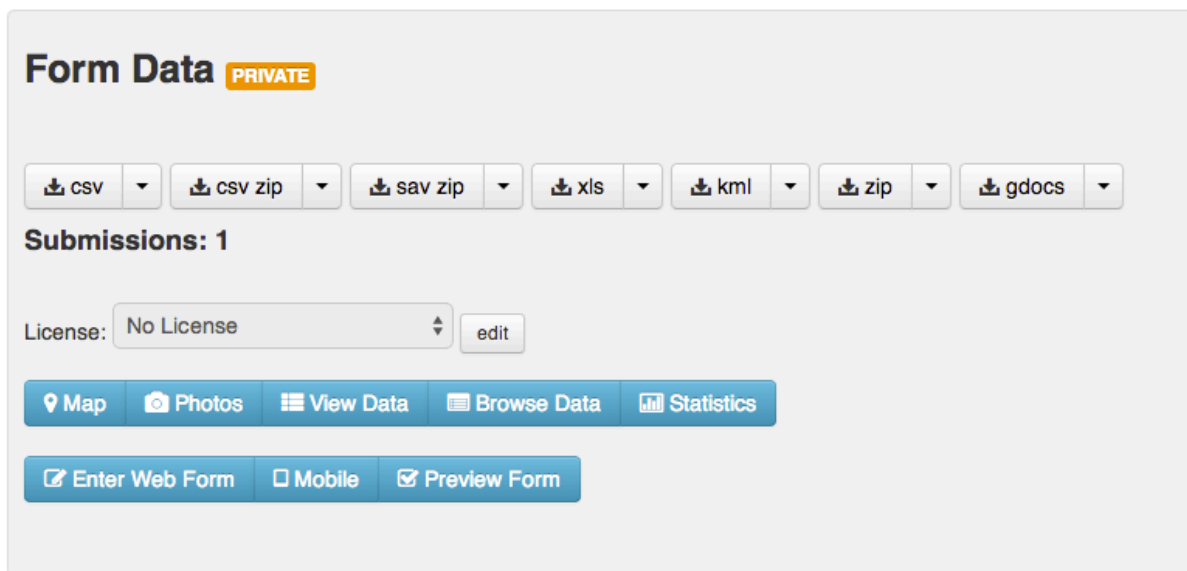
If you are unable to follow the debugging errors Ona provides, you can try uploading one of the pre-built questionnaires available at [\[http://emma-toolkit.org/practice/mobile-data-collection/\]](http://emma-toolkit.org/practice/mobile-data-collection/) (see Step 5, below). Alternatively, you can access further support through the links provided in appendix 1.

Requirements for debugging when uploading a questionnaire from Excel to Ona’s online website

- It is good practice to upload your XLS form (.xls file) to Ona on regular intervals. Ona will show only an error message for the first problem it finds with a description of where the error is located.
- The fewer the changes since your last upload, the easier it is to find and solve the error Ona finds. You should get in the habit of testing your surveys, identifying, and fixing early on.
- The “Find” feature in the “Edit” menu of Excel is often helpful here. If you are having problems resolving an issue with a form, try uploading one of the pre-built market assessment downloadable from the EMMA website (see Step 5 of this document).

3.5 Navigating forms: After successfully uploading the form to Ona, scroll down to see that the questionnaire is listed in the “Published Forms”.

3.6 Submissions: On the right next to the published form is a field called ‘submissions’. The number under this corresponds to the number of questionnaires that have been filled in using that assessment form. If submissions were to have 20 under it, this means 20 questionnaires have been filled in using this questionnaire. Anyone who is given a login will be able to view, add to and download the information. As a result you might want to think about who you give permissions to in order to manage the data.



Screen Shot 6: Web & Mobile forms

3.7 Webform: In Ona, there are two buttons next to the published form under ‘Enter Data’. Pressing the ‘Web’ button takes you through to a second page where you will be able to see the “mobile version” of the form on a web browser where you can see the entire questionnaire as an enumerator would when the form is uploaded to a smartphone. This provides another way to review and test the questionnaire if you don’t have an Android device in hand.

After you have uploaded a questionnaire try clicking on the ‘web’ button and adding data using the webform - but be aware that the webform mode does not mimic the exact same format that will be displayed on the smartphone. You will still need to test the form on an Android smartphone but this intermediate step will let you test the question flow and data entry constraints.

3.8 Mobile: By clicking on the ‘Mobile’ icon in Ona, you are given a QR code. This code is used to select forms using a barcode scanner application. (If you do not have a barcode scanner application on your device, you need to download one.)³ You can use this as an alternative way to select questionnaires to then be uploaded to your phone.



Example QR Code

3.9 View: In Ona, under view you will see three icons. The first gives you the option to view forms that have been filled in geographically using a map. The second allows you to see photos collected in that form. Both geographical

³ To download a barcode scanner, visit

<https://play.google.com/store/apps/details?id=com.google.zxing.client.android&hl=en> or search for ‘Barcode Scanner’ in the Google Play Store on your phone & download / install the first application listed.

representation on a map and the view photos functions are possible only if the questionnaire has used a geotagging or image function. The third takes you to a new page where you are able to navigate and filter the forms you collected. These functions are only accessible after you have filled in a form and are quite useful when you have collected a large number of forms.

3.10 Download: After you have filled in a webform, you will be able to download the completed questionnaire(s) as a CSV, XLS or IML file from the Ona online database onto your computer. As shown in Screen Shot 6 (above), you have the option to download your data in a variety of formats. Click the appropriate button depending on the format you want and download the file. If you have a large number of forms and/or are working in a low bandwidth environment, it may be useful to download as ZIP files first.

3.11 Last submission: Last submission tells you the date of the last form submission.

3.12 Delete/Edit: If you click on the last icon right you will have the option to delete or replace forms.

Step 4: Upload your questionnaire from Ona to ODK Collect

Step 1: Content of an EMMA market assessment

Step 2: Build your questionnaire in Excel saving it in an XLS format

Step 3: Upload your questionnaire from Excel onto the Ona website

Step 4: Upload your questionnaire from Ona to ODK Collect

Step 5: Modifying a pre-built assessment

4.1 What is ODK: Open Data Kit (ODK) is an open-source suite of tools that helps organisations build, manage, and collect information using an Android platform. It has its own suite of tools (ODK Aggregate and ODK Briefcase), which can be used like Ona to build and store the questionnaire. This document has chosen to use ODK Collect to collect the information and Ona to build the questionnaire. For more information on ODK solutions see: <http://opendatakit.org/about/>

4.2 Why ODK: ODK Collect is free and is the most widely used tool to collect information on mobiles by aid agencies. It is easy to use, scalable and supports multiple languages and works on an Android operating system. All you need is an internet connection to download ODK Collect onto your Android smartphone or tablet.

4.3 Upload your questionnaire from Ona to ODK Collect: After uploading your assessment onto Ona you are ready to move to ODK Collect on your smartphone. ODK Collect is the software used to collect the information on the smartphone. Ona is the software used to build the assessment, store and download the assessment on the computer⁴ for analysing using Excel or any other program.

4.4 Install ODK Collect on your smartphone: You will need an Android device to install ODK Collect and internet connection to download ODK Collect into your smartphone or tablet(s). For a list of Android devices, please refer to GSMA Arena (<http://bit.ly/gsmaarenaandroids>)

4.4.1 Using Google Play to download ODK Collect onto your smartphone:

1. Make sure your device is connected to the internet via wifi or data connection.
2. From your device's application drawer, choose the Play Store.
3. Search for "ODK" and choose "ODK Collect" from "Open Data Kit".
4. Select that result and click the Install button. Click OK after viewing the security settings.
5. Download the Zxing Barcode Scanner using the same method (if required).
6. If ODK Collect fails to start, it is likely because the SD card has become unseated or is missing. Re-seat or install the SD card and try again.

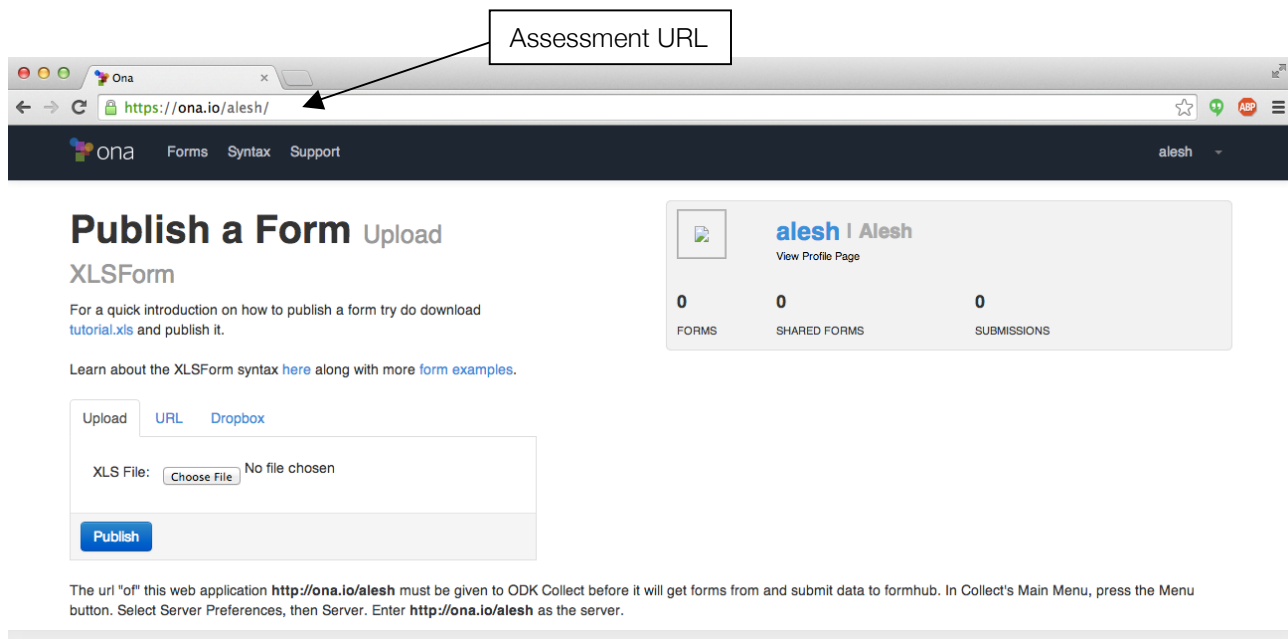
⁴ There are a number of other tools you can use to build, store and view the assessment form. This document focuses on Ona. For others see <http://opendatakit.org/use/aggregate/> or <http://opendatakit.org/use/briefcase/>

4.4.2 Using your smartphones web browser to download ODK Collect: We recommend creating a Google Play account and downloading ODK Collect on your mobile as described in 4.4.1 above. However, there is a second method using the smartphones web browser to download ODK Collect.

1. From your device's application drawer, choose Settings, then Applications. Make sure 'unknown sources' is checked.
2. Return to the application drawer and choose 'Browser.' Navigate to <http://opendatakit.org/downloads/download-category/collect/> and download ODK Collect vN.N.N.apk
3. In the download window, you will see ODK_Collect_vN.N.N.apk. Select it to download the file. On older devices, the APK will automatically install after you approve the security settings. On newer devices, you must go to the download list, rename the file to restore the .apk extension (the extension will have been renamed to .man during the download process), then click on it to install it.
4. If you would like to use the barcode scanning capabilities, you should find and install the Zxing Barcode Scanner found at <http://code.google.com/p/zxing>.

4.5 Using ODK Collect to download and submit an assessment form using the Internet:

1. After downloading, ODK Collect will appear in your mobile's application drawer. Select it to launch the application.
2. In order to see your form on your Android device, you must use the URL of the assessment questionnaire and register this URL in ODK Collect in order for the mobile application to pull forms from the web and submit data to Ona. The URL can be found on Ona at the publishing page under the button 'publish.' URLs are dynamic to each user, so make sure to copy your personalized URL (i.e. the URL shown below is just an example – you're will be custom to your username). Keep this URL visible because the next step is to add this web address to ODK Collect so it knows from where to select the questionnaire.

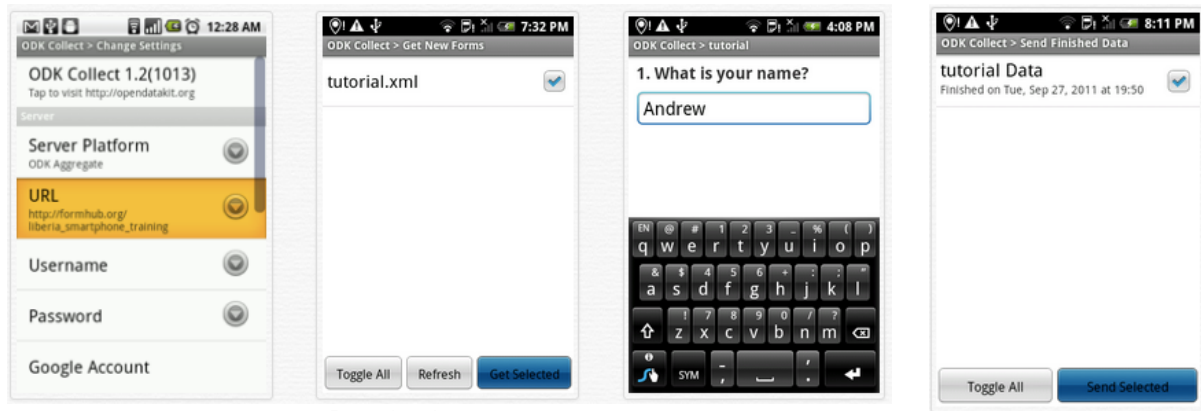


Screen shot 7: Finding the Ona URL to enter into ODK

3. Pick up the smartphone, navigate to ODK Collect's Main Menu and press the Menu button. (On Android 3.x and 4.x devices without a dedicated Menu button, the Menu button functions are

accessed by pressing the three small-vertical squares displayed in the top right of the menu bar. Select Server Preferences, then Server. Enter the URL name of the questionnaire found in your Ona account, shown above in screen shot 7. Then select 'Get Blank Form' and select the questionnaire you created. Try filling in a couple of forms (questionnaires) and save the data to test the process. You will only need to give the URL once to ODK Collect on each smartphone, after this one-time set-up ODK will communicate directly with Ona to receive new questionnaires added to the Ona account and to share data collected in each questionnaire.

Screen shot 8: Collect, download and submit a form



The url "of" this web application (assessment) must be given to ODK Collect before it will get forms from and submit data to Ona. In ODK Collect's Main Menu, press the Menu button. Select Server Preferences., Then enter the server URL for your Ona account.

Download your published form to your smartphone.

4.6 Using ODK Collect without Internet access: It is still possible to use ODK Collect on your smartphone or tablet to complete questionnaires and forms without internet, however internet is required to download ODK Collect on the phone/tablet, so this should happen in advance prior to going to the field. After ODK Collect is installed on each device, the following steps outline how to load questionnaire forms from a computer onto each device if internet is not available. The following steps must be repeated for each device being used for data collection, and must be repeated each time the questionnaire is updated.

1. Place the SD card into your computer (most likely using a microSD adapter). Alternatively, "Mount" your mobile to your computer by linking them with a USB cord and then hitting whatever message pops up (should be along the lines of "Mount Device" or "Allow USB debugging").
2. Copy the XML version of the assessment form onto the SD card in a folder named "forms" which is in a folder named 'odk.' This file and folder name are mandatory, so make sure you have spelled it correctly.
3. Put the SD card back in the smartphone.
4. Open the ODK Collect application on the phone.
5. Click "Fill Blank Form."
6. Wait while the smartphone scans the SD card for new forms.
7. Once the survey form pops up, just click on it and wait for it to load.
8. The longer the survey, the longer load time. This can take up to 30 minutes or more for complex questionnaires.
9. If you get an error message that says "ODK force close," hit "OK" and close the application. Restarting the smartphone in this instance can help.
10. You'll know the survey has loaded when you see a page with 2 hands and the following message: "You are at the start of 'SURVEY NAME.'"
11. Swipe from right to left to begin the survey.
12. Follow the same process to upload and pull the data off the SD card, importing the CSV or XLS file into Excel or any other software for analysing the data.

4.7 Collect your information from the field: After uploading your questionnaires to each smartphone you are ready to start collecting data. After the data has been collected follow step 4.5 or 4.6 if you don't have internet connection, which will allow you to upload the information back onto Ona.

4.8 Download your information from Ona onto your computer using the internet: After you have loaded your information onto Ona you need to download it as an XSL or CSV file type. You can then view / analyse the results in Excel or your preferred analysis software. See 3.10 of this manual for more information about the download function in Ona.

4.9 Download your information from Ona onto your computer without the internet: If you don't have internet access, follow step 4.6 to download results from each smartphone onto your computer.

4.10 Flattening the raw results data downloaded in Excel: If you have used the loop function (step 2.13), you will need to 'flatten' the data so you are able to analyse it. Flattening data means pulling all the desired information across worksheets into a single table to associate the data in one place. The best way to flatten your data is to use a VLOOKUP function in Excel and match the data based on the unique identifiers. There are many free VLOOKUP tutorials that can be found online (<http://office.microsoft.com/en-us/excel-help/vlookup-what-it-is-and-when-to-use-it-RZ101862716.aspx>)

4.11 Analysing the data: After downloading and flattening the raw data (if needed), the next step is for the EMMA team to analyse the data and draw conclusions about market functioning. The raw data can be analysed in Excel format, uploaded to your preferred analysis software, etc. The EMMA Analysis team leader will provide direction on the best approach to data analysis.

Step 5: Modifying a pre-built market assessment

Step 1: **Content of an EMMA market assessment**

Step 2: **Build your questionnaire in Excel saving it in an XLS format**

Step 3: **Upload your questionnaire from Excel onto the Ona website**

Step 4: **Upload your questionnaire from Ona to ODK Collect**

Step 5: Modifying a pre-built assessment

5.1 Modifying Pre-Built Assessments: If you are at this point, you have either got to the end of the detailed approach, have hit some issues along the way or are jumping straight into the light approach. You first need to download one of the pre-built market assessment questionnaires available at <http://emma-toolkit.org/practice/mobile-data-collection/>.

To adapt the pre-built questionnaires, please return to **STEP 2** (page 6) to best understand the functionalities available to you.

- **Pre-built market assessment:** <http://emma-toolkit.org/practice/mobile-data-collection/>

Appendix 1: Support material

The links below provide additional references which can help you understand and build mobile questionnaires. Many of these take you through to information on what's called Formhub, the predecessor to Ona. Nevertheless, the process for building a questionnaire in Formhub is currently the same as Ona.

Useful links:

- 1) Ona blog: <http://blog.ona.io/>
- 2) Overview: http://anokwa.com/publications/2013_IHME_ODK_Slides.pdf
- 3) Ona User's Guide: <https://speakerdeck.com/mberg/Ona-users-guide>
- 4) Ona tutorial (light): <https://Ona.org/tutorial/>
- 5) Ona tutorial (heavy): <https://Ona.org/syntax/>
- 6) Ona user/support group: Ona-users@googlegroups.com
- 7) Ona University / Sample forms: http://Ona.org/Ona_u <http://Ona.org/forms>
- 8) Overview of ODK Collect: <https://speakerdeck.com/mberg/Ona-setting-up-odk-collect>
- 9) Setting up ODK Collect: <http://opendatakit.org/use/collect/>
- 10) Using ODK Aggregate: <http://opendatakit.org/use/aggregate/> (an alternative to Ona)
- 11) Using ODK Briefcase: <http://opendatakit.org/use/briefcase/> (useful for situations without the internet)

Appendix 2: Market Assessment Data Collection Variables

Factors influencing a market assessment

Market System Features	Variables
Products/services/income offered or demanded.	Needs: Critical, livelihood needs, income-earning, etc. Type of assessment: Pre-crisis, rapid assessment, in-depth assessment, monitoring.
Price.	Baseline (or reference period), current and future prices; Buying price, selling price.
Volume.	Availability of items/services, demand for items/services.
Quality/grade of products/services/income	Availability, demand, minimum standards, target population preferences.
Market Integration.	Source markets, end markets, market segmentation, transportation networks, prices, market information flows, communications, etc.
Supply / demand characteristics.	Commodities, typical households, wealth groups, trader type, end markets, product quality, production trends, etc.
Number / type of customers.	Wealth groups, gender, age, preferences, quality of items consumed, etc.
Number of traders.	Seasonality, production cycles, prices, volumes, credit, demand, employment, scale of emergency impact, etc.
Stocks, response capacity, re-stocking requirements and lead times.	Availability, access to capital/finance, storage space, transportation, business methods, security.
Competitiveness	Number of traders, market power