

The Pollination of Micronutrient-rich Crops and Effect on Nutritional Status in a Changing Climate in Jumla, a Remote Mountain District of Nepal (Micro-Poll)

Formative Assessment Manual



A GUIDE TO RECIPE COLLECTION

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ACRONYMS

Introduction

This manual is intended to serve as a resource for nutrition researchers to conduct a formative assessment in Micro-poll study. This manual is designed to help nutrition researchers to understand the formative assessment methods and to carry a standardized recipe collection. In the following chapters we provide:

- A brief description of each common method of formative assessment;
- A brief description on conducting a standardized recipe collection and food market survey.
- A brief introduction on the methodology of preparing and updating food lists, food barcodes and food composition table.

Formative Assessment Methods

A. Food Lists

There is a set of food lists used in other studies previously. The food lists will be adapted and adjusted based on the locally available/consumed foods.

The process includes:

1. A thorough review of previously used food lists to indicate which foods are consumed locally in Jumla and discard the food list which are not at all consumed in Jumla.
2. Discuss with local community people and other stakeholders of Jumla to confirm the prepared food lists and add if any new food items are mentioned during the discussion.
3. Evaluate and match the new food lists with the food composition table and food atlas to ensure which foods needs to be included in a standardized recipe collection process.
4. Update the new food list to go through the standardized recipe collection.

B. Market Survey

Market survey aims to identify commercial sweet/savory snacks and beverages available in the study site. The market survey will be conducted on the main bazaar areas of the study sites. The sample size of shops could range from local shops including small grocery stores, sweet shops, hotel, restaurants and any local vendors selling outdoor.

The process includes: (Option 1)

1. Verify with the food atlas to the list of commercial food items to avoid duplication.
2. Selection of shop/vendor in the bazaar area.
3. Take the verbal consent from shop owner/vendor to conduct a market survey.
4. Ask the vendors on commonly consumed sweet/savory snacks, beverages
5. Click the picture of sweet/savory snacks commonly consumed in the study site.
6. Thank the shop owner/vendor for their participation and ask if there are any food items that are commonly consumed but not available in that place.

The process includes: (Option 2)

7. Verify with the food atlas to the list of commercial food items to avoid duplication.
8. Selection of shop/vendor in the bazaar area.
9. Purchase the commonly consumed sweet/savory snacks from the shop/vendor.
10. Take the picture of sweet/savory snacks.

Things to Consider:

1. Size of the image: Normally a size that fits to A4 size that range from 6 X 8 cm.
2. Single photo is not recommended, at least 4, 6 or 8. Fewer photographs result in some loss of precision.
3. Central image is recommended for the precision.
4. Both side packaging needs to be clicked. (Front part where the name of food item is displayed and back part where the ingredients are labelled).
5. Make sure the information in the packaging are not faded and clearly visible
6. Save the pictures immediately and make a separate folder with name of each food items.

C. Recipe Collection

Recipe collection is the most common method for calculating food composition values for mixed or multi-ingredient dishes to calculate the nutrient content from recipe data, preferably by using nutrient values for the cooked individual ingredients. The recipes selected should reflect food as prepared by the population or subgroup being studied and and recorded on the special recipe form given in Appendix A.

Protocol for Sampling and Preparing the Food Samples

A day before the recipe collection

1. Select the food from food list to be prepared for the recipe collection.
2. Select the household purposively to demonstrate the local recipes of selected food item.
3. Visit the household, establish a rapport with them and explain the purpose of the formative assessment/recipe collection.
4. If they are interested to demonstrate the recipe preparation, then ask and confirm the ingredients that will be used for cooking.
5. Set an appointment for the visit next day.
6. Purchase/collect all the required ingredients including oil, spices and other condiments.
7. Calibrate the weighing scale, charge the tablet, carry power bacnk, collect pen and papers.

Calibration of Weighing Scale

Before taking measurements, use the calibration weights to ensure that the scale is working properly:

1. Turn the scale ON

(Look at the arrow head in the picture)



2. Use the "Unit" button to make the grams 'g' or 'gm' appear on the scale



3. Check that the scale reads 0 grams when the scale is empty. Use the tare or zero button if this is not the case. For the small scale, you can adjust the feet of the scale to ensure that it sits evenly on its surface.



4. Set the calibration weight on the scale and record the value in the table below for each calibration weight.

The values that you get when you place the calibration weight on the scale may be different. If that is the case, please write in the value that the scale tells you.



Record the weights:

Weighing Scale	Scale #	Calibration 1		Calibration 2	
		Weight		Reading	
Big		50g		100g	
Small	g	g	

Recipe Calculation

Steps to Follow:

1. Separate the raw edible ingredient, spices and condiments that will be used for cooking.
2. Prepare the weighing scale and other weighing jars/containers.
3. Weigh each edible ingredients including spices (salt, turmeric, cumin, coriander seeds, pepper, etc), oil, water and other condiments.
4. Weight the cooking utensil before cooking starts
5. Note down the measurement in recipe collection tool (paper form)
6. Observe carefully during the cooking process. (Any additional spices or ingredients added during the cooking process need to be weighed before)
7. Weigh the cooked food and subtract the utensil weight.

Steps to Follow:



- 1. Cover the scales with some kind of cloth before taking a measurement. When taking these measurements, it is important to protect the scales and measure accurately.**



- 2. Make sure to tare/zero the scale before a measurement is taken.**



- 3. Start by measuring the empty pot that the food will be cooked in. Cover the scale with a cloth. Next, once the cloth is on the scale, hit the tare/zero button to make sure that the scale does not take the weight of the cloth into account. Set the pot on the scale and record the weight in the table here:**

Meal Name: _____		Date: _____		Data Collector Name: _____									
Food Name:													
Empty Pot wt:	g.												
Ingredient Name:													
Ingredient Weight:	g.	g.	g.	g.	g.	g.	g.	g.	g.	g.	g.	g.	
Pot Weight After:	g.												



4. Record the weights of every ingredient that goes into each food that makes up one meal.

For larger ingredients, such as rice or vegetables, use the large scale. For smaller ingredients, like spices, use the small scale. Be sure to only record the edible portion for each food. Try not to include bones, large inedible leaves, or other items that will not be eaten.

For example: Jumli Simi

The ingredients could be:

Main ingredient: Jumli simi,

Condiments: onion, garlic, ginger, green chilli, coriander leaves

Spices: schezwan pepper, salt, turmeric powder, cumin seeds, coriander seeds, red chilli powder

Oil: Sunflower oil.



5. Each time a measurement is made, place a clean bowl on top of the cloth on the scale.



6. Next, press the tare/zero button and check to make sure the scale says zero.



7. Then, put the ingredient into the bowl. Then, record the name of each ingredient and the weight in the table here:

Meal Name: _____		Date: _____		Data Collector Name: _____									
Food Name:													
Empty Pot wt :	g												
Ingredient Name:													
Ingredient Weight:	g	g	g	g	g	g	g	g	g	g	g	g	g
Pot Weight After:	g												

8. The last step is to collect the weight of the pot once the food has been cooked. For this step, use a heat-proof mat to protect the scale instead of a cloth. Again, be sure to properly zero/tare the scale before taking the weight of the final pot. Record the measurement in the table here

Meal Name: _____

Date: _____

Data Collector Name: _____

Food Name:												
Empty Pot wt:												
Ingredient Name:												
Ingredient Weight:												
Pot Weight After:												

Things to remember:

- You need to measure all the ingredients before cooking. If you are using soaked beans, legumes then you need to measure it before soaking.
- Only measure the edible portion that will be used for cooking. For example: Peeled potato, onion, other vegetables.
- Use cloth and heat-proof mat to protect the weighing scales.
- Make sure to tare/zero before each measurement.

Data Entry in ODK

Once you have recorded all of your data in the paper table, it is time to enter the data into the ODK app on a tablet. You will need to calculate an individual ODK Form entry for every food in the meal. So, if a meal consists of four different foods, you will need to enter four different ODK Forms.

1. On the ODK app, open the form Recipe collection tool.
2. On the first page, enter in your name

[illegible]

3. Enter in the name of the food.

[illegible]

4. Enter the weight of the empty pot

Recipe_Collection_Tool_ODK

Weight of the pot before cooking began in grams(g):

Meal Name: _____ Date: _____ Data Collector Name: _____

Food Name:	Empty Pot wt:	Ingredient Name:	Ingredient Weight:	Pot Weight After:														


1 2 3 4

5 6 7 8

9 0 .

5. Each ingredient will be added as a group. Hit add group to add your first ingredient

6. Here, type in the name of your first ingredient



Recipe_Collection_Tool_ODK

Ingredient Name:

Look up the ingredient in the Food Composition Table.
Scan the barcode for that ingredient:

Get Barcode

Record the weight of the ingredient in grams(g):

Meal Name: _____ Date: _____ Data Collector Name: _____

Food Name:	Empty Pot wt:	Ingredient Name:	Ingredient Weight:	Pot Weight After:
			12	12

7. Next, use the food composition table to find the correct barcode for the ingredient. Scan this barcode.

Recipe_Collection_Tool_ODK

Ingredient Name:

Look up the ingredient in the Food Composition Table.
Scan the barcode for that ingredient:

Get Barcode

Record the weight of the ingredient in grams(g):

8. Lastly, enter in the weight of the ingredient in grams. For small things, be sure that you are not measuring in milligrams by mistake.

Recipe_Collection_Tool_ODK

Ingredient Name:

Look up the ingredient in the Food Composition Table.
Scan the barcode for that ingredient:

Get Barcode

Record the weight of the ingredient in grams(g):

Meal Name: _____ Date: _____ Data Collector Name: _____

Food Name:																			
Empty Pot wt:																			
Ingredient Name:																			
Ingredient Weight:																			
Pot Weight After:																			

9. Repeat this process for every ingredient used.
10. When you have entered in the information for every ingredient that you used, proceed to enter the final mass of the pot once the cooking is finished.

Recipe_Collection_Tool_ODK

Record the weight of the pot after cooking in grams(g):

Meal Name: _____ Date: _____ Data Collector Name: _____

Food Name:																			
Empty Pot wt:																			
Ingredient Name:																			
Ingredient Weight:																			
Pot Weight After:																			

1 2 3 4 5 6 7 8 9 0

11. Now you can Save and Submit the form. (Make sure you submit the form)

Recipe_Collection_Tool_ODK

You are at the end of Recipe_Collection_Tool_ODK.

Name this form
Recipe_Collection_Tool_ODK

☒ Mark form as finalized

Save Form and Exit

D. Food Composition Table

Food composition tables are used for converting food consumption data into energy and nutrient data. Nutrients in each of the ingredients in a recipe are summed and the average content per serving is calculated. In this study, a best estimate will be compiled from other food composition tables or the published literature that includes similar recipe analysis. Energy intakes (in kilocalories; 1 kcal=4.184 kJ) will be calculated using a food composition table that compiled from multiple sources, including the *US Department of Agriculture, McCance and Widdowson's, The Composition of Foods Integrated Dataset 2015, the Bangladesh food composition table, the Nepal food composition table, the Indian Food Composition table* and other peer-reviewed published sources for rare items. The values for individual food items will be drawn from a variety of sources ranging from the food industry, published and unpublished research, contract research, and government research laboratories. Consequently, care must be taken to ensure that the food composition values compiled for local food items represent the best estimates of the nutrient composition. Here, the nutrients that will be segregated by macro nutrient (protein, fat, carbohydrate), micronutrient ((calcium, vitamin C, vitamin A, vitamins B1, B2, B3, B6, B9, B12, iron and zinc) as well as values for dietary components known to influence the bioavailability of these micronutrients.

Calculating the Best Estimate of Food

1. Locate food composition data for the food items of interest, preferably from regions geographically and climatically comparable to your own.
2. Check to ensure that the names (i.e., common and scientific name, such as genus, species, variety) of the foods on which the data are based match as closely as possible the names of the food being considered.
3. Express each value in terms of per 100g edible portion of food.
4. Record the number of acceptable studies used to determine the best estimate and the reference citations for each of the acceptable studies

E. Food Atlas

Food atlas is used to estimate the food portion sizes.

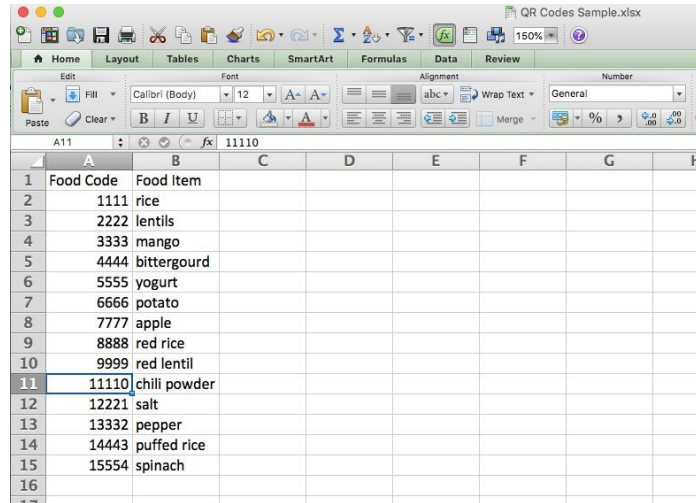
Before starting the development of food atlas

1. If possible, utilize existing photograph series or atlases which satisfy your requirements in terms of development and validation. You must ensure that appropriate validation has been carried out in a sample similar to that in which you plan to use the photograph
2. If there no photographs, then proceed to take the photographs of food items to include in food atlas.

F. Creating Food Barcodes

Steps to follow:

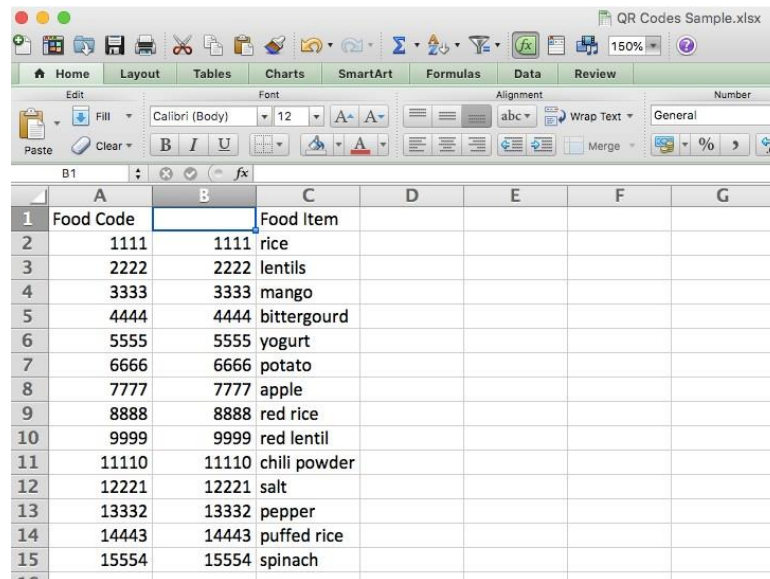
1. Download InDesign. You can own InDesign at a monthly rate or download a seven-day free trial online. Simply search Adobe InDesign on Ecosia.org.
2. Before going to InDesign, let's take a look at the data source for which you want to generate QR Codes. This is easiest in Excel or Stata. See the simple list below:



The screenshot shows an Excel spreadsheet with the following data:

	A	B	C	D	E	F	G	H
1	Food Code	Food Item						
2	1111	rice						
3	2222	lentils						
4	3333	mango						
5	4444	bittergourd						
6	5555	yogurt						
7	6666	potato						
8	7777	apple						
9	8888	red rice						
10	9999	red lentil						
11	11110	chili powder						
12	12221	salt						
13	13332	pepper						
14	14443	puffed rice						
15	15554	spinach						
16								

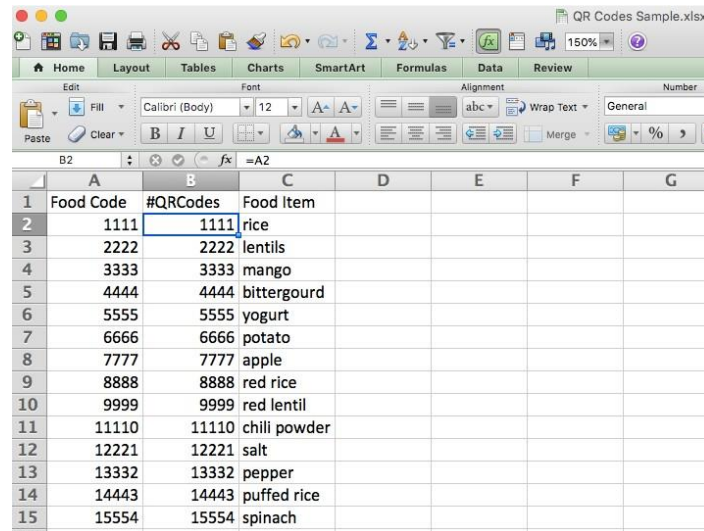
3. You need to generate a column that will tell InDesign what to use as the information to be displayed in the QR Code. In this example, we want the Food Code to be captured in a QR Code. Accordingly, a new column has been generated that mirrors the Food Code column.



The screenshot shows the same Excel spreadsheet as before, but with an additional column (B) added, mirroring the Food Code column (A). The data is as follows:

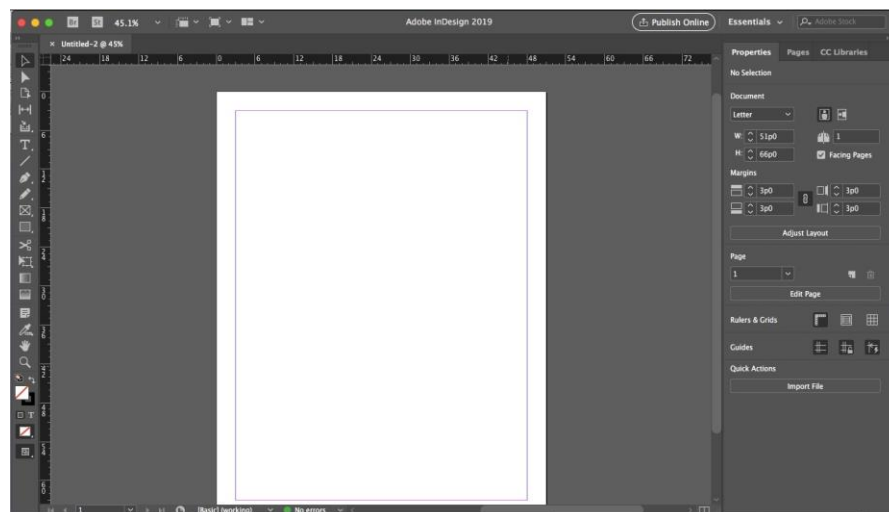
	A	B	C	D	E	F	G
1	Food Code		Food Item				
2	1111	1111	rice				
3	2222	2222	lentils				
4	3333	3333	mango				
5	4444	4444	bittergourd				
6	5555	5555	yogurt				
7	6666	6666	potato				
8	7777	7777	apple				
9	8888	8888	red rice				
10	9999	9999	red lentil				
11	11110	11110	chili powder				
12	12221	12221	salt				
13	13332	13332	pepper				
14	14443	14443	puffed rice				
15	15554	15554	spinach				
16							

4. The title for this new column is very important. In order to indicate to InDesign that the new column contains the information to be displayed in a QR Code, use a hashtag (#) in the beginning of the title. #QRcodes has been used as an example. Save this document as a csv when finished with this step.

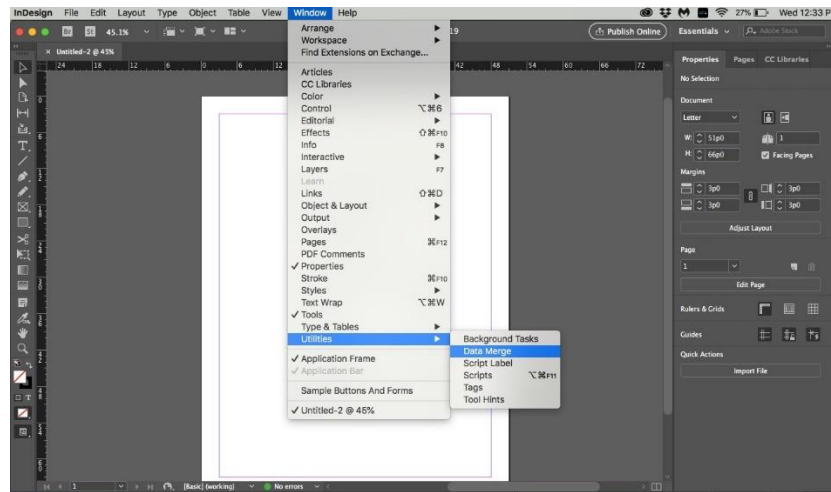


	A	B	C	D	E	F	G
1	Food Code	#QRcodes	Food Item				
2	1111	1111	rice				
3	2222	2222	lentils				
4	3333	3333	mango				
5	4444	4444	bittergourd				
6	5555	5555	yogurt				
7	6666	6666	potato				
8	7777	7777	apple				
9	8888	8888	red rice				
10	9999	9999	red lentil				
11	11110	11110	chili powder				
12	12221	12221	salt				
13	13332	13332	pepper				
14	14443	14443	puffed rice				
15	15554	15554	spinach				

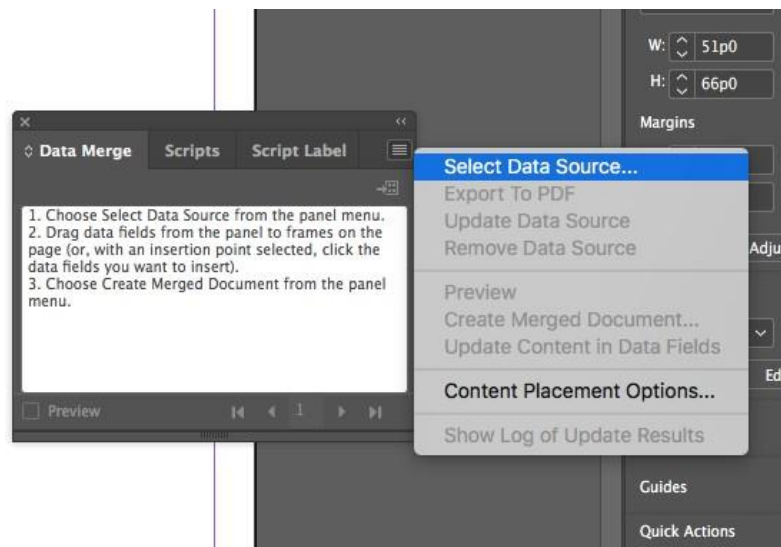
5. Now that the dataset has been prepared correctly, you can begin with InDesign. An important thing to note about InDesign is that you should have the final product in mind, the tool that you actually want to be used. If you are looking to simply input the QR Codes back into Excel to be used later, then this approach will not be ideal. Once in InDesign, create a new document. A default letter will be fine.



6. Select the Window>Utilities>Data Merge option. A small auxiliary window will appear.

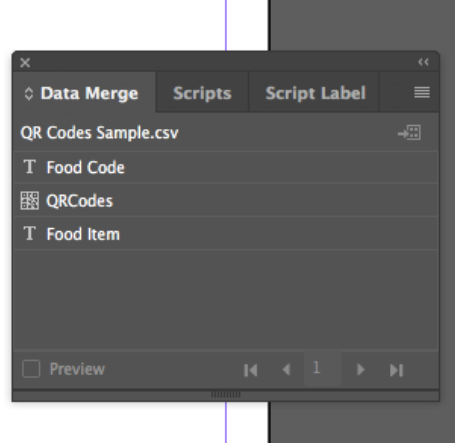


7. Using the small window, select the option to Select Data Source

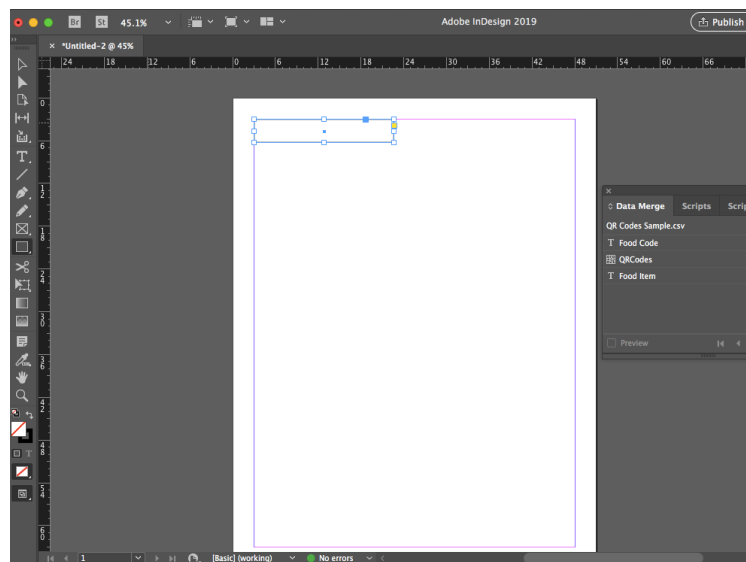


8. Select your data source csv, the document with the # column. It is important that this document not be open on your computer or InDesign won't be able to work with it.

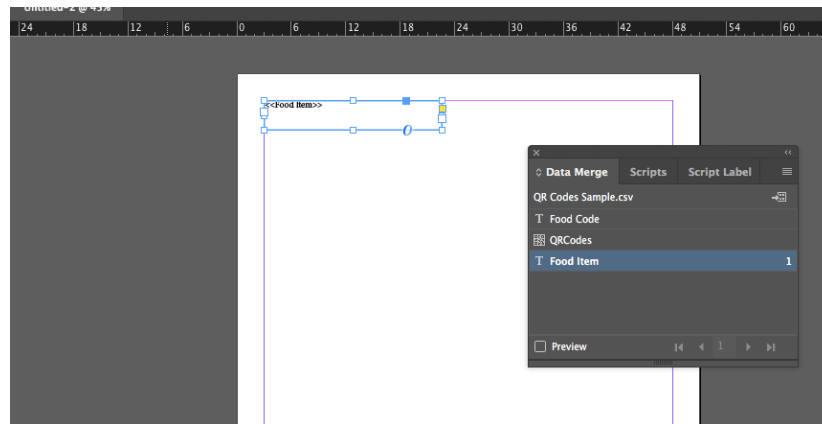
9. Once successfully imported, the column headings of your document will appear in the small data merge window.



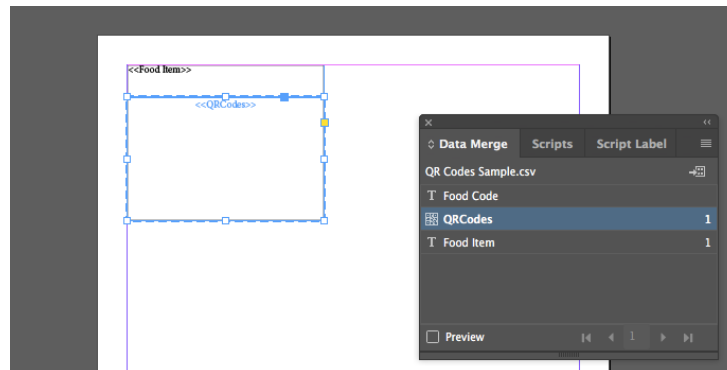
10. Now we should think about how we want our final document to look. This next step will involve assigning boxes to different columns of our data set. This will become clear as we work through our example. In this example, we want to have approximately six Food Name and QR Code pairings per page. First, create a rectangle that is long but shallow on your page. Notice that the rectangle option is the 11th cursor option on the left hand side of your screen.



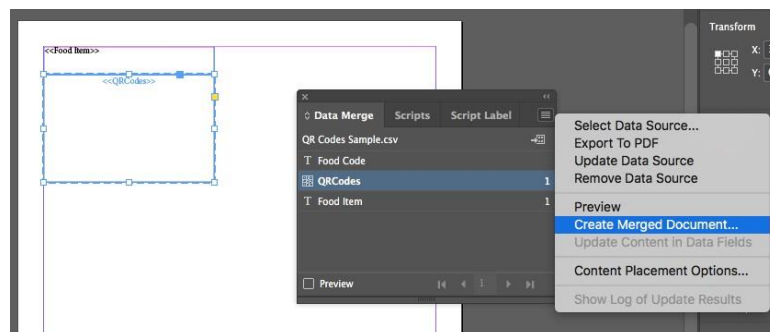
11. Once your rectangle has been drawn, reselect the selection cursor (the first cursor option). Select the rectangle that has been drawn and then select the title that you would like for your QR code in your small window. In this example, we want the Food Item and so that has been selected.



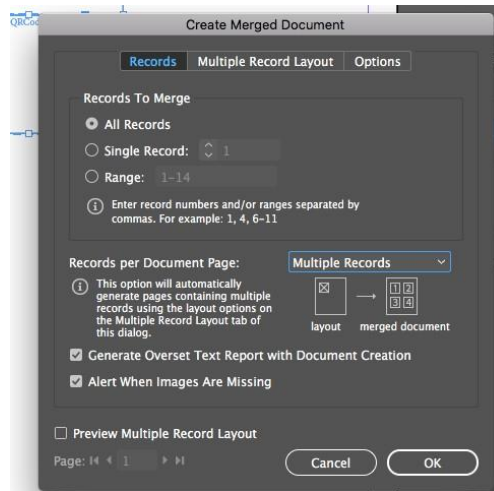
12. Now, repeat the process only this time drawing a larger rectangle and selecting the QR Code option from the small window. The final result will resemble this:



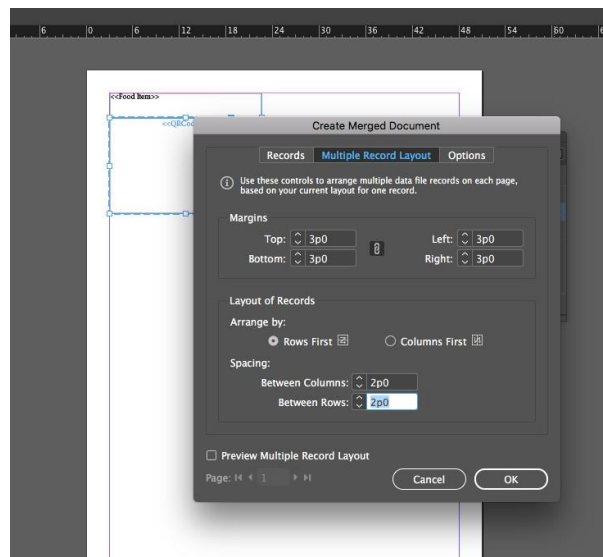
13. InDesign now is able to input the information in the data set into the two rectangles drawn on the document. To merge the data and thus create our desired final document, use the panel option for the small window and select Create Merged Document.



14. If you only want one QR code per page, then leave the option Single Record alone. In this example, we want to generate multiple QR Codes per page so Multiple Records has been selected.

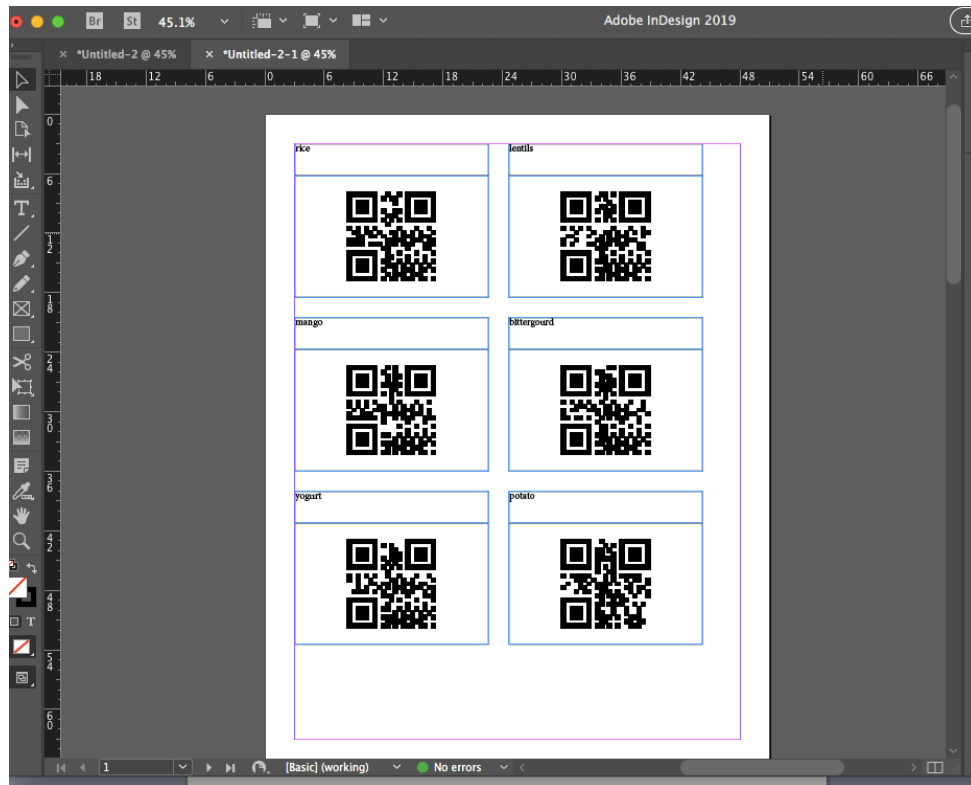


15. The next options section in the Create Merged Document option box is the multiple record layout. Here, it can be helpful to alter the margins and spacing to create the ideal display of your QR Codes and Food titles. I've added 2p0 spacing between codes here to separate out the entries.



16. There are other options that can be experimented with here, but this will be enough for our purposes here. Hit OK.

17. A new merged document will be generated according to the preferences that you have set in the options menu.



QR Codes with the appropriate labels have been generated.

APPENDIX A

Meal Name: _____ Date: _____ Data Collector Name: _____

Food Name:											
Empty Pot wt:	g										
Ingredient Name:											
Ingredient Weight:	g	g	g	g	g	g	g	g	g	g	g
Pot Weight After:	g										

Meal Name: _____ Date: _____ Data Collector Name: _____

Food Name:											
Empty Pot wt:	g										
Ingredient Name:											
Ingredient Weight:	g	g	g	g	g	g	g	g	g	g	g
Pot Weight After:	g										

Meal Name: _____ Date: _____ Data Collector Name: _____

Food Name:											
Empty Pot wt:	g										
Ingredient Name:											
Ingredient Weight:	g	g	g	g	g	g	g	g	g	g	g
Pot Weight After:	g										

Meal Name: _____ Date: _____ Data Collector Name: _____

Food Name:											
Empty Pot wt:	g										
Ingredient Name:											
Ingredient Weight:	g	g	g	g	g	g	g	g	g	g	g
Pot Weight After:	g										

Meal Name: _____ Date: _____ Data Collector Name: _____

Food Name:											
Empty Pot wt:	g										
Ingredient Name:											
Ingredient Weight:	g	g	g	g	g	g	g	g	g	g	g
Pot Weight After:	g										

Meal Name: _____ Date: _____ Data Collector Name: _____

Food Name:											
Empty Pot wt:	g										
Ingredient Name:											
Ingredient Weight:	g	g	g	g	g	g	g	g	g	g	g
Pot Weight After:	g										