USER MANUAL

WaCT DATA COLLECTION TOOL

VERSION 1.42

December 2021

> This User Guide outlines the usage of the Waste Wise Cities Tool Data Collection Application (WaCT DCA) developed by David Newby Associates in support of the UN Habitat Waste Wise Cities Tool (WaCT). The most current version of the WaCT DCA and this guide are available from the Waste Wise Cities pages on the RWM.Global portal (https://rwm.global).

SURVEY TOOL EXCEL APPLICATION

How the WaCT Data Collection Tool Is Used

The WaCT spreadsheet application is used to enter data for your city in order to generate a number of Sustainable Development Goal (SDG) indicators. The WaCT spreadsheet tool handles the calculations necessary to generate some of these SDG indicators.

Data may be collected using paper forms, or (for some of the data) by downloadable forms that can be used on mobile devices (Android or IOS phones and tablets). Currently, collected data must be manually transferred into the spreadsheet.
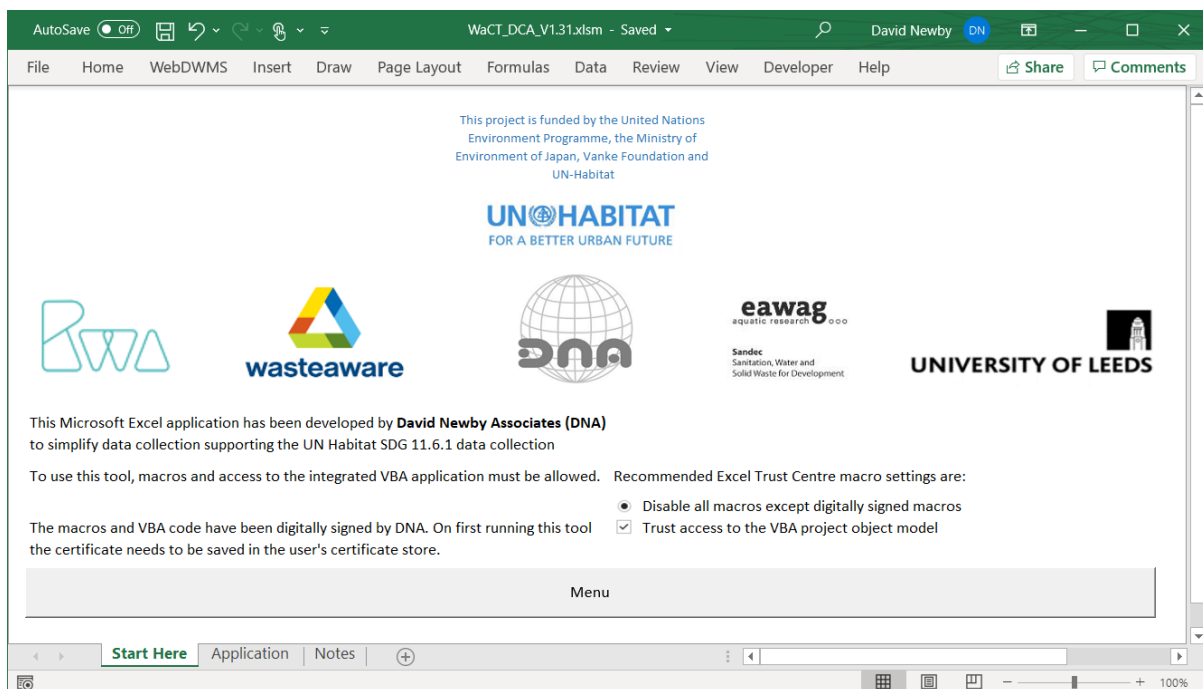
> In addition to this manual, DNA has created a video on the use of the WaCT DCA:
>
> ***https://player.vimeo.com/video/558571329***

### Using the WaCT Spreadsheet Tool

The tool is supplied in the form of a "macro enabled" Microsoft Excel Workbook (DNA-WaCT.xlsm).

When started, the spreadsheet tool will initially open to the introduction page:


NB: To use this tool, macros and access to the VBA project must be enabled (basic instructions shown above; a detailed guide is contained in Annex 1). On a Mac OS machine simply enable maxros.

After enabling the macros and VBA project, the tool functionality will be accessed solely from a single menu page - simply click on the "Menu" button on the start screen to go to the Menu page:
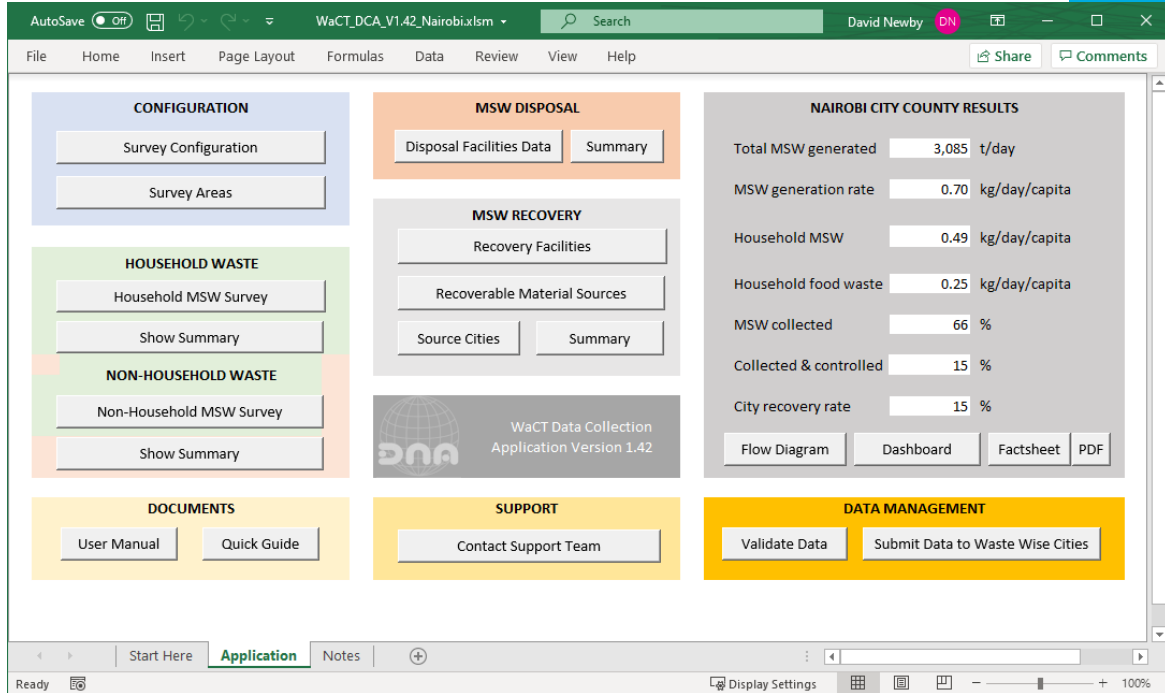
Clicking on any of the buttons will pop up the relevant data entry / data management form. The RESULTS panel is updated as data is entered.

STEP 1 - SURVEY CONFIGURATION / INFORMATION
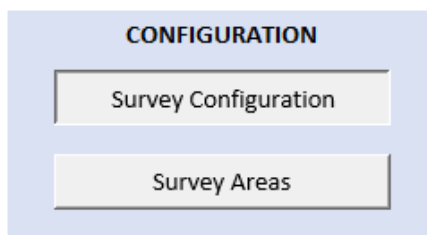
This form enables users to enter the basic information relating to the data collection activity. This includes identifying the country, city and the year to which the data relates and the population statistics by income level necessary for data extrapolation.

It also enables the user to determine the minimum number of areas that will be covered by the survey (for each income level) and the minimum number of households to be included for each survey area (the UN-Habitat WaCT guide gives recommendations), clicking Survey Configuration pops up the following form:

Step 1.1 – General Settings Tab.

Firstly, enter:

- Year survey is undertaken
- City name
- Country name

The WaCT methodology uses a mandatory proxy figure for the percentage of rejects/residues from recovery/recycling processes. While the checkbox is disabled, users may adjust the proxy % figure if it is considered that a different % figure

WaCT Data Collection Tool
David Newby Associates

is more appropriate for the survey city or to determine "sensitivity" of this proxy figure.

A proxy figure can also be used for modelling the generation of municipal solid waste type wastes from non-household sources. If the checkbox is checked then this configurable proxy figure (which defaults to 30%) is used. If the box is un-checked then actual survey data is used. Again, the proxy percentage figure can be varied according to the local circumstances, or to determine the "sensitivity" of this value.

Having entered this data, it can be saved by clicking the Save button. Once this data has been entered, the Register this survey button is enabled. The survey can be registered with the online UN-Habitat data repository now, or at any time up until the user wishes to submit data to the portal.

Register this survey   When you click the Register this survey button, a registration form pops up enabling the WaCT DCA to be registered.

Note: V1.42 of the WaCT DCA is not fully supported by the Microsoft Excel Mac OS version. Registration is currently only possible if the WaCT DCA Excel application is opened on a device running a Microsoft Windows operating system.

All fields on the pop-up form must be filled in after which the Register Survey button can be clicked.

The Application will contact the Waste Wise Cities web page on the RWM.Global server.

If your organisation has not previously registered a survey an account record will be created on the server, similarly, if the user name is not already registered for the organisation's account the user will be added.

Finally, the survey will be registered. The server will respond whether the registration has succeeded. If a message indicating that the survey was not successfully registered this is usually because the city name has not been found in the world cities database the server users, either try an alternative spelling of contact support.

If registration is successful, the online application supplies a unique Survey ID and looks up the City ID ("geonameid") for the named city, and will send a confirmation email which will include a user PIN. You will need to remember the PIN number in order to subsequently submit data to the Wastewise Cities server.

You will note that the General Settings tab will now have a survey ID number and a city ID which is the geonames database ID for the survey city.

Step 1.2 – Household Settings Tab

The "Household settings" tab is used to enter the survey parameters for the household waste survey including target number of survey areas and the target number of households per survey area and the populations for upper, middle and lower income levels. Enter the year the population figures were taken.

Tip: if you plan to survey fewer areas for a particular income level or fewer households for a particular area enter the lowest values here. The application checks that the minimum numbers have been created when checking the validity of data for submission to the server.

Step 1.3 – Non-Household Settings

The "Non household settings" tab is used to enter the data for the data for extrapolation of non-household MSW waste generation.

To enable this the application needs to know the total numbers for each premises type in the city.

The Save button on each tab is clicked to save the entered data to the underlying worksheets.

At this point (if Excel is running on a Windows machine) the survey can be registered with the online UN Habitat SDG application by clicking the Register this survey button. If this is successful, the online application supplies a unique Survey ID and looks up the City ID ("geonameid") for the named city. If successful this data is entered in the Excel application.

Once the city and year is registered online it cannot be changed.

Step 1.4 – Factsheet Tab

The WaCT DCA is capable of producing city "factsheets". The factsheet has a default "Introduction" section, shown below.

WaCT Data Collection Tool
David Newby Associates

Step 1: Preparation

Step 2: Household MSW Generation and Composition

Step 3: Non-Household MSW Generation

Step 4: MSW Received by Recovery Facilities and Control Level of Recovery Facilities

Step 5: MSW Received by Disposal Facilities and Control Level of Disposals Facilities

Step 6: Waste Composition at Disposal Facilities

Step 7: Calculating Food Waste, Recycling, Plastic Leakage, Greenhouse Gas Emissions and Air Pollution

In the rapidly urbanizing world, the crisis in waste management and plastic pollution is a reflection of current unsustainable lifestyles.

The availability of fact-based data on municipal solid waste can guide evidence-based planning and lead to increasingly effective and efficient solid waste collection systems, enhanced local resource recovery and controlled waste disposal, thereby improving the quality of life for urban residents.

UN-Habitat's Waste Wise Cities Tool (WaCT) assesses the parameters for Sustainable Development Goal indicator 11.6.1 - the proportion of municipal solid waste collected and managed in controlled facilities out of total municipal solid waste generated, by the city. It consists of seven steps and provides the necessary data to support evidence-based decision making by city managers.

Together we can achieve a sustainable future.
Have a look at the Waste Wise Cities website, learn about the WaCT and how its application created impact on the ground in other cities.

It is recommended that text for this "Introduction" should be provided in the form of a quote by a city official (with an environmental or waste management role).

The text can be entered by typing or 'cutting-and-pasting' a suitable block of text, along with specifying the city official's name ("Quotation by") and position.

The default picture on the factsheet can be changed when viewing the automatically generated city factsheet.

The Close buttons close the open form, CAUTION any unsaved data will be lost.

Step 1.5 – Configuring Survey Areas

Configuration of survey areas where data collection activities are being undertaken is done separately to the rest of the configuration, by use of a second form:

Survey area records are simply created by entering the Area name into the form, selecting the income level for the new area and then clicking the Add survey area button.

Values for any of the survey areas can be viewed by clicking on the entry in the survey areas list, updating the information and clicking the Save button.

Data for a survey area can be changed, although this should not be necessary unless for example, the name has been miss-spelt.

STEP 2 - HOUSEHOLD MSW SURVEY
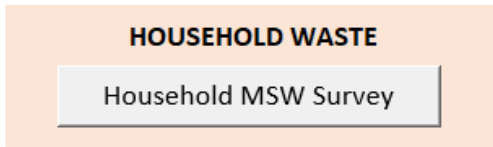
Clicking on the Household MSW Survey button pops up a form to enter data for the household MSW survey:

This form has a drop-down box at the top to select a survey area:

It has a list box to show households in the selected area (if one is selected) and a "tabbed" data entry area.

The tabbed data entry area has three tabs:

- "Details" for entering details for a selected household (a new household can also be added to the list for the selected area)
- "Quantities" for entering MSW generation quantities for a selected household (tab is only accessible if a household is selected in the list)
- "Composition" for entering MSW composition data for the selected area (tab is only accessible if a survey area is elected but no household has been selected)

The Clear form button can be used to clear the contents of the form before entering data for a new household to be added to the selected survey area.

Clicking the "Save" button saves any entered data. Clicking the Close button closes the form.

Caution: save data as necessary before closing the form

Adding a household

Firstly, select a survey area to add the household to (for example area "Karen").

Enter the details for the household, for example "Household 2" (second household in area "Karen") then click on the button Add new household button, to add the entry.

Selecting "Household 2" in the list would enable the details for household 2 to be edited and saved.

The address and contact name are provided solely for use by a survey team to ensure that each day the correct household is visited to quantify the waste generation, it is never transferred out of the DCA.

Entering MSW Generation Quantities

When a survey area and a household is selected, the "Quantities" tab is enabled and clicking on the tab shows the form for entering quantities data:

There is a checkbox for users to confirm that Day 0 waste has been collected to be discarded.

Each subsequent day the quantity collected can be entered.

Only numbers can be entered, a period (.) is used as the decimal separator.

Clicking the Save button transfers the data to the Households worksheet.

If a value (including "0") has been entered for each day, when this button is clicked, the application compares the generation per householder per day with proxy data held and warns the user if the value falls outside the range of 50% to 150% of the proxy value.

Once a value has been entered for each day, the "valid" checkbox may be enabled. Data is not used for modelling city total MSW generation unless the data is marked as valid. To do this click the valid checkbox and save the data again. The validation check is skipped if the checkbox is ticked.

Clicking the Close button closes the data entry form, CAUTION: any unsaved data in the quantities form would be lost. The same applies if the user clicks on another household in the households list.

Anytime data is amended, click the Save button to save it.

Entering MSW Composition Data

When a survey area is selected and a household has not been selected, the "Composition" tab is enabled and clicking on the tab shows the form for entering composition data:

Clicking the Save button transfers the data to the Households worksheet.

Clicking the Close button closes the data entry for, any unsaved data would be lost.

Clicking on the View chart button will close the pop-up window and display the composition chart for the selected area:
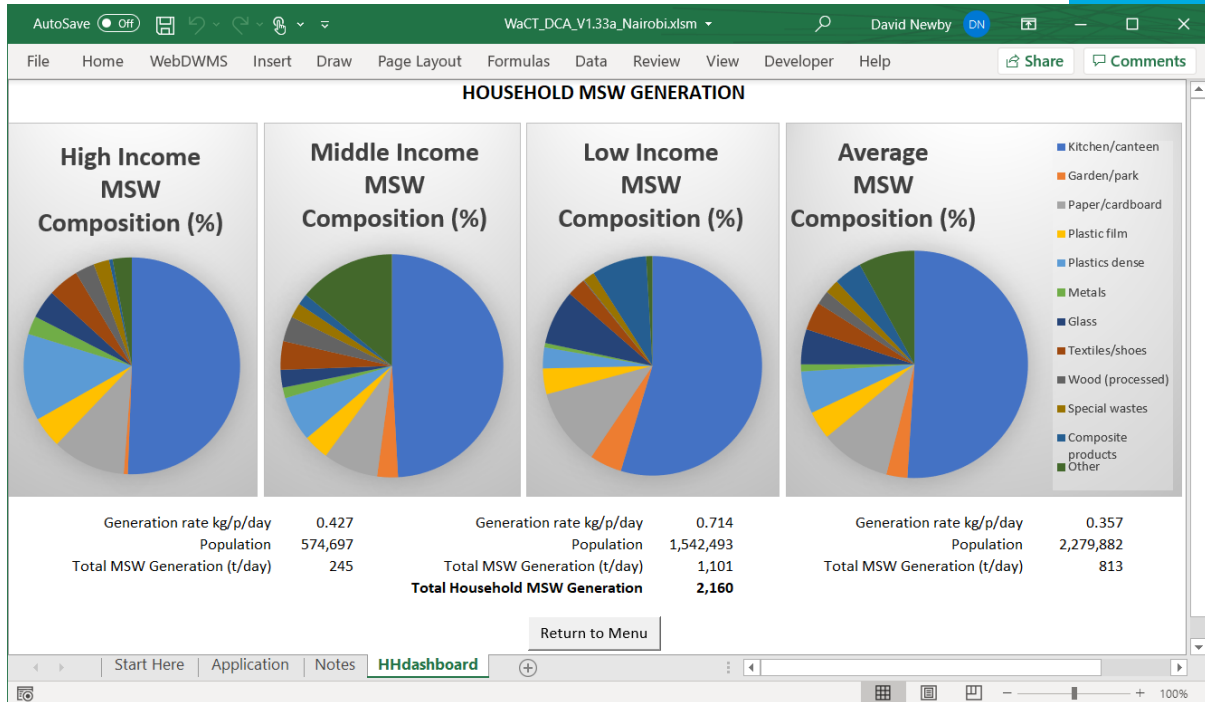
Clicking on the Return to menu button takes the user back to the main menu screen.
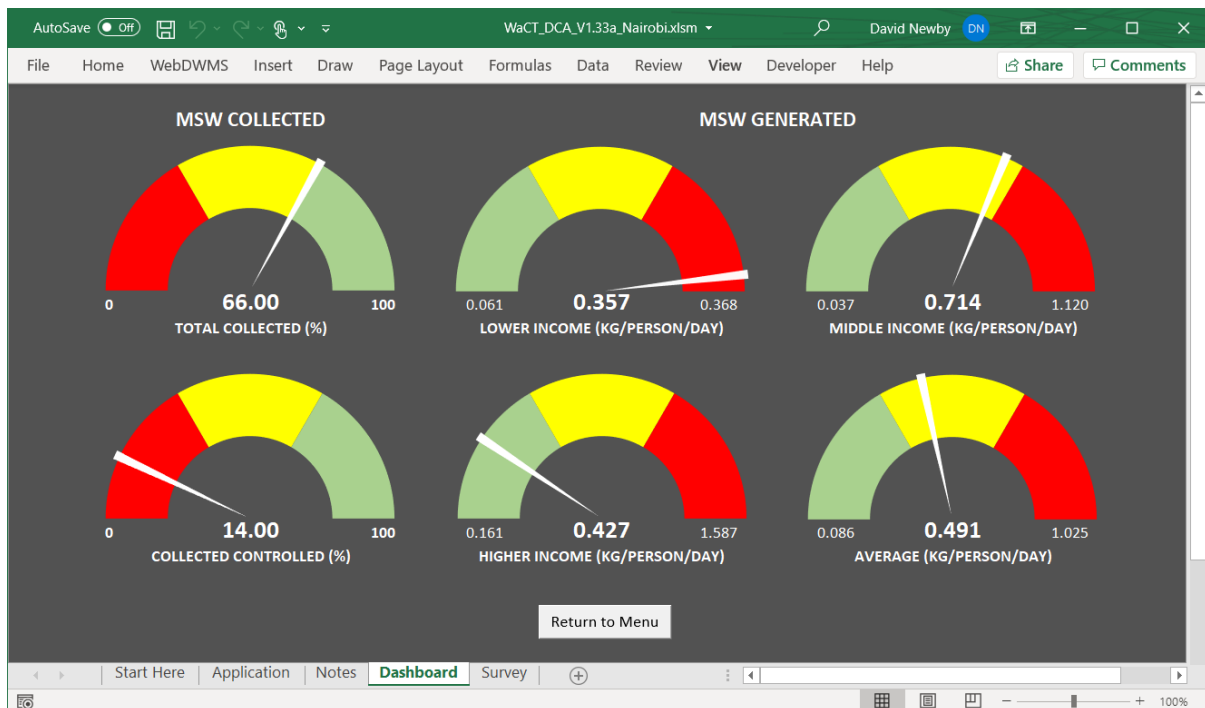
SHOW HOUSEHOLD SUMMARY

A summary dashboard for household waste generation and composition can be displayed by clicking on the button
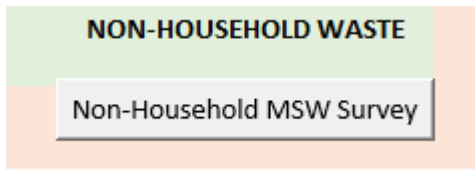
Show Summary :

Click the Return to Menu button to return to the main menu.

One the results panel of the main menu there is also a Dashboard button clicking this shows:

STEP 3 - NON-HOUSEHOLD MSW SURVEY

Clicking the Non-Household MSW Survey button pops up a form to enable the user to enter details of surveyed non household premises. The first thing to do on this form is to select a survey area and premises type, the application then displays matching premises:

A new premises can be added by entering its details such as name, unit number and MSW quantity generated, and then clicking the Add as new button.

If an existing premises record is selected then the data is displayed and can be edited and saved.

If no premises has been selected details can be entered for a new premises of the selected type in the selected area. Clicking the Save button saves the record.

The user can also click the Clear Form button when data is displayed to clear the form for entry of data for a new premises.

Records for different premises and different areas are entered and edited by selecting the relevant area and premises type in the drop-down lists and choosing a premises or entering details for new premises.

There is no limit on numbers of premises. **The data is only used for modelling total city waste generation if the "Valid" checkbox is ticked when the record is saved**. Validation is not automatic for non-household generated MSW.

STEP 4 - MANAGE RECOVERY FACILITIES DATA

This set of buttons pop-up the necessary data entry forms for:

- Entering data for recovery facilities
- Entering data for sources from which recoverable materials are received.
- Entering data for cities from which recoverable materials are received.
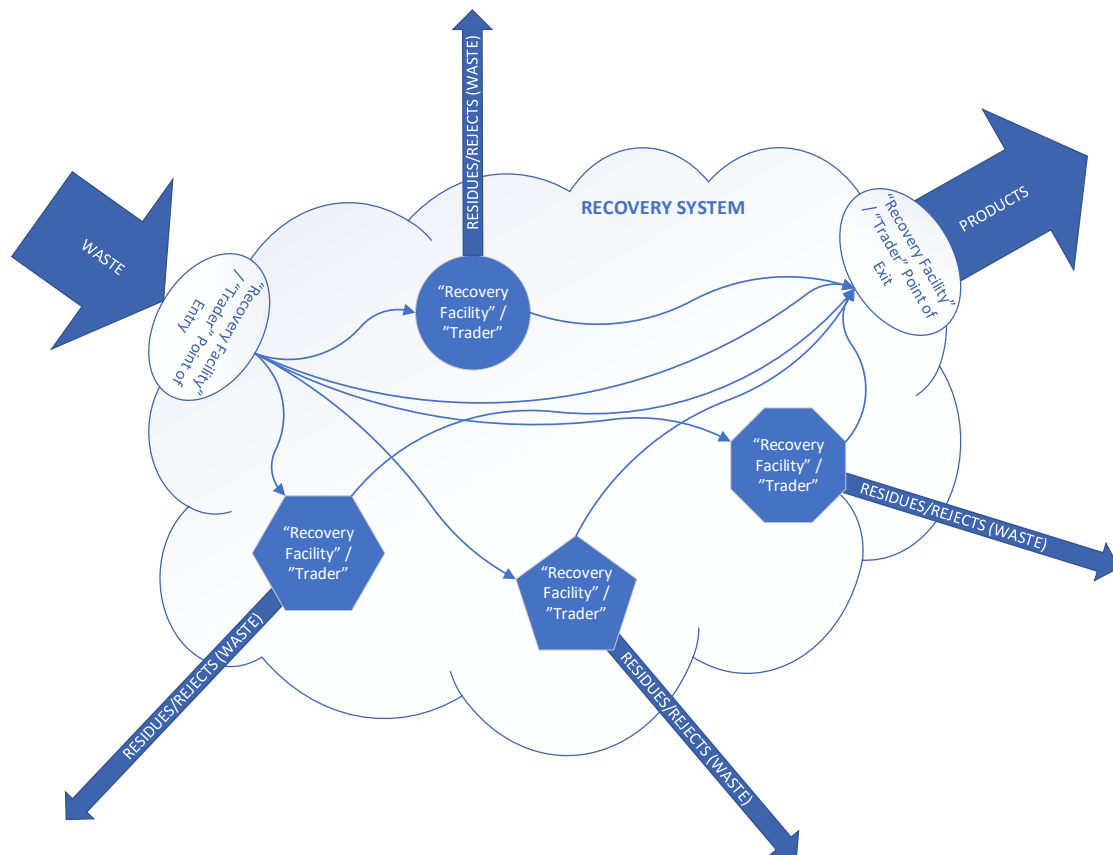
Materials Recovery "System"

Understanding the Materials Recovery System is key to gathering useful data. Overall, a material recovery system, in reality, spans waste segregation at the point of waste generation all the way through to the point when the "products" of the overall materials recovery system are traded as no

longer "waste". In cities with world class data reporting systems, this data may be available, but where it doesn't exist, a data collection exercise needs to be determined which is practicable (technically and economically).

A key part of this is to define the system that will actually be "modelled" for the purposes of the WaCT.

The diagram below illustrates a systems which can be modelled. This diagram illustrates the importance of identifying a point of entry to the modelled "Recovery System".

Wastes containing potentially recoverable materials enter the systems and could have multiple "paths" through the system to the point where the input waste either leaves the system as a recovered product or as a waste (rejects / process residues).

To avoid double counting it is crucial to only count wastes as "Received" for materials recovery at the point of entry and identify the "Recovery Facility" it first goes to (to determine the level of control).

For SDG 11.6.1 we want to determine wastes collected for disposal and recovery, and whether they are taken to a controlled facility. For this we need the only need the two data points identified above quantity at point of entry and level of control of the facility it goes to along with the type of recoverable material and the source city. From this we need to subtract the wastes as these are received at disposal facilities (or dumped).

The actual pathway through the system is not relevant to SDG 11.6.1. However, we have two choices to determine the wastes from the system – EITHER try to collect data on waste generated by each of the facilities / traders within the system handling or processing the materials OR simply apply proxy value to waste inputs to the system. Experience in cities where WaCT has been applied would

indicate that applying a proxy value is the best solution, and a proxy value of 10% is suggested (refer to Survey Configuration/**Error! Reference source not found.**).

Finally, products of the overall materials recovery process may be determined in one of two ways, EITHER by identifying all "end-of-chain recyclers" and gathering data on their products, OR by mass balance concept PRODUCTS = INPUTS - RESIDUES/REJECTS.

The net inputs cannot be modelled unless all entities within the system are identified, and their wastes quantified.

The decision has been made to focus on gathering the best data possible on inputs, applying a proxy value for rejects/residues and determining recovered material quantity as the difference between the two.

Recovery Facilities

The "MSW" RECOVERY menu provides access to forms to enter recovery data.

The Recovery Facilities button is used to enter most data and pops up the "Resource Recovery Facilities" form which has four "tabbed" data input panels:

General information about the facility is entered on the "Facility Details" page.

New facility records are created by entering the details and clicking the button

Add as new facility .

The type of facility, level of control, informal percentage and market share are all selected from drop-down lists.

The facility record can also store information on the capacities of facilities if this data is collected.

The facility record presents a simple mass balance (material in vs material out). In cases where the proxy is used for residues/rejects, the mass balance will always balance. The inputs to the facility are summarised by total inputs and inputs just from the survey city.

Facility records can be edited by selecting the facility in the list, which retrieves the record for the facility enabling the data in the form to be edited and saved by clicking the Save button.

If a record for a facility has been selected, the Clear form button must be clicked before details for a new facility record can be entered. The "Inputs" tab enables the user to enter data for a selected facility.

The Outputs tab and the Residues/Rejects tab are disabled when using proxy value for residues/rejects and percentage of inputs. In this case the mass balance display is simply calculated using the rejects / residues proxy value (and will always "balance").

Waste Inputs to Recovery Facilities

The "Inputs" tab enables all data on Recoverable Materials received to be entered. Data is stored in the "RF_inputs" worksheet.

For any given recoverable waste type there may be multiple records associated with materials received from different source types, sources and different cities.

When the input form is opened the existing records of inputs to the Facility are listed, clicking on one of these in the list enables the record to be edited and saved. If no input is selected a new input record can be created by entering the new information and clicking the Add button.

If an input is selected, the form can be cleared by clicking on the "Clear form" button to enable new data to be entered.

It is crucial to modelling the SDG Indicators to ensure that the "Point of Entry" and "Non-MSW" check boxes are correctly set:

- Waste received is a "Point of Entry" waste received if it is received from any person, trader or facility that is NOT itself being included in the survey programme. If that person, trader or facility IS being included in the survey programme then "Point of Entry" is NO (check box left un-checked) and the data for material in question at "Point of Entry" should be collected for that person, trader or facility.
- The Non-MSW box should be checked if the waste is not a household type waste (for example, industrial or construction demolition waste).

The options in the Sources list depend on whether the source type is "Apex Trader" or "End-of-chain-recycler". If so, the list displays recorded Resource Recovery Facilities; otherwise, the list displays all entities from the "Sources" sheet.

If the source is not already listed in the sources drop-down list box, then a record for a new trader **should** be added by clicking on the + button at the side of the list box. This will pop up a dialogue box for the user to enter the name of the new trader. If a name is entered, then a new Recovery Facility record is created. If the source type was "Apex Trader" or "End-of-chain-recycler" then a new

record for that type of facility is added to the list enabling the new trader to be selected. Check the list carefully and be careful not to add duplicates!

A source city should be selected from the drop-down list. Again, if the required city is not in the list, it can be added by clicking on the + button at the side of the list box – a box will pop up allowing the new city name to be entered. Alternatively, the source cities can be added directly through the Source Cities button.

Data entered into the Inputs tab is transferred to the "RF_inputs" worksheet:

Outputs from Recovery Facilities

NOTE: Only read if the proxy for residues/rejects is NOT being used.

As with Inputs (potentially recoverable materials received), we gather data on products of the recovery processes. The recipients of the products are recorded in the "Outlets" data sheet.

Using the "Outputs" tab details of all outputs (Products) can be entered.

As with "Inputs", If the outlet is not already listed in the sources drop-down list box then a record for a new outlet can be added by clicking on the + button at the side of the list box. Check the list carefully so as not to add duplicates.

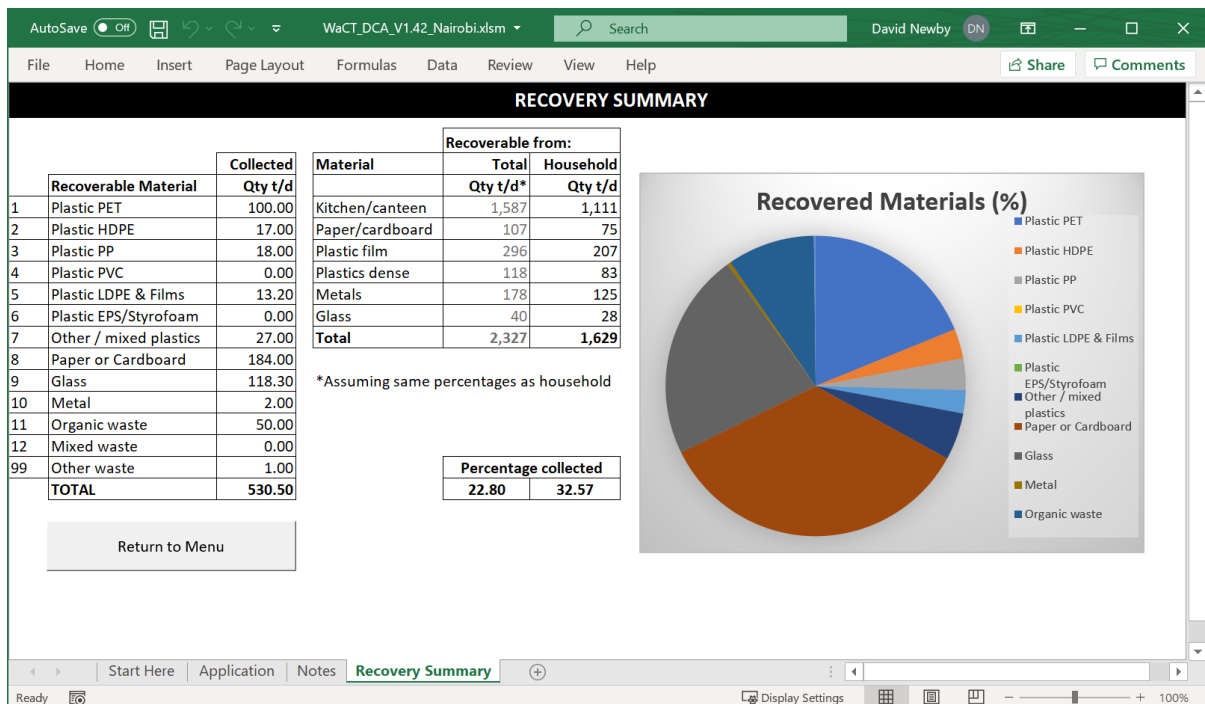Data is stored in the "RF_outputs" worksheet.

NOTE: Only read if the proxy for residues/rejects is NOT being used.

The "Residues/Rejects" tab is used to enter the details of residues/rejects (wastes) from the processes operated.

The "MSW RECOVERY" menu has a Summary button, clicking this opens a summary sheet:

RECOVERY SUMMARY

	Recoverable Material	Collected Qty t/d		Material	Total Qty t/d*	Household Qty t/d
					Recoverable from:	
1	Plastic PET	100.00		Kitchen/canteen	1,587	1,111
2	Plastic HDPE	17.00		Paper/cardboard	107	75
3	Plastic PP	18.00		Plastic film	296	207
4	Plastic PVC	0.00		Plastics dense	118	83
5	Plastic LDPE & Films	13.20		Metals	178	125
6	Plastic EPS/Styrofoam	0.00		Glass	40	28
7	Other / mixed plastics	27.00		**Total**	**2,327**	**1,629**
8	Paper or Cardboard	184.00				
9	Glass	118.30		*Assuming same percentages as household		
10	Metal	2.00				
11	Organic waste	50.00				
12	Mixed waste	0.00			Percentage collected	
99	Other waste	1.00			22.80	32.57
	TOTAL	**530.50**				

The summary sheet shows materials received at the recovery facilities surveyed, and also uses the household waste generation data and household waste composition data to estimate the quantities of materials potentially recoverable for comparison. This enables users to identify potential opportunities for increasing recovery rates.

STEP 5 - MANAGE DISPOSAL FACILITIES DATA
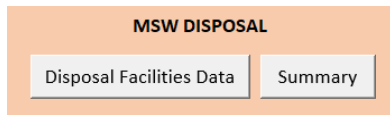
Click on the Disposal Facilities Data button pops up a data entry form allowing records to be created (and edited) for MSW Disposal Facilities, and enables users to enter data for MSW received (quantities and composition).

Initially, a list of disposal facilities is displayed, if none have been entered this is blank. In addition to the disposal facilities list, this form has three "tabbed" data entry areas:

Facility details

This tab enables new records to be created for MSW disposal facilities, or edited (clicking on a facility name in the list displays the details for the selected facility). Edited data can be saved by clicking on the Save button.

If viewing data for a facility, the displayed data on the form can be cleared by clicking the Clean form button, enabling data to be entered for a new disposal facility record. A new record can be saved by clicking on the Add as new facility button.

The Close button simply closes the pop-up form (any unsaved data may be lost).

MSW quantities

The "MSW quantities" tab enables quantity data to be entered and edited:

Clicking the Save button will save entered data, the Close button closes the form (any unsaved data will be lost).

For each disposal facility, enter:

- the daily quantity of waste received,
- the number of pickers removing recoverable materials from the deposited MSW, and
- the average daily quantity each picker collects in kg.

STEP 6 – MANAGE COMPOSITION DATA FOR WASTE DISPOSAL FACILITIES


Composition data can be entered for 3 samples at any of the waste disposal facilities reflecting samples for waste from each income level.

Click the Save button will save entered data; Close button closes the form (any unsaved data will be lost).

Clicking on the View chart button will, if composition data has been entered and saved, take the user to the composition chart for the selected disposal facility showing composition for the currently selected disposal facility and income level:
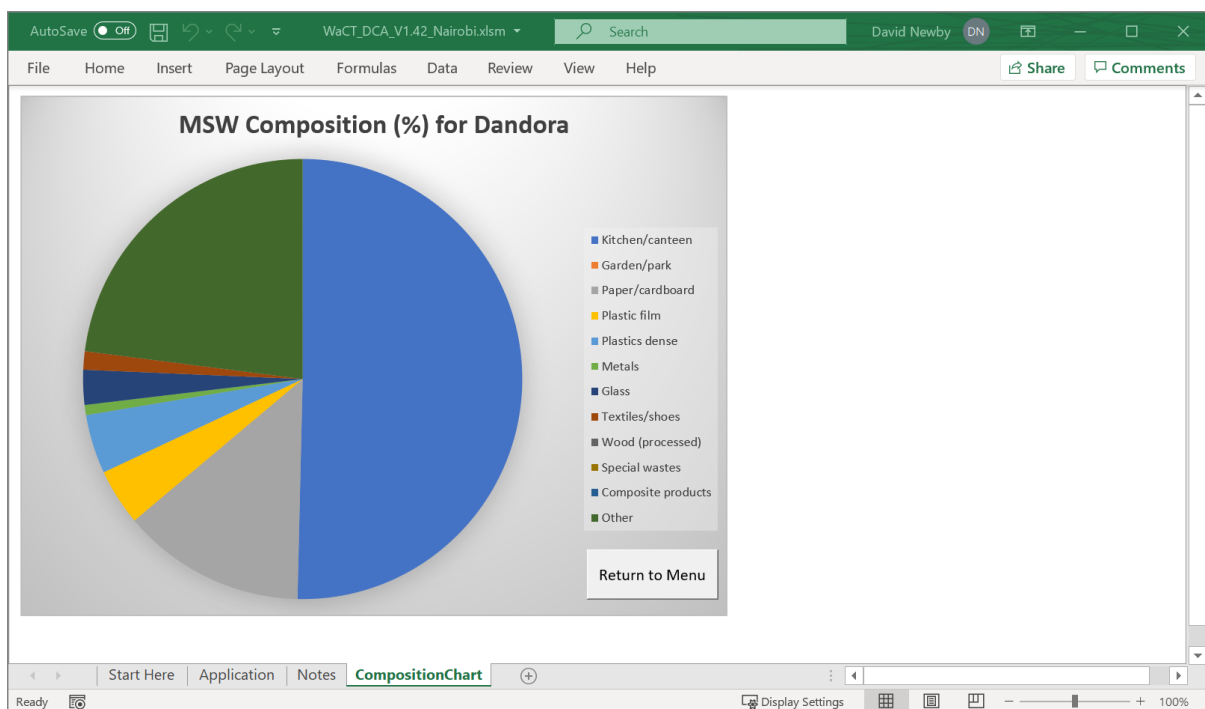
Click on the Return to Menu button to go back to the main Menu page.

Clicking on the Summary button on the MSW Disposal panel opens a spreadsheet with summary data for MSW disposal:
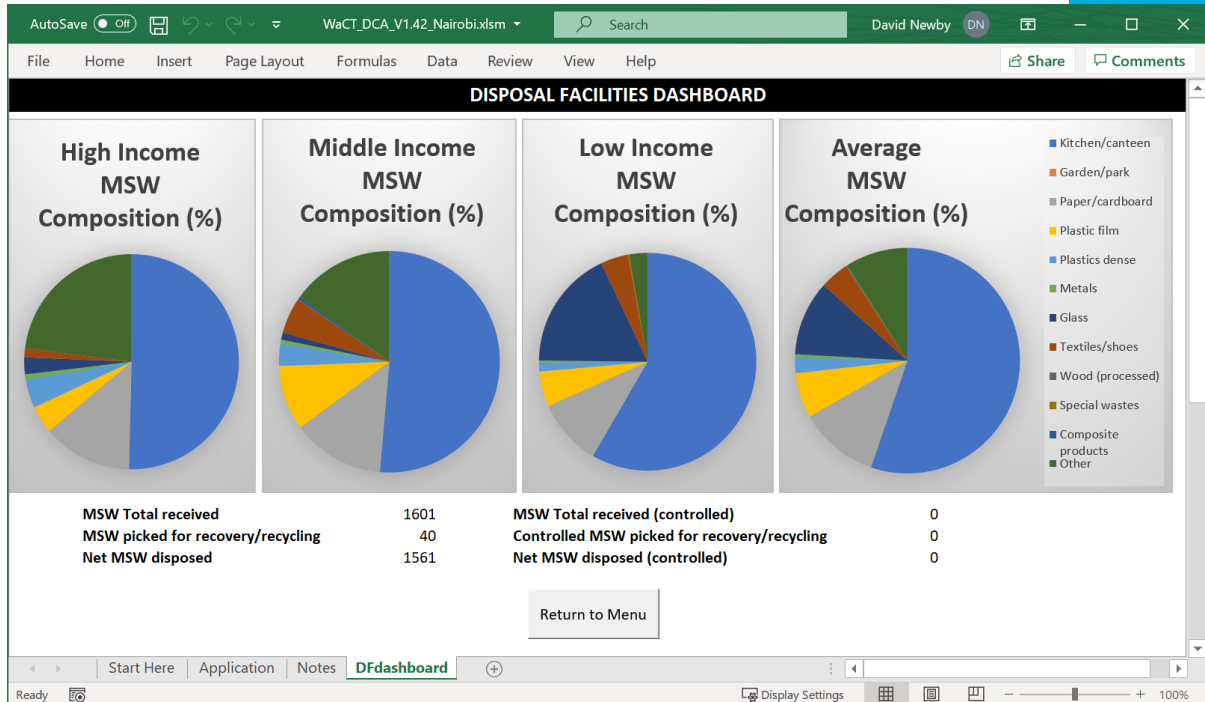
DISPLAYING RESULTS

As data is entered into the Application, the results are immediately updated in the RESULTS panel:
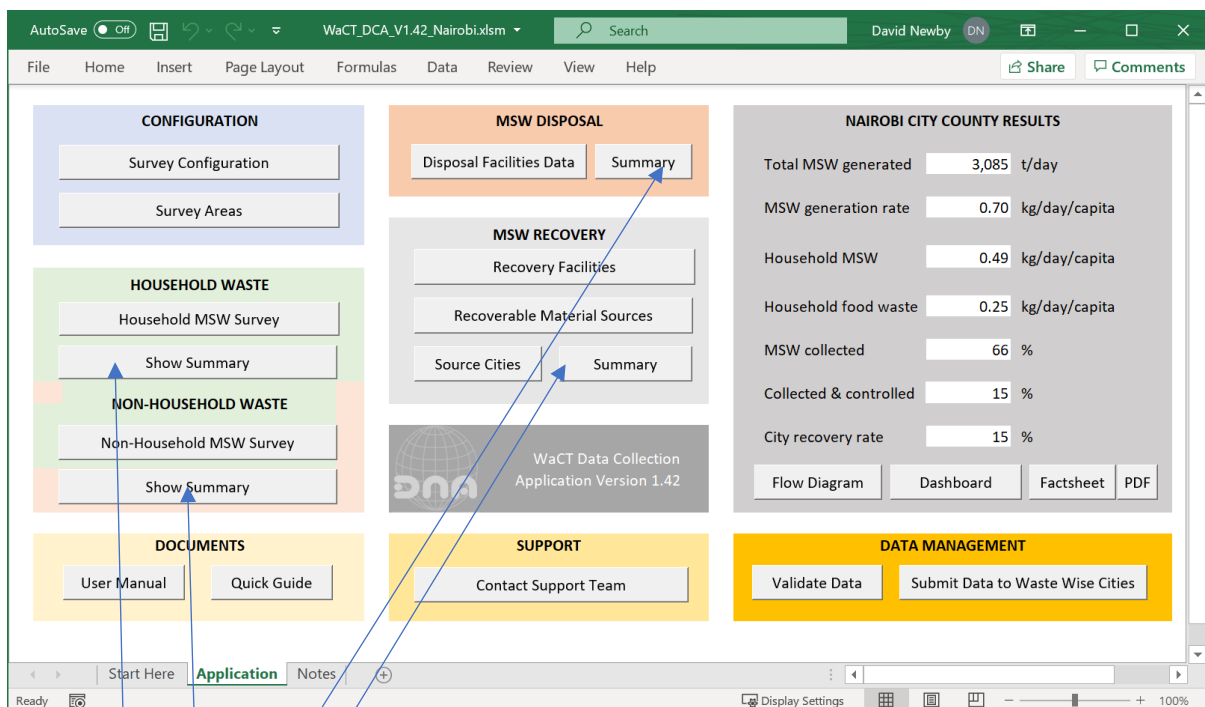
As indicated in the previous sections, summary displays are available from the Main Menu showing:

- Household waste generation summary (quantities and composition)
- Non-household waste summary (generation)
- Recovery summary (quantities recovered and potential recoverable quantities)
- MSW disposal summary (quantities and composition at disposal)

A "performance dashboard" can also be viewed (click on the Dashboard button in the RESULTS panel) this shows the waste collection performance and the waste generation factors compared to high and low values from the World Bank's "What a Waste 2" database, depicting this information in the form of gauges:

A flow diagram can be displayed by clicking on the Flow Diagram button in the RESULTS panel:

The WaCT City Factsheet

The WaCT DCA automatically generates a City Factsheet, to view it click the Factsheet button in the RESULTS panel of the main menu screen.

Initially this has a default picture and "forward" text:

The text can be changed as described in the section on Survey Configuration. The default picture can be changed by clicking on the picture and pressing delete on your keyboard. This reveals a "Click to add image" button.

A popup dialogue box appears to select a picture:
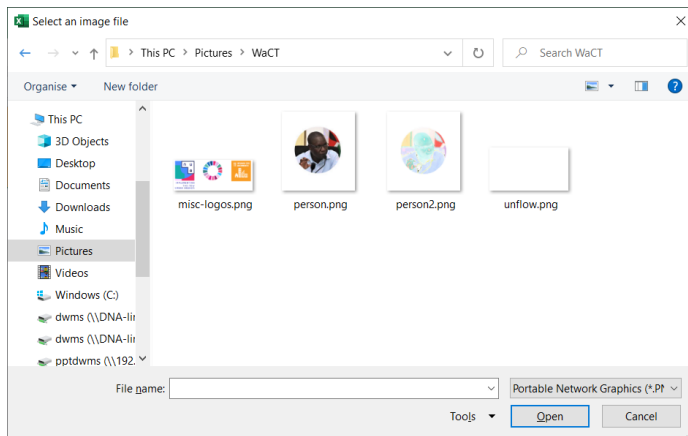
When a picture is selected, it is inserted into the Factsheet.

The picture accompanying the "Introduction" would normally be a picture of the person making the quote. Ideally, the pictureshould be 380 pixels wide by 410 pixels high. It can be larger but should be a similar aspect ratio to this.

When a picture is selected it is inserted and automatically resized to fit the area in the Factsheet:

Next to the Factsheet button is a PDF button. Clicking this automatically generates an Adobe PDF format file which will be saved in your default Documents folder.

Tip:

To generate a PDF without margins, choose "File", "Print" from the Excel program menu and select "Microsoft Print to PDF" as the printer. Then exit the "File" menu. Clicking the PDF button should then generate the PDF file with no margins.

DATA MANAGEMENT

Registration with WaCT data server

Register this survey

Click the Register this survey button, a registration form pops up enabling the WaCT DCA to be registered.

Survey Registration

Organisation	
Address	
Telephone	
User name	
Email address	

Register Survey   Cancel

All fields on the pop-up form must be filled in after which the Register Survey button can be clicked.

The Application will contact the Waste Wise Cities web page on the RWM.Global data portal.

If the Organisation has not previously registered a survey an account record will be created on the server; similarly if the user name is not already registered for the organisation's account the user will be added.

Finally, the survey will be registered. The server will respond with a message indicating whether or not the registration has succeeded.

If registration is successful, the server will send a confirmation email which will include a user pin number. You will need to keep the pin number in order to be able to submit data to the server. The pin number is also required to log into the Waste Wise Cities web page on the RWM.Global server.

Validating results
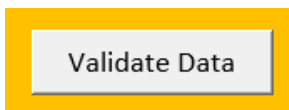
Validate Data

The application undertakes basic validation of household waste generation quantities at the time of data entry, but before data may be uploaded to the online data server it is further validated to ensure it is complete. To check the data click on the Validate Data button to pop up the data validation form.

Checking Data

Checking: Issues:
- ☐ Survey registered
- ☐ Survey data complete
- ☐ Survey areas created
- ☐ Households created
- ☐ Household data complete
- ☐ Composition by income level
- ☐ "Non-households" data
- ☐ Disposal site data
- ☐ Disposal waste composition
- ☐ Recovery facilities data
- ☐ Recovery facilities input data
- ☐ RM source cities

Start   Close

Then to start validation, click on the Start button. The application goes through all of the data sheets to check that the data required is complete.

Checking Data

Checking: Issues:
- ☑ Survey registered
- ☑ Survey data complete
- ☑ Survey areas created
- ☑ Households created
- ☑ Household data complete
- ☑ Composition by income level
- ☑ "Non-households" data
- ☑ Disposal site data
- ☑ Disposal waste composition
- ☐ Recovery facilities data   Capacity missing for Recovery Facility ID 1
- ☑ Recovery facilities input data
- ☑ RM source cities

Microsoft Excel

Data validation failed

OK

Cancel   Close

If any data is missing then the application displays the relevant result:

If validation fails, the form will indicate missing data enabling the user to enter the missing data and retry validation.

UPLOADING DATA TO THE DATA SERVER

Submit Data to Waste Wise Cities
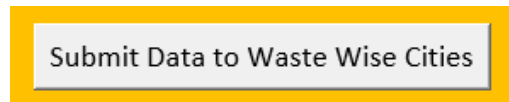
Data can be uploaded to the WaCT data server by clicking this button. Prior to attempting to upload the data, the application revalidates the data. If the data is validated successfully a Send to Server button is enabled.

Clicking that button pops up another form to initiate the submission process.
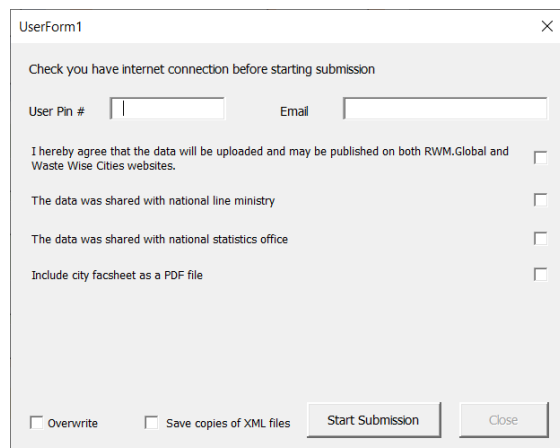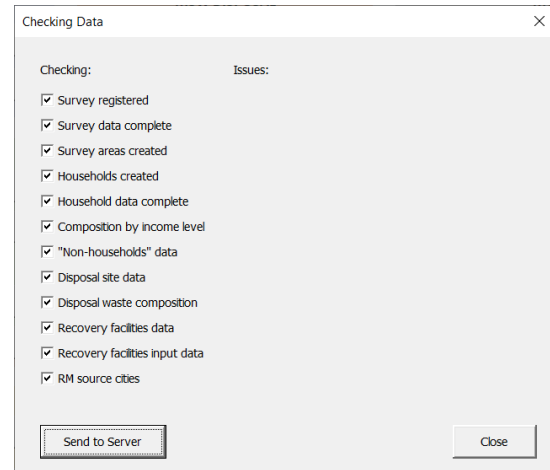
To submit the data it is necessary to enter your user pin number (which you received when registering the survey, see **Error! Reference source not found.**) and email address.

Aggregate data uploaded to Waste Wise Cities may be displayed on the RWM.Global Waste Wise Cities pages and on the UN Habitat Waste Wise Cities pages; click the check box to agree to this.

Prior to uploading data, it is recommended that you also communicate your results to the relevant national line ministry and the national or city statistics office. Clicking the checkboxes indicates that this has been done.

Click the Start Submission button to start sending the data to the server. The application then generates data files to submit to the server and then sends them. Progress is displayed and the application will indicate success or failure.

Notes on the WaCT data modelling

Household Wastes

Household generation rates are averaged by income level and used to calculate the total waste generation for each income level using the population data. Only data flagged as "Valid" is used in these calculations.

When calculating the generation rates for income levels the application sums the average daily waste generation for each valid household record for that income level and divides this by the total residents for each valid household record for that income level.

Non-Household Wastes

Non-Household generation rates are averaged for each type of non-household premises and used to calculate the total waste generation for each type of premises. Only data flagged as "Valid" is used in these calculations.

The application gives the option of using a proxy percentage to estimate non-household waste generation based on the modelled household waste generation.

Disposal Facilities

Data on MSW quantities received (along with quantities "received" at recycling facilities) is used to calculate the % of MSW waste generated that is received at waste management facilities. The model also calculates quantities of waste received at "controlled" facilities by using the control level data and counts waste received at facilities that have a control level of "basic" or better.

Recovery Facilities

Inputs into a Recovery Facility are counted in total inputs only if the records are flagged as "Point of entry" records.

They are counted as "Received" (City Inputs) for the SDG indicators if flagged as "Point of entry" records AND the source city is the survey city.

They are counted as "Received" at "Controlled" facilities if the control level of the facility is recorded as "Basic" or better.

The WaCT methodology uses a proxy value to estimate net recovery/recycling by assuming a fixed percentage for rejects/residues. This proxy value is user configurable.

The **recovery rate for the city** = City recycled/recovered as a percentage of total MSW generated.

Waste Flow

Waste from households and non-households to disposal facilities =

Total waste received at disposal facilities – waste received at disposal facilities from recovery facilities

Waste from households and non-households to recovery facilities =

Total waste received at recovery facilities – waste received at recovery facilities from disposal facilities

Waste disposed of =

Total waste received at disposal facilities – waste taken from disposal facilities to recovery facilities

Materials recycled / recovered =

Total waste received at recovery facilities – waste taken from recovery facilities to disposal facilities

ANNEX 1 - Excel Applications Security

WaCT and Excel Security

The WaCT spreadsheet application contains a full MS Office VBA application and a suite of Macros. To the use the tool, Excel must be configured to allow the use of Macros and the VBA application.

MICROSOFT WINDOWS

Step 1 Configure Settings In The Trust Centre (Windows)

Open Excel and click on File in the menu:
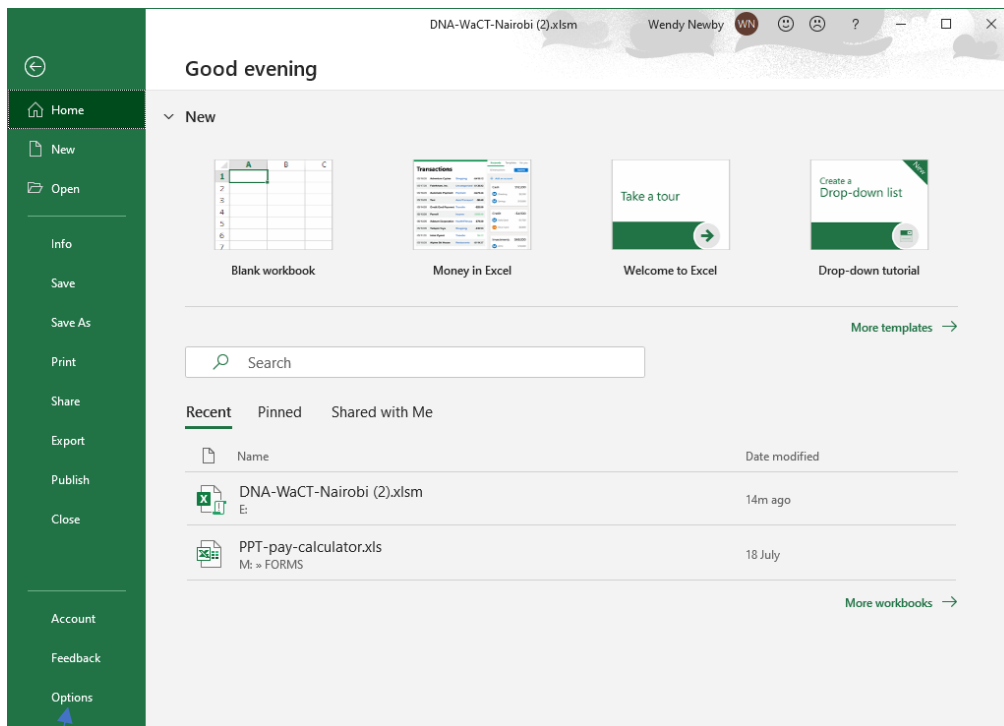
Choose Options and click on Trust Centre and you will see the following screen:
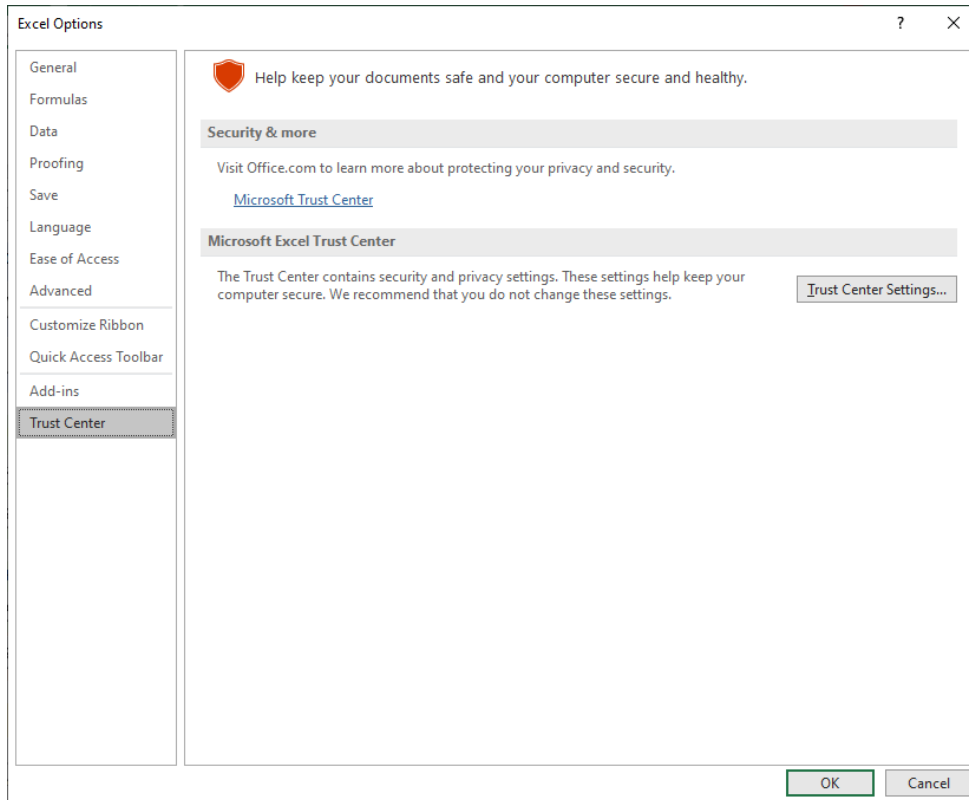
Then click on Trust Center Settings.. you will then see the following screen:
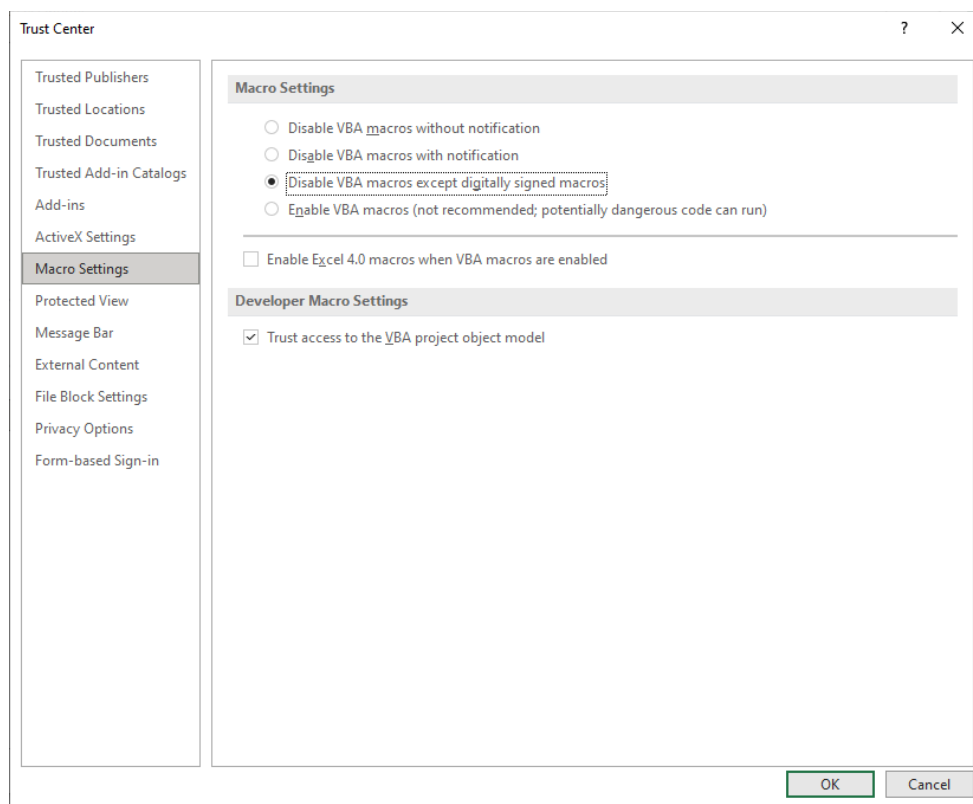
Choose the Macro Setting "Disable all macros except digitally signed macros". Also tick the option "Trust access to the VBA project object model". Do **NOT** tick the option "Enable Excel 4.0 macros" if that option is displayed.

Clock OK button to save settings and exit back to the Excel program. Close Excel and re-open the workbook…..

Step 2 Open WaCT Spreadsheet Tool and Save Certificate (Windows)

Open the WaCT spreadsheet you should then see the SECURITY WARNING:
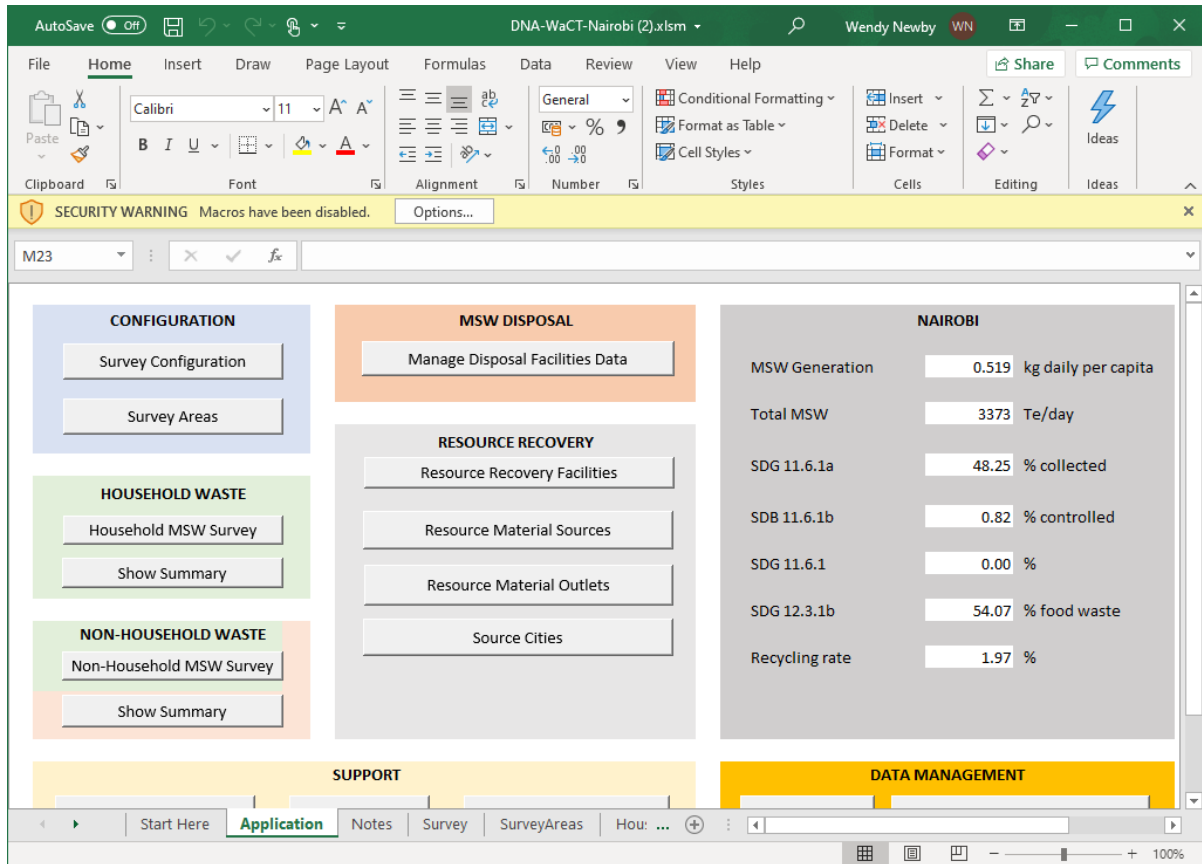
Click on Options.. button.
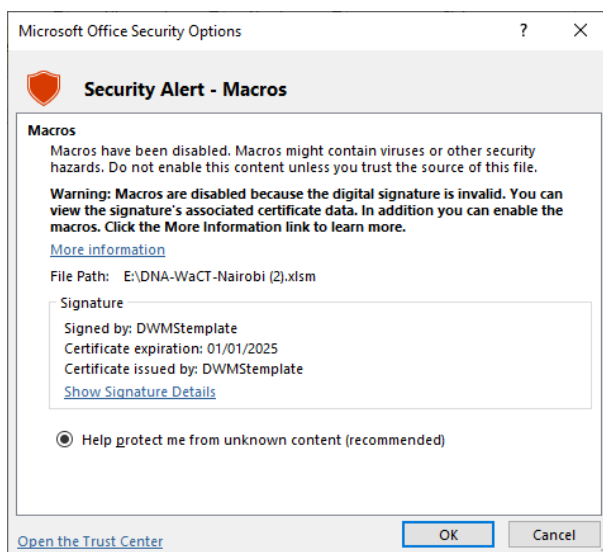
The dialogue box that opens shows the certificate details that the spreadsheet model is digitally signed with.

Click on "Show Signature Details"
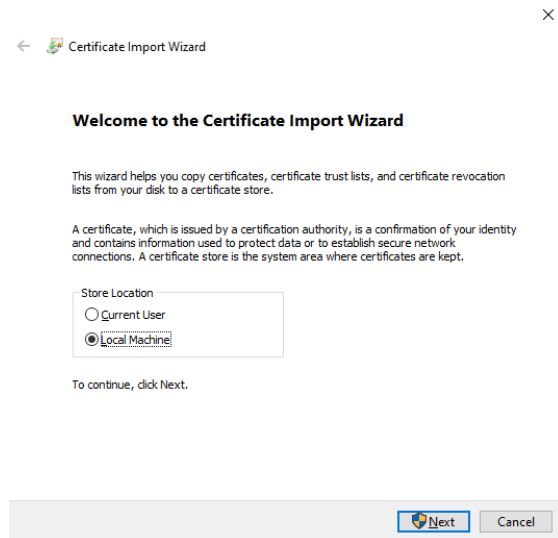
A further "Digital Signature Details" dialogue opens:

Click on the View Certificate... button:

Now click on Install Certificate... and the next dialogue box opens:

Choose store location "Local Machine" and click Next button:

× Now we choose where to save the certificate. To do this, you click on the Browse… button.
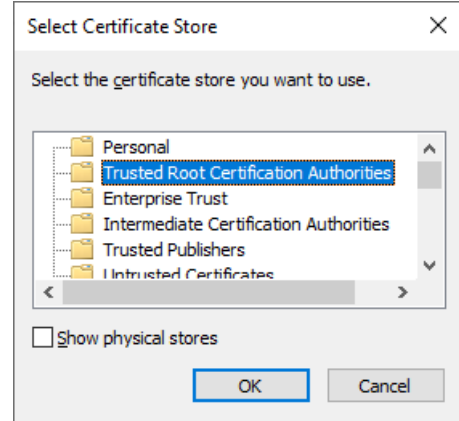
Choose "Trusted Root Certification Authorities" and click on the OK button.

× Having chosen the certificate store, click the Next button.

Then click Finish button to complete the certificate installation. You will get a confirmation:
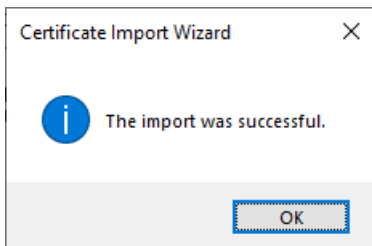
A final dialogue box will be displayed:

Click OK .
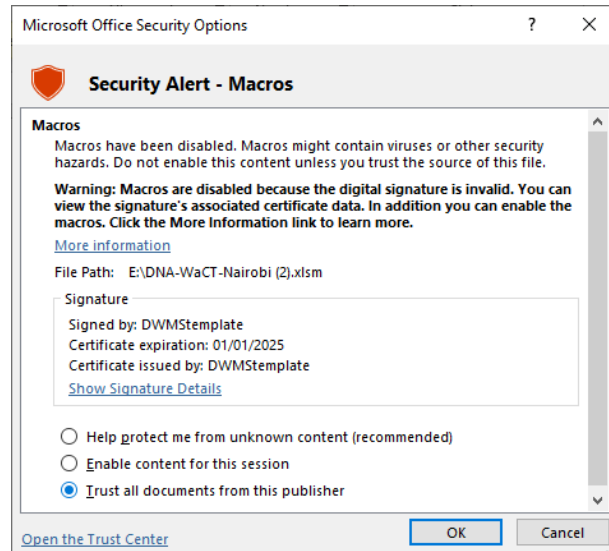
Select the option "Trust all documents from this publisher" and click OK.

Close Excel and reopen the WaCT spreadsheet application and the system should be fully functional.

MACKINTOSH OS

Note: the WaCT DCA in version 1.42 is not Mac OS compatible, as Excel on the Mac supports only a sub-set of VBA functionality. DNA is developing a Mac OS compatible version and we can supply a beta version that is Mac OS compatible, with the exception of the ability to register the survey and upload data.

DNA can however handle the registration and data submission on your behalf, by request if you send a request with the DCA attached to us by email.

Step 1 Enable Macros

On a Mackintosh computer/laptop the process is much simpler. When you open the WaCT DCA spreadsheet tool the Mac will pop up a dialogue message saying

"This workbook contains macros. Do you want to disable macros before opening the file?"

Click the Enable Macros button.

Note: doing this removes the DNA digital certificate so once the workbook is saved, the digital certificate is no longer present to safely configure Excel for Windows and the application will no longer function on a Windows PC with the Trust Centre configured as recommended above.

To subsequently open in Excel on a Windows PC is necessary to enable all macros on Excel for Windows (not just digitally signed macros).

ANNEX 2 - Version 1.42 Data Import Functionality

DCA Version 1.42 Data Import

The WaCT DCA Version 1.42 has a new capability, it is capable of importing data from any other WaCT DCA version 1.40 or above.

Caution, this is a relatively slow operation, it creates a new "instance" of Excel, opens the selected workbook in the background and copies all data across. This does NOT merge data - any previous data in the original workbook where this procedure is initiated will be cleared down first.

A confirmation message should indicate completion.

With the application open to the Main Menu, press the "I" key while holding down shift and ctrl keys.

The application will open a 'file open dialogue' for you to select the excel workbook that you want to copy data from.

If you select a file, the application will do a version check and if the source workbook is 1.40 or above, it will then ask for your confirmation before proceeding.

If you confirm, the copy process will be initiated, a wait symbol will display until the process is complete. Do not close the WaCT DCA until the process has finished. You will notice during the import process the results panel is progressively updated as the data is imported. The overall process typically takes one or two minutes.

This data import capability can be used to transfer data from the standard DCA Version 1.40 and above into the beta Mac OS compatible DCA and vice versa from the Mac OS beta version into the standard Version 1.42.