Quefax: A Research Data Management System

Users Manual Version 1.0

ILRI-ICRAF RESEARCH METHODS GROUP

7/1/2010

Peter Muraya & Charles Masson

Acknowledgement

The authors would like to acknowledge inputs from the many scientists in the Sub-Saharan Africa Challenge Program (SSA CP) and the ILRI-ICRAF Research Methods (RMG). In particular, we acknowledge inputs by:-

- Mikkel Grum and Enock Musingusi of Bioversity International who kindly agreed to test and give us feedback on the performance of the beta version of Quefax in a Dietary Survey they conducted Kitui, Eastern Kenya.
- Benard Fungo of Makerere University for figuring out on his own how to operate Quefax in the Lake Kivu Pilot Learning site without any written instructions, thus helping to shape the first draft of this manual.
- Jemima Njuki of the Cross-site Research Team (CRST) who coordinated over 100 scientists to develop the data collection instruments based on the Quefax model, leaving us time to concentrate on developing the methodology.
- Nicholas Ndiwa of RMG who ran practical tests with real data to compare Quefax with alternative methods.
- Anja Gassner, co-leader RMG, who influenced the structure of this manual by emphasizing the non-technical user as the first client of this manual.
- Sagary Nokoe, leader of CRST
- Fatunbi Oluwole, Program Officer of SSA CP, and Adekunle Adewale, Leader of SSA CP, for their relentless encouragement to have Quefax documented as an international public good from the SSA CP program.

Contents

1. Introduction

Quefax is a system of research data management that uses Word document forms to capture field data and a relational database to maintain and make it available for analysis. The database is generated automatically from the form; so is the data transfer from the form to the database. This is made possible by (a) marking up the form using the Extended Markup Language (XML) and (b) re-using the Logbook software (Muraya & Garlik 2001).

Quefax was designed to cope with the complexity of data management encountered in the Sub-Saharan Africa Challenge Program (SSA CP). In this program data were collected at multiple levels: plot for biophysical measurements, household and village for socio-economic conditions. The data collection instruments were collaboratively designed by a team of close to 100 scientists of different disciplines, spread out throughout Africa and not all of whom had good internet connection. A key requirement for this program was that data collected for the baseline conditions, for monitoring and evaluation and for assessing impact at the end of the study must be all so managed that was analyzable as a consistent set. Furthermore the data management system needed to accommodate data, outside of the common variables, that were unique to some regions.

Against this backdrop we needed a system that ensured that the collected data would be:-

(a) of good **Qu**ality
(b) Processed **Ef**ficiency
(c) **Acc**essible and understandable all the time
(d) Documented as far as possible

This manual documents Quefax in 3 parts. The targets for part 1 are the data enumerators who are responsible for data collection, entry and cleaning; part 2 is for the scientists who have to pre-process the data prior to the formal analysis; and part 3 is for the data managers who need to have enough database skills to setup Quefax and support both the enumerators and users.

2. Part 1: Data Operators

This section for data operators is organized to follow the data life cycle as illustrated in Figure 1

Figure 1: Data Life Cycle

The style used is to present as much instructions as needed by someone to operate Quefax after it has been properly setup. All Quefax installation details are referred to part 3 for data managers.

The last stage, data archiving, is not covered in this manual. Quefax was designed to ensure that the metadata needed for accessing and understanding the data in the long-term are captured during the preceding stages, i.e., not when the project ends.

1.1 Data Planning

Setting up Quefax is the work of data managers, and is covered in part 3. For data operators, planning to use Quefax means simply identifying computers on which Quefax has been installed, and being able to access the data management tools. There are two signs to look out for:

(i) The Logbook sub-menu in the Windows Start/All programs menu and

(ii) The Quefax folder which should organized as illustrated in Figure 2.

Figure 2: Folder structure of a Quefax Installation

Check with your data manager absolute location where Quefax is installed; in this manual were will refer to this folder as <Quefax>

1.2 Data Acquisition

You are ready for data acquisition if you have identified a Quefax computer (i.e. one in which Quefax has been installed successfully); then take the following steps

(i) Create a new dataset folder or select an existing one.

(ii) Create or select a data entry template for dataset
(iii) Use the template to create an electronic form (i.e. e-form)
(iv) Enter the data using the e-form
(v) Save the filled-in e-form

The first 2 steps -- creating data entry templates and dataset folders – are covered in part 3; here we use the sample datasets to illustrate the last 3 steps.

a) Select the dataset if you have one. If not, select the one named "Conservation agriculture" in folder <Quefax>\Sample datasets\Conservation agriculture household survey. Generally this folder will be called the <dataset folder>
b) In the Work sub-folder open the word document template named Household survey.dotx
c) Double-click on the template to create a new document (Do NOT right click to open it as this will modify/edit the template instead of cloning it). The new document is called e-form.
d) Transfer the data recorded on the printed paper to e-form. This step should be straight forward because the e-form should be identical to the hard copy equivalent – if the paper version was printed from the same template as the e-form. This means that there should be less data transcription errors than in alternative scenarios and the time to train data entry people (as well as the required computer operation skills) are minimal.
e) Save the e-form to <dataset folder>/e-form folder using a systematic naming pattern. In the SSA CP program we used <dataset name>xx.docx where xx was a unique number for each questionnaire. We found that using the same number on the hard copies was very helpful.

1.3 Data Maintenance

Data maintenance in a Quefax setup involves 3 activities.

i. Getting a database that match the dataset
ii. Updating the database using e-forms
iii. Cleaning the data

Each dataset has a database associated with it. Section 1.11 explains to data managers how to create one. In this section we assume you have access to an existing one. This may be one already created by the data manager for your project, or the one located in <Quefax>\sample datasets\conservation agriculture\work\household survey.mdb

Take the follow steps to update the database

a) Open the database
b) Call the Logbook
c) Use the Logbook to load the e-forms

Updating database
When the Logbook is called and an Access database is open, it will lock onto the database. If there are many open databases, it locks onto the first one – which may not be the one you want. So, make sure that there is only one copy of database running before you call the Logbook.

Logbook provides 2 methods of loading the e-forms: one e-form at a time or many e-forms in a batch. To load a single e-form, open it first; then click on Logbook's *Update database* menu, followed by the *Using current e-form* sub-menu.

The batch mode for updating the database requires the use of an Interface Workbook to specify a number of input parameters, one of them being the location of the e-forms. Section 1.12 explains how to modify the Interface Workbook for batch loading to fit your situation.

The default method for reporting errors is that the loading stops and the user respond to the error. This is called the attended mode of error reporting. The preferred mode for error reporting errors while loading e-forms is unattended, so that errors are instead logged into a file. Follow these steps for batch loading.

a) Get an Interface Workbook for batch loading your dataset
b) Set to unattended mode by clicking on the *File* menu, followed by the *Set unattended mo*de sub-menu.
c) Click on the *Update Db* menu, followed by the *Using current workbook* submenu.
d) Inspect the error log and, if there are errors, re-act to them. The error log file is in *C:\logbook_error_log.xml*. Its structure is documented in appendix 1.13

The use of e-forms is a structured means of updating the database; there are other less structured methods, such as adding new fields to the databases and capturing variables directly, capturing data in spreadsheets then uploading it, etc. Quefax defines this as more a role for the data manager than for the data operators.

Cleaning data
It is much easier to clean the data after it is loaded into the database than when it is in e-forms. To synchronize changes in the database with those on e-forms, Quefax uses the following steps to effect data cleaning.

i. Select the variables for cleaning. Section 1.5 covers this in more detail
ii. Use one of many approaches (visual inspection, data type consistency, range checks, graphical plots, etc) to detect errors
iii. Investigate their causes. The simple errors could be "tips of an iceberg"
iv. Retrieve the erroneous e-forms.
v. Correct them
vi. Update database using the corrected e-forms
vii. Suggest changes in field practices, questionnaire design, or Quefax system that could minimize chances of further occurrences of similar errors

1.4 Data Utilization

Quefax expects that data operators will have database querying skills, specifically the Structured Query Language (SQL). There are many tutorials available in the internet. In addition they will need to understand the model that was used to create the relational database used for data maintenance. The following sections of this manual will assume basic knowledge of relational databases, but it will cover in detail those aspects that are unique to Quefax.

3. Part II: Data Users

Data users are typically performing the following tasks:-.

i. Querying the database
ii. Presenting the results
iii. Exporting the results outside of the database to statistical software for formal analyses

1.5 Querying the Database

To use a Quefax database effectively you need to understand how structure of the database that is related to the structure of the template from which it was generated; then the template becomes useful for selecting data from the database. This section assumes that the user:-

- Knows what variables to select
- Can locate them easily on the template
- Has the Developer menu in Microsoft Word 2007 available
- Can use the query design view of Microsoft Access to select data

Understanding the Quefax data model

The general Quefax data model comprises of one parent table and 0, one or more child tables linked by a one-to-many relationship. This means that one record in the parent can be linked to many records in the child table, but one child table can only link to one parent table. For example, if the parent table is Country and the child table is Person, then a country can have many people, as expected. The one-to-many relation forbids dual nationality. In the SSA CP the primary tables derived from the major types of surveys conducted: Households, Villages, Traders, Plots and Innovation Platforms. For each primary table, there were as many child tables as there were in the questionnaire. It is during the process of creating a template, section 1.10, that the parent and child tables are marked. The names given to tables and fields in the database are read directly from the template.

Selecting data

The Quefax databases from the SSA CP work had many child tables, some of them with few fields, other with very many fields (See Table). You therefore need to focus on a few variables. Select them, one at a time; then join them for further presentation. This would be easy if the only a few tables and fields were concerned, otherwise you need a systematic way of navigating from the template to the database tables and fields. The procedure is as follows:-

i. Start from the template that was used to create the database
ii. Copy it, to create a working version, and open the copy
iii. Unprotect it, to allow changes to the template. See further help on how to do this in Word 2007.
iv. Find (and move to) the variable of interest
v. Use the XML panel of Word 2007 to get the names of the field and the associated table
vi. Use the names to query the database

Table 2: Structure of the a complex questionnaire

Tables of the Household Questionnaire in the SSA CP		
Title of the Table	**Table Name**	**No. of fields**
*****Household Baseline Survey**	household	53
Marketing strategies and linkage with agricultural traders	strategies	18
Land Holding in Hectares / Acres	acreage	13
Sale of Livestock products	products	12
Most recent interactions	interactions	12
Use of soil conservation and other land management options	agriculture	11
Use of Post Harvest Technologies	harvest	11
How many livestock does this household own now?	livestock	11
Saleof Livestock	sales	10
If yes, which groups and what are their main activities?	activities	10
Equipment	equipment	10
Evaluation of Existing interactions and approaches:	evaluation	10
General access to inputs	inputs	10
If Yes, who provided the training, what was the topic and how would you rate it? (up to a maximum of 5)	training	9
What are your priority sources of income and what is the income estimate from these sources for the last 12 months?	income	9
Constraints to marketing	market	8
If yes, which were the months in the last 12 months that you did not have enough food to meet your family's needs?	food	8
What kinds of assistance or information were requested? Tick where appropriate	assistance	8
Household Food Security	foodsecurity	7
Household dietary diversity	dietary	7
Access to credit	credit	7
WELFARE INDICATORS	indicators	7
Collective Marketing and other group activities	marketing	7
Access to market information	access	7
Interactions with other farmers and farmer groups	farmers	6
Coping with food shortages	mechanisms	6
If yes, complete the following table	participation	5

Getting field and table names

In the template the names of tables and fields are captured in XML attributes. Use the following steps to find the table and field names for a selected variable.

(a) On the template point to the title of the variable of interest

Table 3: Identifying raw data in the questionnaire

This is one of the variables required for output. How do you locate it in the database?

1 2 3 4 5

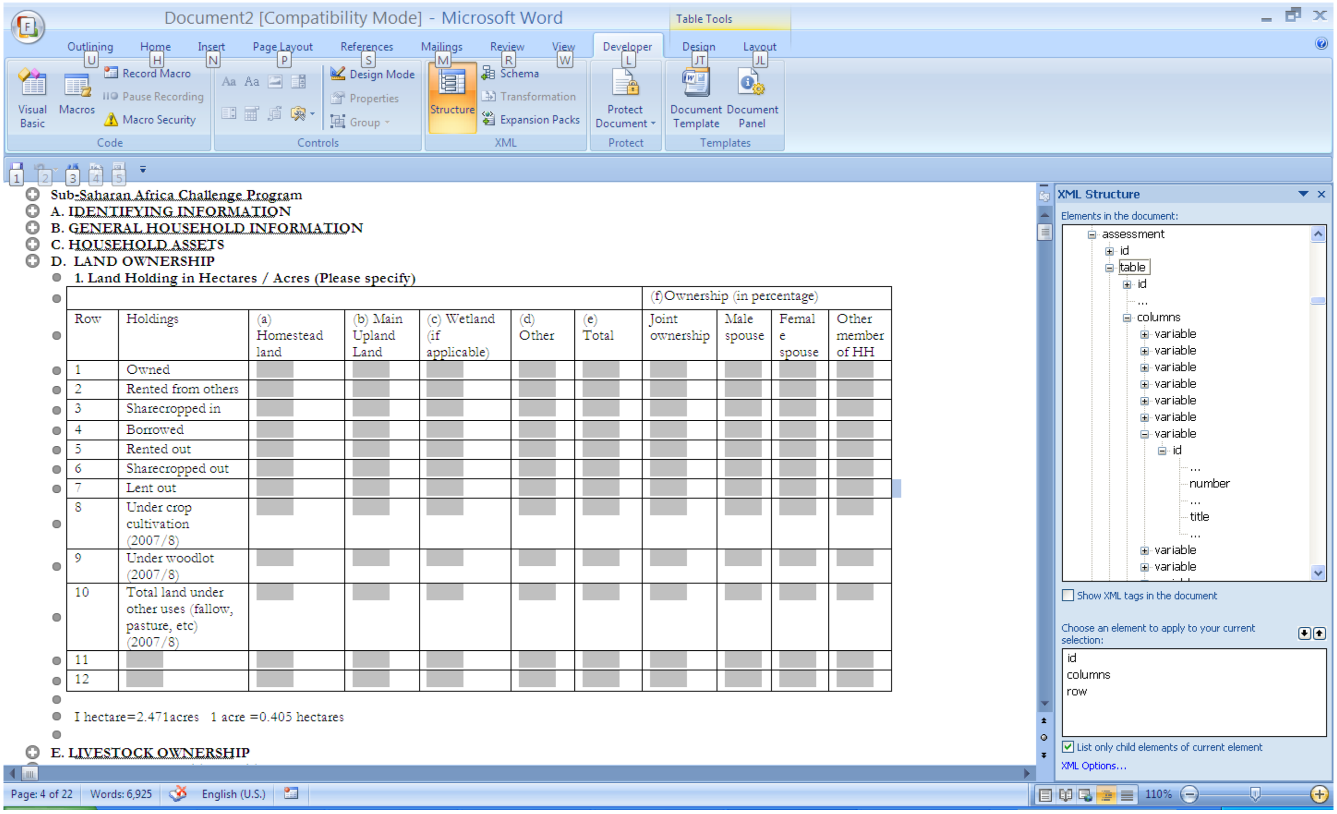
- Sub-Saharan Africa Challenge Program
- A. IDENTIFYING INFORMATION
- B. GENERAL HOUSEHOLD INFORMATION
- C. HOUSEHOLD ASSETS
- D. LAND OWNERSHIP
  - 1. Land Holding in Hectares / Acres (Please specify)

							Ownership (in percentage)			
Row	Holdings	(a) Homestead land	(b) Main Upland Land	(c) Wetland (if applicable)	(d) Other	(e) Total	Joint ownership	Male spouse	Female spouse	Other member of HH
1	Owned									
2	Rented from others									
3	Sharecropped in									
4	Borrowed									
5	Rented out									
6	Sharecropped out									
7	Lent out									
8	Under crop cultivation (2007/8)									
9	Under woodlot (2007/8)									
10	Total land under other uses (fallow, pasture, etc) (2007/8)									
11										
12										

  - I hectare=2.471acres 1 acre =0.405 hectares
- E. LIVESTOCK OWNERSHIP
- F. USE OF AGRICULTURAL TECHNOLOGIES
- G. GENERAL CROP AND LIVESTOCK PRODUCTION
- H. MARKETING OF AGRICULTURAL PRODUCE
- (I) ACCESS TO CREDIT SERVICES, INFORMATION, EXTENSION, AND TRAINING
- J. WELFARE INDICATORS

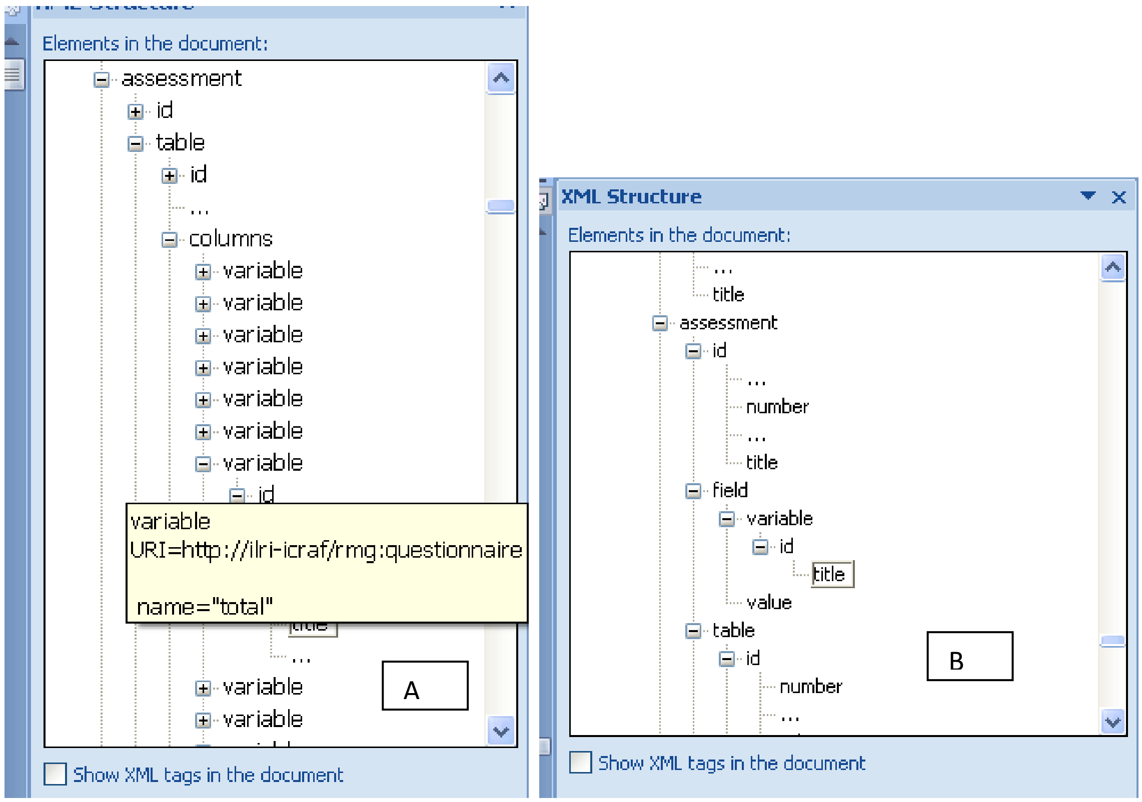
(b) On the *Developer* tab, click on *Structure* in the *XML* group to open the *XLML structure* pane. Click on the desired variable i.e. Total Note that the *title* element in the *XML structure* pane is marked.

Table 4: Switch on the XML pane to show the XML structure of the questionnaire



(c) Move up the tree structure to locate the *Variable* element that is a parent of the *title* element. Point to the variable to reveal the *name* attribute

Table 5: Accessing the *name* attribute of a *variable* element. XML pane A shows a variable that is part of a child table. B shows a variable that is part of the parent table. Note that the immediate parent node for a child table variable is the *columns* element. That of a parent table is the *field* element.



(d) Find the table names

Find the table name associated with a variable depending on whether the associated table is the parent table, or one of the child tables. For a child table, get the parent element of *columns*. It should be a *table* element. Pointing to it will reveal the *name* attribute.

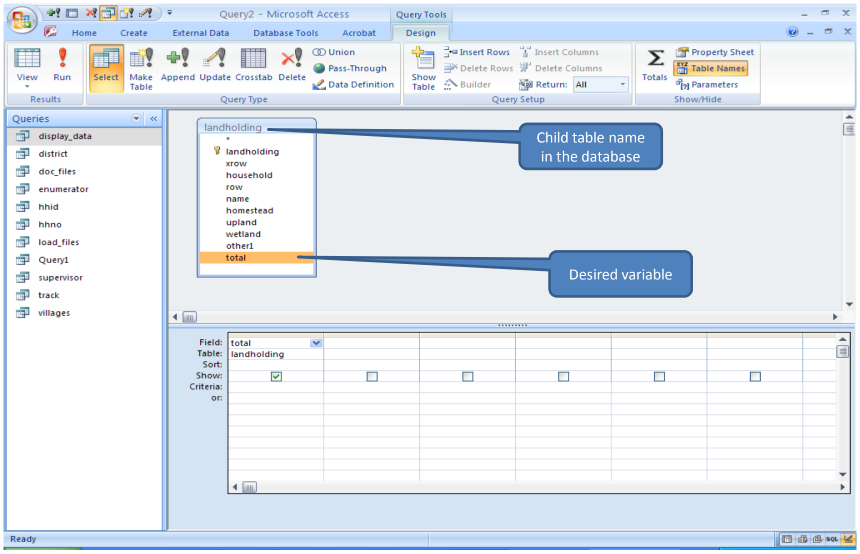
For a parent table, go to the root node of the document. It is the *questionnaire* element. You reveal the name by pointing to the element.

Querying the database

Once the field and table names of the desired variable are known, you query the database following these general steps.

1) Open the database
2) Create a query
3) In the query design view, add the named table
4) From the table, select the named field

Basic database querying steps



Other variables under the landholding can be added to the grid below as required. You then need to switch to the Datasheet View to checks on the results as recorded in the database. The criteria row is used to set conditions to for summaries, totals, sorts etc.
In some cases some variables need to be converted from text to numeric for further computations. To do the conversion, under criteria type the following expression.

```
IIf(IsNumeric([landholding.total]),Val([landholding.total]),Null)
```

This will convert all entries under variable name **total** in the **landholding** table returning a blank if there is no entry.

1.6 Presenting Data

1.7 Exporting Data

Using Open Database Connectivity (ODBC)

ODBC is a widely accepted application programming interface (API) for database access and uses Structured Query Language (SQL) as its database access language.To set up ODBC on your access database:

1. Click the **Start** menu, point to **Settings**, and click **Control Panel**. Then Administrative Tools" to find Data Sources (ODBC)

2. You'll probably find that the dialogue defaults to "**User DSN**". Make sure that you select the "**System DSN**" tab and click "Add".

3. Select the **Microsoft Access Driver,** and click **Finish.**
4. In the **ODBC Microsoft Access Setup** dialog box, give an appropriate name for the **Data Source Name**.
5. Navigate to the database provided by the ASP Web Wizard 2000 on your hard disk , select then click **OK.**

Setting up an ODBC connection to your database

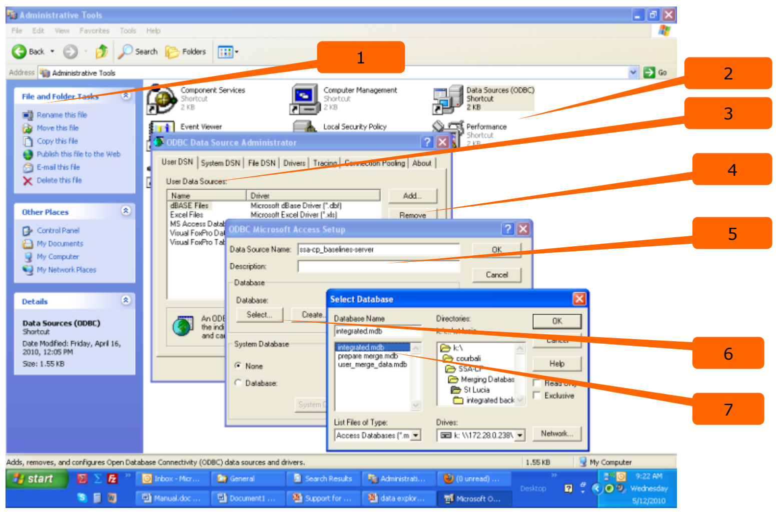


Figure: Sequential steps involved in setting up ODBC

4. Part III: Data Managers

This part is for data managers, i.e., people who have to setup and support the Quefax system. After reading it, the data managers should be able to:-

a) Prepare a new computer to work with Quefax
b) Create Quefax datasets
c) Create new Templates
d) Create new Quefax databases
e) Creating Interface Workbooks for controlling Quefax behavior
f) Archive datasets

1.8 Create a new Quefax compatible computer

Creating a Quefax compatible computer means 2 things: (i) update your computer so that (ii) Quefax can install properly.

Updating Computer

Quefax has been tested on a computer that has the following settings:-

- Microsoft Windows XP Professional, with Service Pack 2
- Microsoft Office 2003 and 2007

Use the *Control* panel to check your Windows settings. Figure 3 shows a typical result. You may need to update your computer if your settings are different.

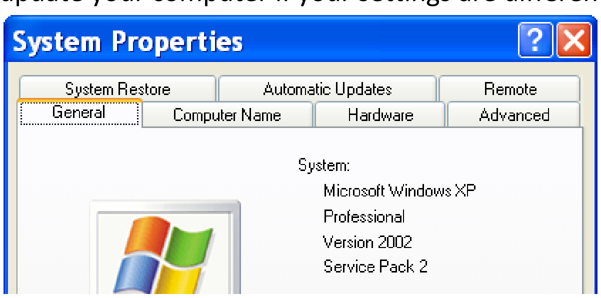
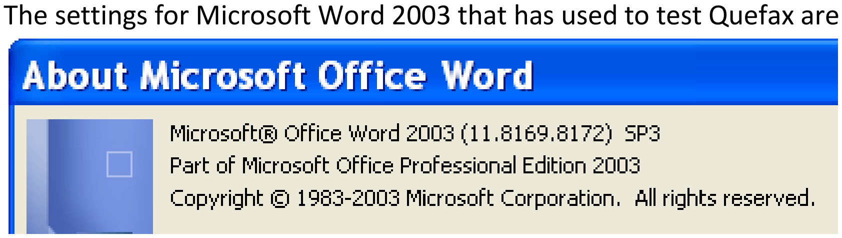


Figure 3: Windows Settings

From the **Start/All programs** menu click **Windows Update**. Then follow the wizards that follow.

The settings for Microsoft Word 2003 that has used to test Quefax are shown in the following figure.



Quefax was also runs in the Office 2007; the detailed steps and menus in this documentation refer more to this version than Office 2003.

Install Quefax

Quefax is available as single zip file from ICRAF's ftp site at
ftp://www.worldagroforestry.org/anonymous/ResearchMethodsGroup/SSA CP/Quefax.zip

Download to your computer; then install it using the following steps.

1) Unzip the download to a folder called Quefax
2) Setup the Logbook processor
3) Add XML schema to Microsoft Word to the Schema Library

Setting up Logbook processor

Unzipping the Quefax.zip creates a folder structure that is similar to Figure 2. To start the Logbook setup, go to the Logbook subfolder and run the setup program. Then follow the wizards to the end. Most setup problems are solved by updating your Windows system

Adding Quefax schemas to the Schema Library

Quefax has one schema called questionnaire.xsd that is used for turning word forms into data entry templates. To be useful, you need to add it to the Schema library.

To add Schemas to the Schema Library, do the following:

1) On the **Developer** tab, in the **XML** group, click **Schema**.

NOTE To display the **Developer** tab, do the following: Click the **Microsoft Office Button** , and then click **Word Options**. Click **Popular**, and then under **Top options for working with Word**, select the **Show Developer tab in the Ribbon** check box.

2) Click **Add Schema**, browse to the **Quefax/templates/questionnaire.xsd** file, and then click **Open**.

3) In the **Schema Settings** dialog box, select the options that you want, and type a name, say **questionnaire**, for the Schema in the **Alias** box.

NOTE The name that you type for the alias appears in the list of available Schemas in the **Templates and Add-ins** dialog box.

4) Click **OK** to finish.

1.9 Create a new Dataset folder

Quefax defines a dataset as all those files that are based on the same form document. The structure of a dataset folder has two sub-folders: *e-forms* and *work*. The *e-forms* folder is used for saving electronic forms after they are filled in with data. The *work* folder is used for holding all other working files associated with the dataset. The starting form document should be copied to this folder

1.10 Create a new Template

Templates are very central to Quefax. To create a new one, from an existing document, do the following:-

i. Insert Form Fields
ii. Add XML tags
iii. Add the attribute names
iv. Update file properties
v. Protect the document and save it

Insert Form Fields

Form fields allow data entry on electronic forms. Starting from an existing document (see *<Quefax>/sample datasets/registration for participants.do*c) do the following:-

Double click on each line (needed for writing responses on the paper form) to select it and replace it with a form field. How?

a. Select *Developer* tab.
b. From the Controls group click on *Legacy Tools.*
c. From *Legacy forms* select *Text Form Field.*

The samples in Box 1 and 2 show the sample document before and after inserting the Text Form Fields.

Form No. 1: Registration for Workshop Participants

1. Name: ________________________________

2. Contact address: __________________________

3. E-mail: _______________________________

4. What is your current position? ____________________________

5. What is your relationship to the SSA CP? ___________________________

6. How familiar are you with MS Access? 1=Not familiar, 2=Familiar, 3=Very familiar

Box 1: Document before inserting Text Form Fields

Form No. 1: Registration for Workshop Participants
1. Name:
2. Contact address:
3. E-mail:
4. What is your current position?
5. What is your relationship to the SSA CP?
6. How familiar are you with MS Access? 1=Not familiar, 2=Familiar, 3=Very familiar

Box 2: Document after replacing response markers with Text Form Fields

Microsoft Word has many controls: drop down list boxes, combo boxes, radio buttons etc, but the present version of Quefax works only with the simple Text Form Field. This is because we found it difficult to extract data captured by controls, other than Text Form Field, after we convert the Word document into an XML document.

Add XML Tags

The Quefax XML tags are used for carrying the data that is needed for (a) generating a relational database and (b) supporting the transfer of data from a filled in e-form to the database

Before you can add the Quefax XML tags, you first attach **questionnaire** schema, then use it to add the tags to the document

Attach a Schema to a document

After there are Schemas in the Schema Library, you can attach a Schema to a document.

1. Open your document in Word.
2. On the **Developer** tab, in the **XML** group, click **Schema**.
3. In the **Checked schemas are currently attached** box, select the check box for Questionnaire schema.

Add XML tags

1. In your document, highlight the content that you want to tag.

   You can select a word, phrase, paragraph, cell, row, column, field, picture, or object in the document.

2. In the **XML Structure** task pane, in the **Choose an element to apply to your current selection** list, select an element.

   NOTE To limit your choices of elements and attributes, select the **List only child elements of current element** check box.

3. If necessary, specify an attribute for the element.

⊟ How?

   a. In the **XML Structure** task pane, under **Elements in the document**, right-click the element, and then click **Attributes**.

   b. In the **Available attributes** list, select the attribute that you want.

   c. In the **Value** box, type the value of the attribute.

   d. Click **Add**.

A formal description of Quefax XML elements is covered in Appendix 1.13

Add the attribute names

To add the attribute for the variables you right click on it and select **attributes**.You are prompted with a attributes for variable dialog box, then type in the appropriate name and add. This names will be translated into the tables field name in the Quefax databse; hence basic rules for naming conventions should be adhered to which include;

1. Avoid the use of upper case.
2. Avoid using spaces between two or more names.
3. Use short names (in most cases at most eight characters).
4. Do not use symbols such as %, &, #, '', etc.
5. Use names that summarize the whole variable.

Update File Properties

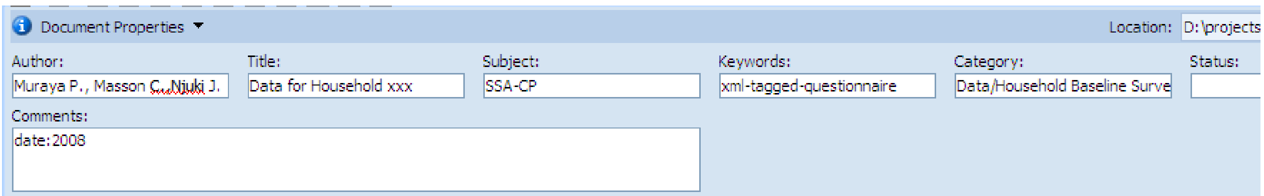
File properties are useful for data management if used in a structured way. Quefax use them for (a) systematizing filenames for e-forms, (b) grouping related data and (c) indicating to the Logbook processor if a document is an e-form or not. To use them, you first need to access them, then to modify them appropriately.

Accessing file properties

To access the file properties before a Word 2007 document is saved do the following

1. Click the **Microsoft Office Button** , point to **Prepare**, and then click **Properties**.

2. In the **Document Information Panel**, type the information that you want in each of the property field boxes. See the example below.



Modifying file properties

The following table shows how Quefax uses the standard file properties

Name of file property	Quefax uses it for…	Example
Title	Systematizing file names for e-forms based on this template. When a document from this template is saved, the **Save As** dialog box prompts the user with the Title. You complete the file name by specifying values in the space marked **xx**x	Household xxx
Subject	Grouping all e-forms of the same project together. Choose a short code as a unique project identifier	SSA CP
Author	Linking back to the person who can provide further data about the Template. Start with surname, followed by initials and use the comma as a separator for multiple authors.	Masson C., Njuki J.
Category	Indicating that the e-form contains data of the described type	Data/household survey
Keyword	Indicating that the document is an electronic form with xml markers already added	xml-tagged-questionnaire
Comments	Capturing other properties, using the following syntax:- *<property1>:<item11>, <item12; <property2>:<item21>,<item22>* Where <property> refers to the x'th property name. A property can be associated with more than one value; <itemxj> refers to the j'th one. The comma is used for separating out the items for a property, and a semicolon is used between properties.	Year:2008; location:Kivu

Filling in file properties is important for data archiving. The metadata captured in these properties are useful for building catalogs for searching data in a large archive.

Protect & Save Document

If you want users to be able to edit the data in an XML document without editing or deleting the XML tags, you can use the document protection feature to make only the content of the XML elements available for editing, and not the tags themselves.

1. In the **XML Structure** task pane, select the **Show XML tags in the document** check box.

2. On the **Developer** tab, in the **Protect** group, click **Protect Document** and select **Restrict Formatting and Editing.**

3. In the **Protect Document** task pane, select the **Allow only this type of editing in the document** check box, and then select **Filling in forms**.

4. Click **Yes, Start Enforcing Protection**.

5. To assign a password to help prevent the accidental removal of the document protection, type a password in the **Enter new password (optional)** box, and then confirm the password.

After the form document is protected, you save it as a template, in the *<dataset>/template* folder, where <dataset> is the name you selected for the dataset based on this form.

1.11 Create a new Database

Use the following steps to create a Quefax compliant database:-

1. Get a Quefax database template.
2. Load database schema
3. Generate database tables

Get a Quefax database template

The database template has pre-installed tables and queries that are important for supporting the creation of a Quefax compliant database. They are normally hidden from the user to prevent accidental deletion. This is one of the templates copied to your computer after a successful installation of Quefax. You need to copy it from **<Quefax>\templates\startup database.mdb** to your **<dataset folder>\work** folder. We recommend that you give it the same name as your dataset (and of course the .mdb extension). The current version of Quefax does not work with newer .accdb files.

Load database schema

This step uses the XML tags in the newly constructed form template and populates the database with the data for adding new tables. To execute it, take the following steps:-

1. Open the database
2. Open the form template
3. Call the Logbook Assistant
4. Click the **UpdateDB** menu
5. Click the **Using schema in current e-form** menu

Generate tables

Once the database schema has been read, the next task is to use it to generate the necessary tables and their relationships. With the Logbook Assistant still locked to the database, do the following.

1. Click on the **Efficiency** menu
2. Click on **Create tables from uploaded schema** menu
3. After the Logbook Assistant returns with an Ok message, close it
4. Press F5 function key to refresh the Tables window in MS Access.

After the last step, you should see the newly added tables. To see the relationships between the parent and child tables in MS Access do the following.

1. Click on the **Design** Tab
2. In the **Relationships** group click **All Relationships**

You should now see a result similar to figure

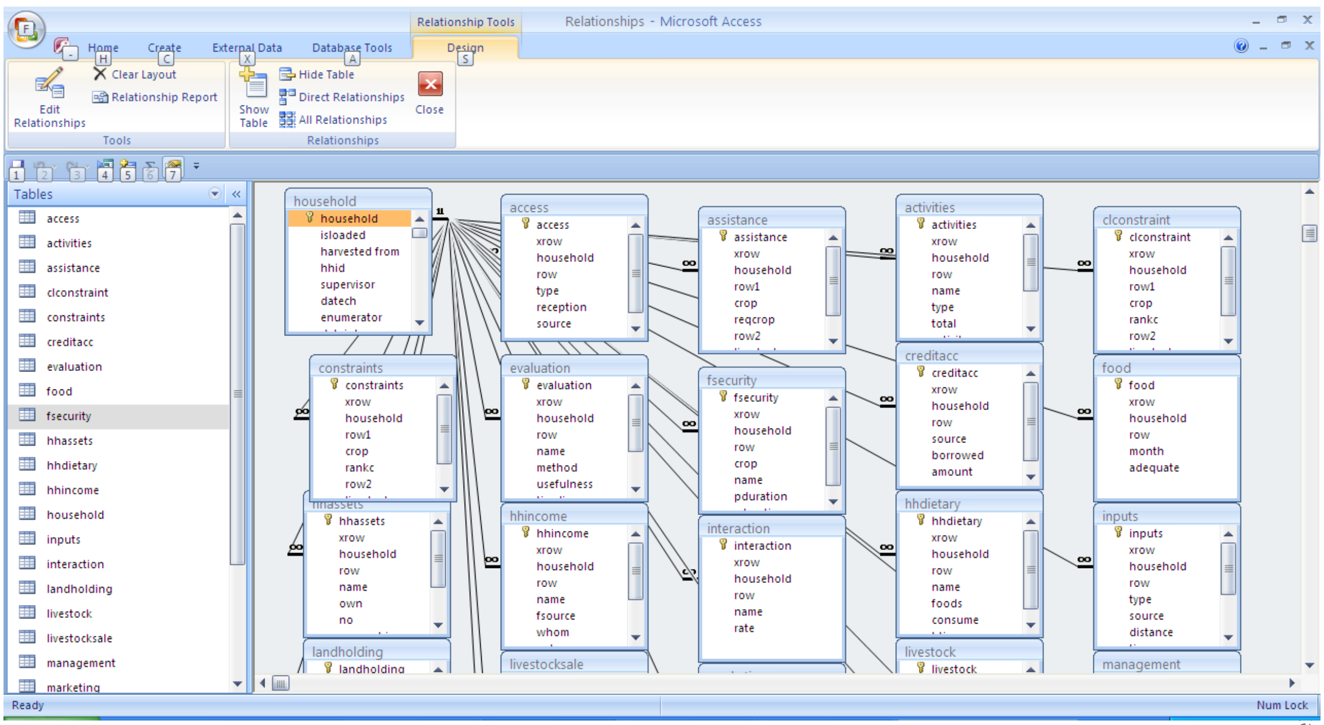


Figure 4: Tables and their relationships generated automatically from e-forms. Household is the parent table. The others are child tables.

1.12 Modify the Interface Workbook for Batch Loading

An interface workbook is an Excel Workbook that is used to provide the Logbook Assistant with different parameter values to control its behavior. For instance, there are 2 parameters that need to be modified to suit your conditions for loading e-forms in a batch

(a) The physical locations of your e-forms

(b) The password used for protesting the original template

To do these modifications, do the following.

1. Copy **<Quefax>/templates/Batch loading of e-forms.xls** file to your working directory, say **<dataset folder>/work**
2. Go to the **Data source** sheet
3. Type the path to the location for e-forms. The most preferred way is to copy and paste under **root_name** the full path from the Address bar; this is likely to reduce incidence of making errors.

Note: If the e-forms are located in more than one folder, use this sheet to specify as many of them as you need. Enter **yes** in the **root_isvalid** column for all those folders with data to be uploaded otherwise enter **no** in the same column for all any sub-folders that don't contain e-forms of interest(not for uploading).

4. Go to the **Options** sheet
5. Enter the password that was used for protecting the e-forms in the indicated cell.

Note: The Logbook Assistant needs the password for unlocking the e-forms; otherwise it cannot access the XML tags (when it needs them)

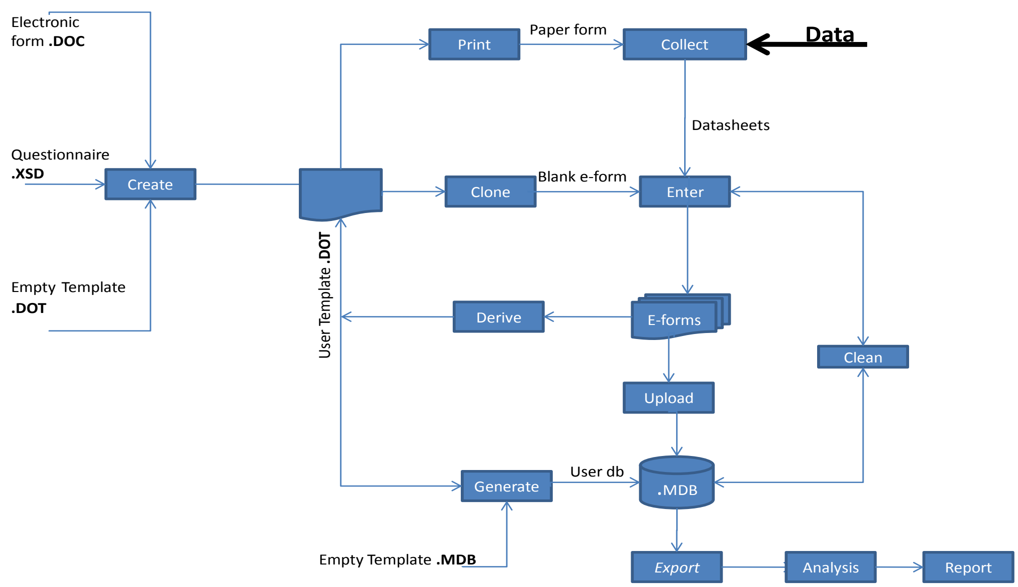
The rest of the worksheets should not be modified.

5. References

6. Appendices

1.13 Quefax Optimization System

The Quefax Optimization System SSA-CP



Figure

1.14 Quefax Questionnaire Schema

The Quefax XML elements and their relationships are shown in Figure 5

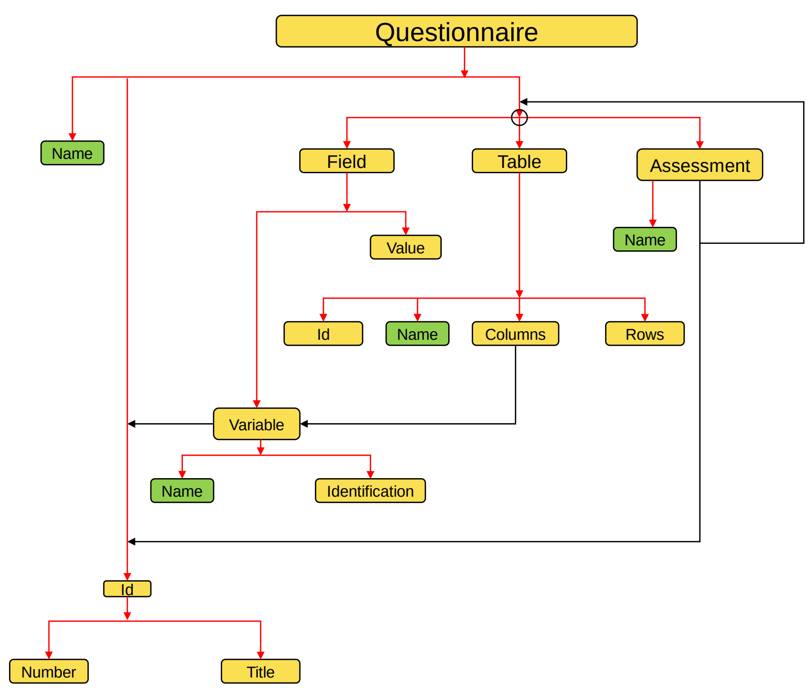


Figure 5: Quefax XML elements. The green shaded boxes represent important attributes

The following table shows the relationship between the structure of the database (as described in section 1.5) and that of the Quefax XML elements

XML Element	Parent elements	Child elements	Purpose and Attributes
Assessment	Questionnaire	Assessment, Table, Field	This element is useful for extracting the hierarchical structure of a form into a Quefax database.
Columns	Table	One or more variables	Container for variables that for the field names of a child table.
Field	Questionnaire	Both of the Variable, Value	Container for a variable and its value
Id	Questionnaire, Table, Variable, Assessment	Number, Title	Contains numberings and associated texts that are used for describing various database components
Number	Id		Container for text used for numbering questions on a form
Questionnaire	This is the root element of the Quefax schema	One of the following Field, Table, Assessment, Variable occurs one or more times	Attribute Name: corresponds the name of the parent database table
Table	Questionnaire	Id, Columns, Row	Corresponds to a child table Name attribute: corresponds to the name of child table
Title	Id		Container of text used for describing database elements
Value	Field		
Variable	Field, Table	Id	Name (required): Corresponds to the name of a field. If the parent is Questionnaire, then this is the name of a field in the parent table; if it is Table, then it's the name of a child table. Type: data type of the field. Possible values are **text**, **memo** and **numeric**. Text fields have a length of 255 characters. The memo type is used when the length exceeds this value Fixed: means that the values associated with

	the variable are not entered by the user, rather they are part of the e-form. This is useful for determining truly empty records

1.15 The Structure of the Logbook Error Log

The Logbook Error log file is an XML document with a root node called **report.** See the example below.

```
- <report>
  - <file name="e-form1.doc" counter="1">
      <populate>0.9375</populate>
    </file>
  - <file name="e-form2.doc" counter="2">
      <error>Check for duplicate record in table upath</error>
      <error>Error #: 3281 Generated by: DAO.TableDefs Description:Cannot delete this index or table. It is e
        relationship.</error>
      <error>Check for duplicate record in table table</error>
      <error>Error #: 3078 Generated by: DAO.Database Description:The Microsoft Jet database engine cann
        exists and that its name is spelled correctly.</error>
      <error>Error #: 3078 Generated by: DAO.Database Description:The Microsoft Jet database engine cann
        exists and that its name is spelled correctly.</error>
      <error>Label 'plot_date' at row '1' col '2' of the 'horizontals' label region is not known</error>
      <populate>10.98047</populate>
    </file>
  </report>
```

Figure 6: The structure of the Logbook Error Log File

There is only one child node, called **file**, under report that occurs one or more times. In the context of batch loading, there will be as many occurrences of the **file** as there are e-forms being uploaded. The file node has two attributes: one showing the full path of the e-form being uploaded, the other is a sequential counter used for monitoring progress.

file has two child nodes: **populate** and **error**. The contents of **populate** is the time it takes to upload an e-form. This information was used monitor Quefax performance during development.

The **error** node is more important for data managers; its content is the reported error message for further follow up.

If the batch loading completes successfully, the error log is a well-formed document. However, if the process is stopped forcefully, for example, using the Windows Task manager, some nodes may not be closed properly. You may need to use Notepad to insert the missing closing tags.