STATA 14 - SAMPLE SESSION

Cross-Sectional Analysis

Short Course Training Materials
Designing Policy Relevant Research and
Data Processing and Analysis with STATA 14 for Windows*
1st Edition

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Components of the Cross-Sectional Training Materials

Section 0 - Introduction to the Window structures for STATA 14. (Stata Review, Results, Command, Variables and Properties Windows as well as the Do-File Editor). This section must be read before starting the sample session.

Section 1 - Basic functions

Section 2 - Table Lookup & Aggregation

Section 3 - Tables & Multiple Response Questions and Other Useful Commands

Section 4 - Graphs, tables, publications and presentations, how to bring them into word processor, and use of Survey commands.

Annexes

I - Frequently used Stata commands.

II - Several pages from the socio-economic survey of the smallholder survey in the Province of Nampula, Mozambique (NDAE Working Paper 3, 1992).

References to papers discussions levels of data

On the Food Security Group web site at MSU there are several survey research training materials which you might find helpful. The website is http://fsg.afre.msu.edu/index.htm. The Survey Research Training Materials link can be found by scrolling down to the end of the page.

There are two papers that discuss levels of data, which is an important concept to understand when working with survey data to handle the data properly:

1) Computer analysis of survey data – File organization for multi-level data by Chris Wolf, MSU Department of Agricultural Economics. This document can be downloaded as a separate document in English or French
2) Data Preparation and Analysis by Margaret Beaver and Rick Bernsten. June 2009. (CDIE reference number pending)

Another article of interest which contains guidelines to manage the data, data verification techniques and preparation of data for analysis is:

Survey Data Cleaning Guidelines: (SPSS and Stata). 1st Edition. Margaret Beaver. MSU International Development Working Paper 123. April 2012.

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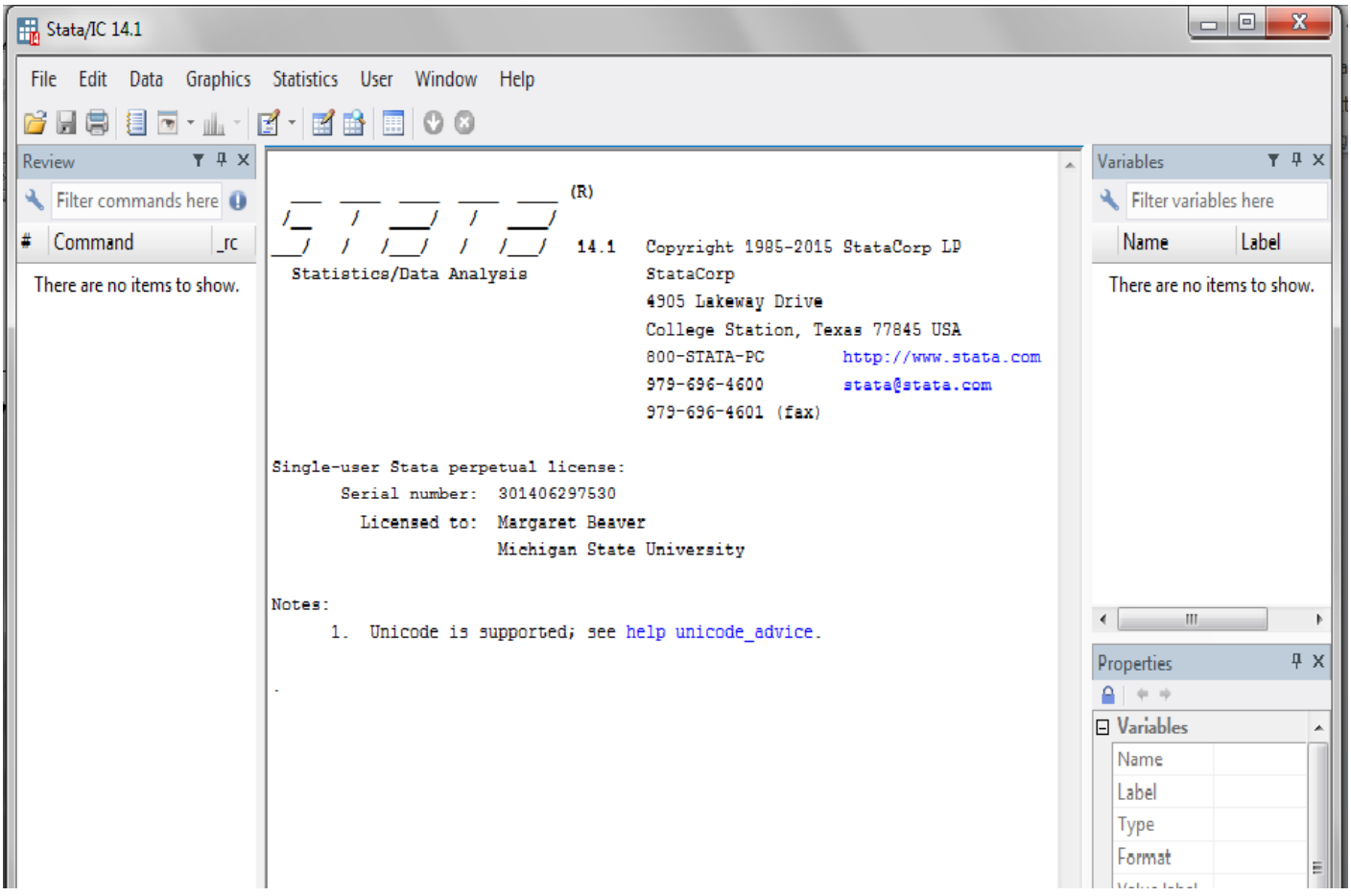
Stata 14 - SAMPLE SESSION
SECTION 0 - File structure and Basic Operations

This section introduces the basic concept of levels of data, the notion of cross-sectional analysis, and consequently, the methods of data organization. A brief description of the file structure of Stata is discussed. It is essential that you read through this section before starting the cross sectional tutorial.

Overview

When you open Stata 14 for the first time, you will see five different windows within the main program —

- the Results window in the center (results of a command are displayed in this window),
- the Review window on the left (commands submitted to the processor appear in this window),
- the Variables window on the right (the list of variable names in the data set that has been opened appear here)
- the Properties window on the bottom right (where the properties of the selected variable and the data file can be viewed).and
- the Command window (where commands can be typed). This is the "active" window at startup. The cursor is located in this window.



Other windows are available, but are not opened at startup. These windows are:

- Viewer (used to view help files and log files, SMCL - markup and control language- files, and print log and other files. This window is not contained in the STATA 14 program window but stands alone and appears on the task bar as another icon.)
- Data Editor (where you can view the data you have loaded into the program's memory)
- Do-file Editor (text editor where you can build a "do" file, a file that contains commands that Stata can execute. This window is not contained in the STATA 14 window but stands alone and appears on the task bar as another icon.)
- Graph window (only appears if the graph command is run).

Note the tool bar at the top under the menus which provides shortcuts to options in the Menus that are most commonly used.

You can switch between the windows within Stata by using the **Window** choice from the **Menu**. Note that shortcuts are also listed, e.g. to switch to the Variables window, press <Ctrl> 4, to switch back to the Command window press <Ctrl>1.

Version 14 of Stata provides menus to help the user. However, the user can also type all the commands in the Command window. Throughout this tutorial, if the action desired can be done using the menus, directions will be given on how to use the menus. The Stata command that will do the same action will also be given so that you become familiar with the commands. Stata provides a mechanism to paste commands into a do file that you can then execute. You can send commands that appear in the Review window to the Do-file editor by using the mouse (<Right Click> and choose Send to Do file Editor). Another method is to copy commands from the Command window and paste them into the Do-file editor. The <Right Click> using the mouse will show different menus depending on which window is active.

How Stata uses memory:

A data file must be loaded into memory before any analysis can be done. Allocation of memory is now automatic and no longer a major concern to the user. If you are interested in how much memory is available, use the following command:

```
memory
```

```
. memory

  Memory usage
                                          used                allocated
    ------------------------------------------------------------------
    data                                     0               33,554,432
    strLs                                    0                        0
    ------------------------------------------------------------------
    data & strLs                             0               33,554,432

    ------------------------------------------------------------------
    data & strLs                             0               33,554,432
    var. names, %fmts, ...                   2                   64,600
    overhead                         1,064,960                1,065,356

    Stata matrices                           0                        0
    ado-files                                0                        0
    stored results                           0                        0

    Mata matrices                            0                        0
    Mata functions                           0                        0

    set maxvar usage                 2,143,936                2,143,936

    other                                1,643                    1,643
    ------------------------------------------------------------------
    grand total                      3,209,029               36,829,967
--more--
```

Compress

Since the data file that you are working with is loaded into memory, it is good practice to run the compress command occasionally to reduce the amount of memory that is being used. Stata will examine the variables and change the type to another type that uses less memory if it will not affect a loss of precision.

```
compress
```

:

If you wish to compress specific variables just include the variable name in the command. This command is available using the menus. From the **Menu**:

Select **Data**, then **Data utilities**. then

Optimize variable storage

A dialog box opens where you can select the variables to compress, choose to exclude the long string variables, or just click on OK to compress the whole file. The command is:

```
compress varlist
```

Stata comes in different flavors: Stata MP / Stata SE / Stata IC and Small Stata. With Stata IC we are limited to the use of 2048 variables. For the MP and SE flavors, you can increase the number of variables that can be used. Read the documentation to understand more.

Types of files used by Stata and their extension names

1. Data files

Data files have an extension of .dta .

- files containing data (Extension *.dta)

NOTE: The format of the data files used by Stata 13 and later versions has changed. Stata 14 can read files created in earlier versions. However, since there is a new format for strings that allows very large strings (greater than 244 characters), if you want to save a data file so that it can be read into an older version, you must use the "saveold" command.

To open a file:

From the **Menu**:

Select **File**, then **Open**.

If you are not in the directory where your files are, change to the appropriate directory. Only files with an extension name of ".dta" will be listed.

You can also select the icon on the GUI bar -  . Only one file can be open at a time. If another file is in memory, Stata will not permit a new file to be opened and will give an error message. To open another data file, the subcommand "clear" must be included in the command. From the Command window (if you are working in the correct directory), you can type:

```
use "name of file", clear
```

2. Log files

Stata can record a copy of the commands and the output from the commands in a "log" file. If you wish to record this information in a file, you must turn on the log. There are two types of logs, log files and cmdlog files. The log files can have 3 different types of extension names - .SMCL, .log and .txt as described below:

- commands and output (Extension *.SMCL)
  Stata markup and control language
- commands and output (Extension *.log)
- ASCII text: commands only (Extension *.txt)

1. **Log:** The first type of log records everything that you submit for execution and all the output resulting from the commands. You can specify one of two formats, either SMCL or ASCII text (log)

From the Menu: Select **File**, then **Log**, then **Begin**. You are prompted for a file name. The default extension is SMCL. The file is formatted in the Stata markup and control language. Type a name for the file and click on OK. If you prefer to record the information in ASCII text, then you would need to type the file extension of "**.log"**, e.g. session1.log.

The **log using** command

To start a log file, you can select the Menu options

From the **Menu**:
Select **File**, then **Log**, then **Begin**.

Stata asks for the name of the log file. You can change the folder where you want the log file by navigating to the folder you wish to use, then entering the name of the log file in the box next to "File Name:". Note that the default extension is .smcl

There is a GUI button on the tool bar – 4th icon from the left. 
You can click on that icon to start a log. You can also open a log by typing the command in the Command window:

```
log using session1, append
```

The .SMCL log file can only be opened in the Stata Viewer.

If you wish to create a log file that can be opened in any word processing program, then you must specify the extension name of .log . In the example below, a log file will be started with the extension name of .log:

```
log using session1, append text
```

The above command opens a file to record the session and uses ASCII format. This file can be opened in any text editor or word processor.

Stata has provided a translate command to convert .smcl log files to plain text. With this provision, you can always share your log file with others who might not have Stata. The command is:

```
translate session1.smcl session1.log
```

The **cmdlog using** command

The other type of log file records only the commands, not the output from the commands. The command is

```
cmdlog
```

This command creates a file that records only the commands.
In the Stata Command window, type:

```
cmdlog using session1, append
```

A file is opened which is named "session1.txt", and commands will be appended to anything that already exists in this file.

The **log close** command

To close the log, in the Command window, type

```
log close
```

Reminder: The log file that is written in SMCL format can only be opened in Stata. It is a specific format as mentioned earlier. If you want to share your commands and results from the log files with another person who might not have Stata, you can use the translate command to save the log file in the ASCII (text) format with the extension of .log. Any editor or word processor can open this file. However, in the word processor, the font must be set to a fixed font, such as Courier New. Otherwise, the output will be difficult to read.

3. Do files

A ".do" file contains commands that Stata can execute.

-Stata commands (Extension *.do)

The "do" file is created in the Do-file Editor. The user can type commands or paste commands into the editor. Other ways to create a do file are:

a) You can create a log file that contains only the commands, using the "cmdlog" command (see above).

b) You can select the Review window, click the right mouse button and select "Save All…". The extension .do will be automatically added to the file name you enter into the "File name" box.

c) You can copy the command to the clipboard, using the option provided in the dialog box where commands are built.  and then switch to the Do-file Editor to paste the command.

d) You can copy commands from the Results windows into the Do-file Editor using <**Ctrl C**> to copy what you have blocked in the Results window and then switching to the Do-file Editor and pressing <**Ctrl V**> to paste the command that was copied from the Results window.

e) In the Review window, if you <Right Click>, there is an option to Send to Do-file Editor. This option is only useful if you have not been building a do-file. Every time you Send to Do-file Editor a new do-file is created. This option will not send the commands to a do-file that is already open. You can select all the commands in the Review window and choose this option. A new do-file opens and the commands are copied to that do-file.

Adding comments to document commands in the do-file

Comments can be placed in the do-file as you copy and paste commands. Comments in a do file can start with an asterisk if the comment is one line. If the comment covers several lines use **/*** before the comment and end with ***/** so that STATA will not think the comments are commands.

You can also use a double slash - //. This option is useful if you want to add a comment after a command. Example of the various styles of comments are:

Single line comment
*** your name here and the date the file was created**

More than one line comment
/* do file to examine variables using the methods of Tabulate and tab1 */

Comment after a command. When Stata reads the double / it knows that the remaining information in the line is a comment.
describe // describing the variables in the file

Within the Do-file Editor, you can submit several commands at once. (In the Command window, only one command at a time can be submitted for execution.) You cannot send commands directly from the Stata Command window to the Do-file Editor. The command must be copied.

The **doedit** command

There are 2 ways to open the Do-File editor.

1. From the Button Bar, you can click on the "**Do-file Editor**" button  . Another window opens which is the Do-file editor.

2. From the Command window you can type:
   doedit

Discussion of the Windows used in STATA

A) The Do-file Editor

It is important to recognize the significance of the different types of files and to understand the various commands you use to create and access the files.

The Do-file Editor is the window where commands can be typed before they are submitted to the STATA processor. Commands can be **typed** directly into the Do-file Editor. You can copy the command to the clipboard, using the option provided in the dialog box where commands are built.  and then switch to the Do-file Editor to paste the command or you can copy the commands from the Results window and paste the commands into the Editor. There are four main uses of the Do-file Editor:

- To type commands directly into the Do-file Editor to be processed later by STATA,
- To send these commands to Stata 14 for processing,
- To save these commands to a file to be run again in the future, and
- To retrieve files of commands that you have saved previously so that you can run them again without the need to rebuild the commands.

It is important to understand that the commands you put in the Do-file Editor will not be executed (no output will be produced) until you send the commands to the processor. The Do-file Editor is simply an area that helps you prepare the commands. To send the commands to the processor, you use the **Execute (do)** icon  in the Do-file Editor window toolbar. This command runs the commands in the current do-file and shows the output in the Results window. If you wish to run the commands without the output showing in the Results window, you can select **Execute quietly (run)** from the Tools option on the menus. Choosing either one sends all the command(s) to the processor, which reads the commands written in the Do-file Editor and executes them. To send only specific commands, block the commands you want to send and select the **Execute selection (do)** icon  .

When you have successfully completed each step in your analysis (or when you are ready to end a STATA 14 session, even if it was not completely successful) you should save the commands to a file for future use. To save the commands, make the Do-file Editor active and select **Save** from the **File** menu or click on the diskette symbol on the Tool Bar. A file created from the Do-file Editor is called the *command file*. It is a file containing only commands; it never contains any of the data you may be analyzing with the commands. You must save your data separately, as described in the following section. We suggest that you use the default *extension* of `.do` when naming command files. Examples of file names are: Rep7.do, dem-all.do, and section1.do

By storing your commands to a .do file, you can retrieve, look at, or modify sets of commands and rerun them. To retrieve a do-file into the editor, open the Do-File Editor pull down the **File** menu and select **Open** or you can click on the "yellow" file folder  on the tool bar in the editor. Select the file you wish to open and click on **Open**. Once you have opened a specific file, you can use the commands from the file, without having to recreate or type them again. If you make changes to the command file that you wish to keep, make sure you save it to disk again.

Caution: From Windows Explorer, if you double-click on a ".do" file, the Stata program will open and run all the commands in the do-file immediately. The do-file will not be opened. To open a "do" file from Windows Explorer, right click on the file name and choose "**edit**". The application "STATA" will open and the "do" file will be opened in the Do-File Editor. When you have opened a do-file in this manner, STATA automatically executes the command

```
doedit ….\nameofdofile.do
```

which you can see in the Results window.

B) The Data Editor Window

Stata stores your data in a *data file*. In addition to the values themselves, a data file contains such things as variable labels and value labels, formatting information, missing-value specifications, notes, etc. Before you can do any data analysis in Stata 14, you must first tell Stata to open a Data file. Select **File** from the menu, select **Open**, highlight a data file (example: **c-hh.dta**) and click on

Open

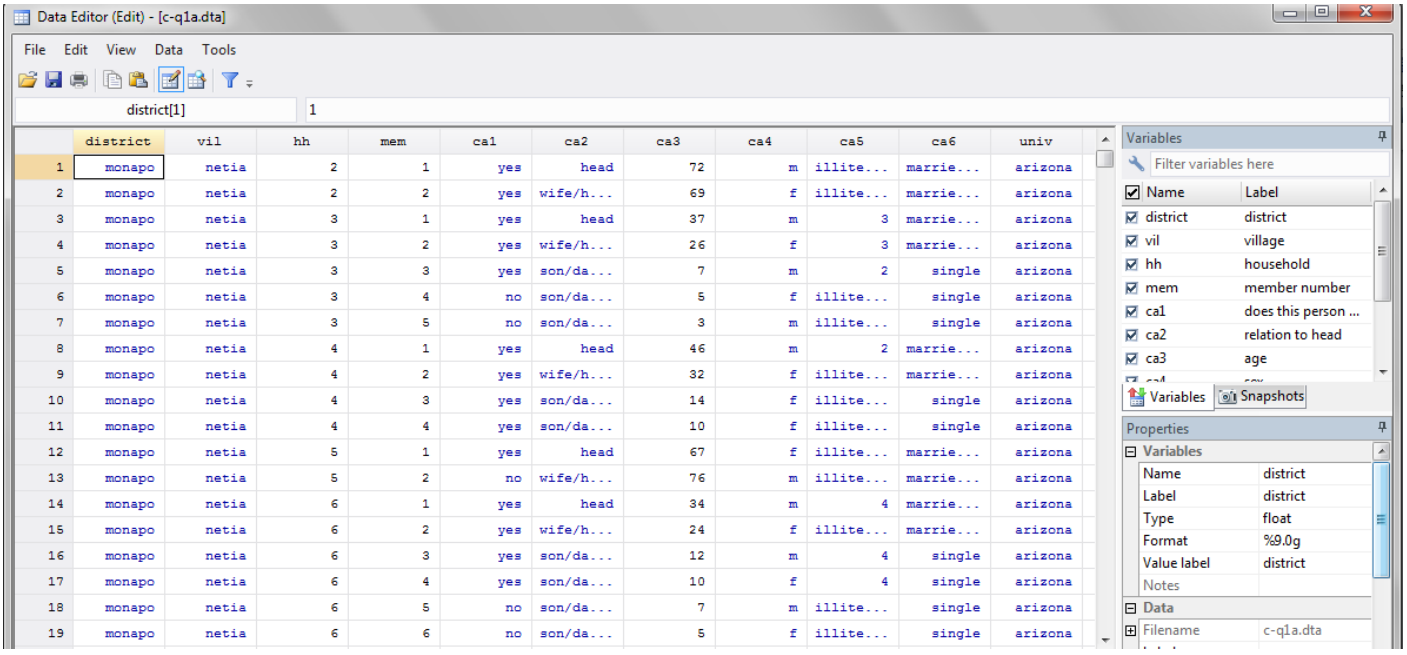
The command is immediately run. The data in the file are now available to be viewed in the Data Editor window. In the Review window you see the command that opened the data file. In the Variables window you see the list of variables that are available.

There are 2 methods that you can use to look at the data. The first opens the file in the Data Editor window. In this window you can manually change the data, so be careful when you use this method. The other method opens the data in a browser window where you cannot change any of the values, but you can sort and look at the data.

Open Data Editor window

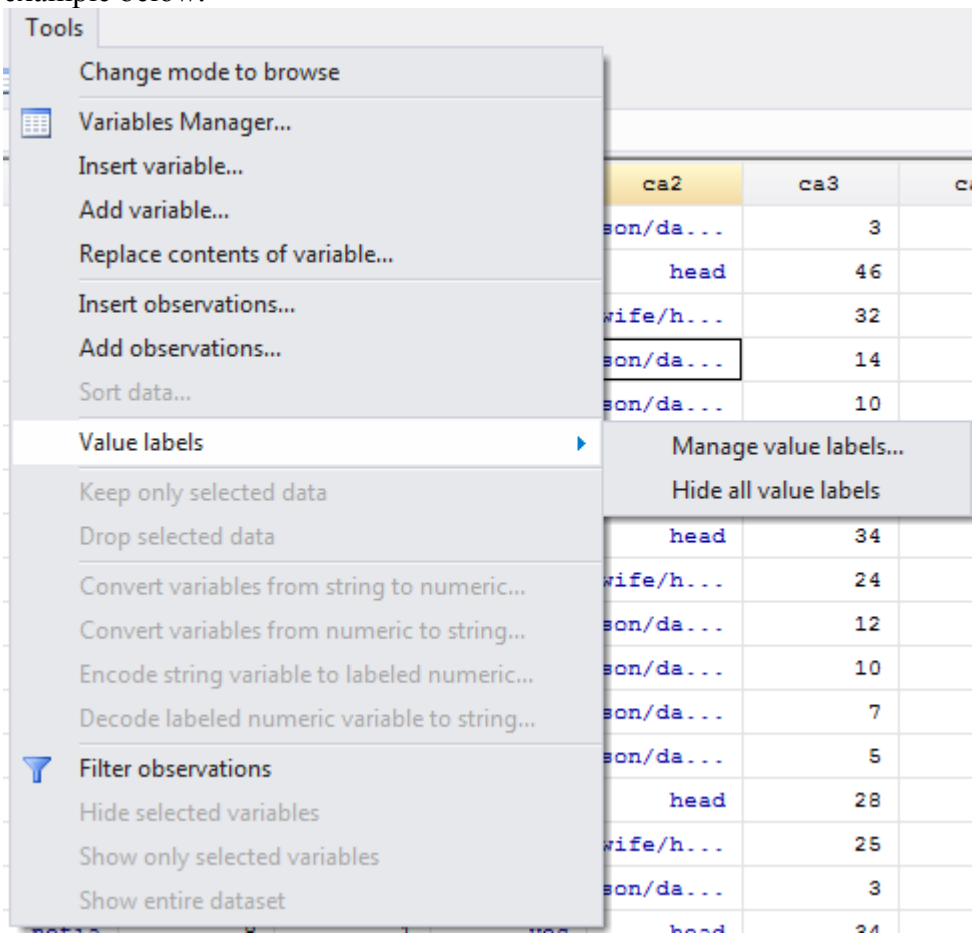
The **edit** command

1. The first method to view the data is to open the Data Editor window. Click on the Data Editor button  or in the Command window, you can type **edit** and press <**Enter**>. If value labels have been assigned to the values in a variable, you will see the value label rather than the actual value. Below is an example of a data file with value labels displayed for some variables and values only for other variables.



On the right side are two windows. One is labeled "Variables" and the other is labeled "Properties". The Properties of the variable that is highlighted in the Variables window is showed in the Properties window. If you select a different variable, its properties are shown in the Properties window. The variable properties are: name, label (variable label), type (type of variable), format, value label (name of the value label set attached to the variable) and any notes that might be associated with the variable. Below the Variables is the Data where the name of the data file is shown with its properties – label, number of variables, number of observations, size, memory and sort order.

In the Data Editor some of the data show as words and others are numbers. Stata color codes the types of variables, where string variable appear in red, numeric variables without labels in black and categorical variables in blue where the value label is shown rather than the underlying numeric value. Those variables with words in blue are showing the value labels for the values. If you want to see the values rather than the labels, click on the **Tools** in the Menu, Select **Value labels, Hide all value labels**. See the example below.



Selecting this option will show the numeric values for the categorical variables rather than the labels.

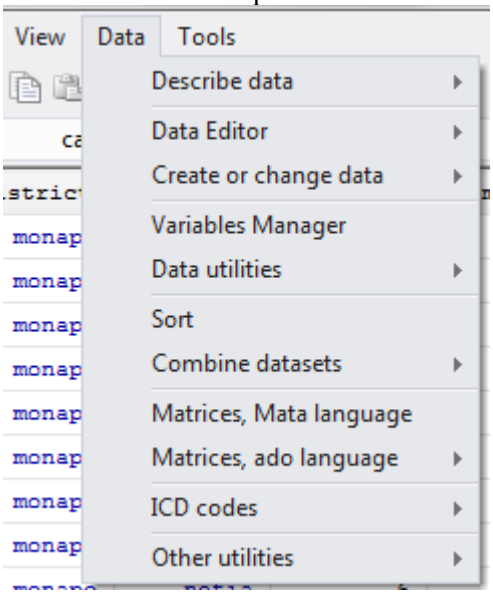
If you want to hide variables or see only certain variables, go to the "Variables" box on the right and remove the tick mark on the left to not show specific variables.

Look at the icons available from the data editor. You can open a data file directly within the data editor rather than opening it first in Stata. If you open a file while in the data editor, the command will appear in the Results window as well as in the Review window.

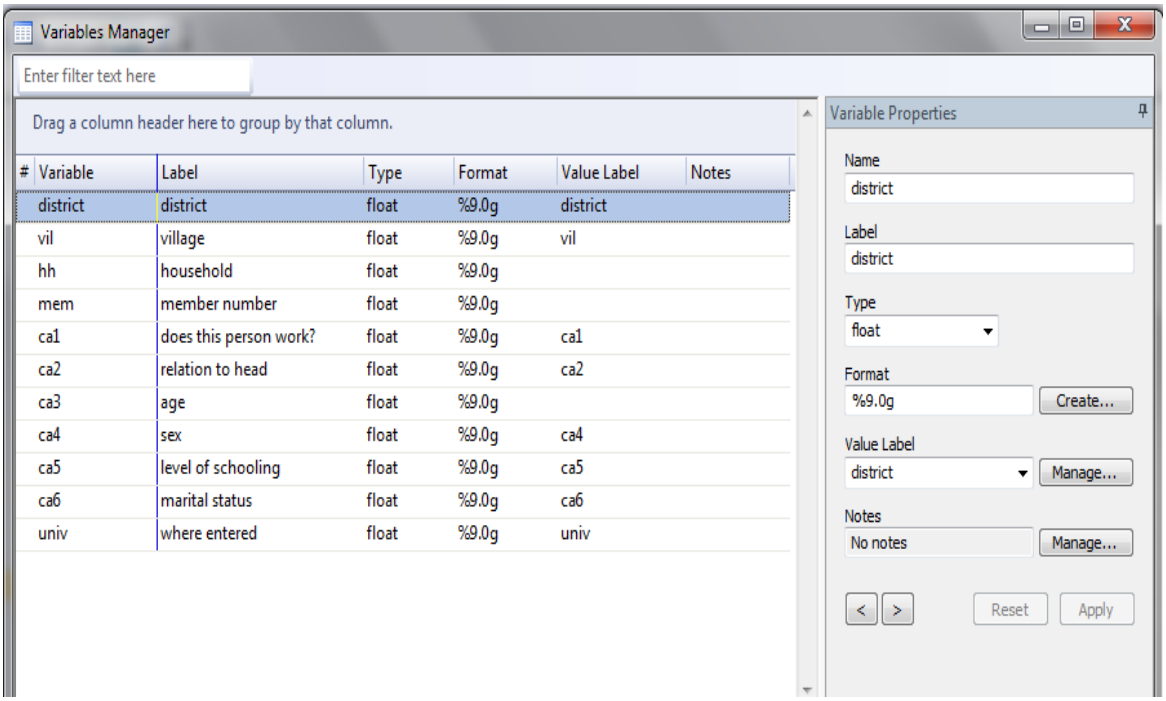
The data editor can remain open while you are working with the data. Within the data editor you can change from being able to edit the data to only browsing the data. To switch to browse, click on the icon  with the magnifying glass. You can also open the data file from the main Stata window in browse mode rather than edit mode. Unless you need to change values, it is best to open the data in the browse mode to prevent accidental changes to the data.

All of the data manipulations that are available from the main window are also available within the data editor. If you want to sort the file in a specific way, you can click on **Data, Sort**. A dialog box opens where you can specify the variables you want to use to sort the data.

Below is a snapshot of the options available to manipulate the data within the data editor from the **Data** menu. These options will be discussed later in the tutorial.



If you want to change the definition of a variable, that can be done in the "Variables Manager". A new dialog box opens:



Click on the red "X" in the upper right-hand corner to close the Variables Manager window.

If you want to change a value directly within the data editor, you can just type the new value. The command that changes it is written in the Results window as well as in the Review window

Exercise:

Exercise: Change the value to 1 in the hh column where hh=2.

Switch back to the Stata window. You will see a command that has been run that replaces the value. What do you see?

In the Results window you should see documentation of the Stata commands that were executed while you were in the Data Editor, e.g.

```
. replace hh = 2 in 1
(1 real change made)
```

Now switch back to the data editor.

Another option from the **Tools** menu is to **Manage Value Labels** where a value label can be defined, dropped or added. We will discuss later value labels when we create new variables.

Exiting the Data Editor

To exit the Data Editor, click on the "x" in the upper right hand corner of the Data Editor. The window closes. The change made will not be saved to the file on disk until you specifically save the file.

You will often get a data file, compute new variables, make transformations, and finally save the modified set of data to a new

name to be used at another time. For example: you might retrieve a data file with land area per crop, add to it production per crop from another file, and then calculate yield. If you want to use the new production and yield variables at a later time, you must make sure that the data file is saved with the new variables in it.

Never save data that has been modified to the same file name unless these are permanent changes to be made to the original data set.

Saving the Stata Data File

We do not want to save any changes that were made to this data file. Below are instructions on how to save the file if you wanted save the data file. You can close the Data Editor or you can also save the file within the Data Editor.

The **save, replace** command

From the menus select
File, Save As... enter a new name.

From the Command window, you can also type

```
save "newfilename"
```

or, if you want to use the same name, type

```
save, replace
```

The same name as the file you opened will be used.

C) The Brower Window

The **browse** command

The second method to look at the data is to use the "**Browse**" mode. You cannot modify the dataset if you use this method. This method will prevent you from accidentally modifying the data. Click on the browse  button. In this window you can sort the data and also hide columns if you wish. To exit the Browser, click on the "x" in the upper right hand corner of the Browser.

D) The Stata Results Window

Stata automatically writes all messages and output to the Results Window from the execution of your commands. For example, if you run a tabulate command, then the frequency table will be written to the Results window. If you wish to save the information in the Results window you must remember to turn on a log file. See the explanation above on "Log files".

E) The Command Window

The Command window is used to type commands directly. If you use the menus, the command is run immediately. The command is placed in the Review window. If you want to rerun a command that is in the Review window, click on the command. The command is placed in the Command window. To execute the command, press <Enter>.

Useful keystrokes within this window.
<PageUp> recalls the last command run and places it in the

Command window. If you continue to press <PgUp>, the next command above will be placed in the window.

<PageDn> moves back down through the commands that appear in the Review window.

<Esc> clears the contents of the Command window.

F) The Viewer

The Viewer in Stata is used to view help files and log files and to print these files. To enter the Viewer, click on **File, View....** The "**Choose File to View**" dialog window opens. You can type the name of the file or click on the

Browse

button. By default, the file type extension name is: SMCL Files (**.smcl)**. Select the file you want and click on

Open

The file name is pasted into the dialog box where you can then click on

OK

If you decide to use Help from the menus, the Help files are opened in the Viewer.

G) Stata Graph window

A graph is opened in its own window and is not stored in the Results window. If you wish to keep a graph, you can copy the graph to a word processing document or you can save the graph to a file. Right-click on the graph to see these options. A graph file has the extension **.gph**.

Summary of the Basic File Types

Do-file files

Do-file files (or command files) contain commands saved in the Do-file Editor. They do not contain output or data—only commands. Do files are made accessible to Stata if you open the Do-file editor.

Log files contain statistical output, data information and presentation generated by the Stata processor. They do not contain data. Log files are made accessible to Stata with a **File, View** command. The extension is *.smcl.

Data files contain data, including original survey variables plus any new variables created through various Stata commands such as the generate command. Data files are made accessible to Stata using a **File, Open** command from the menus or typing the command in the Command window.

Stata 14 SAMPLE SESSION

SECTION 1 - Basic functions: Stata files, Descriptives and Data Transformations

Introduction

This is a self-paced training aid designed to introduce the commands needed for some typical statistical survey analyses using **Stata 14**. This tutorial is intended to be a stand-alone training tool. To use it most effectively, you should ask a knowledgeable STATA user to help you get started and to answer questions as you work independently through the session. It can also be used as a guide for classroom training.

A copy of the questionnaire on which the data is based can be found in the Mozambique project 1992 **NDAE Working Paper 3: A Socio-economic survey of the smallholder survey in the province of Nampula: Research Methods**, copies of the three tables which were made available and can be found at the end of the manual in the annex section (for further information please contact Dr. Michael Weber at webermi@msu.edu). Four portions of the questionnaire are referenced, each of which has a corresponding Stata data file. Two other Stata data files are required for conversion of units of measure.

Questionnaire Section	Stata Data File
Main Household Section	c-hh.dta
Table IA: Household Member Characteristics	c-q1a.dta
Table IV: Characteristics of Production	c-q4.dta
Table V: Sales of Farm Products	c-q5.dta
Conversion factors for computing kilograms	conver.dta
Conversion factors for computing calories	calories.dta

This training consists of four sections, each of which should take approximately two hours. We recommend that you complete each section in a single sitting. These tutorial materials make the following assumptions:

- You know how to use Windows with a mouse
- The six data files listed above should be stored in a directory of your choosing on your hard disk.

Important: *Always remember to SAVE the changes to the data after each exercise and section, using a* ***new*** *file name.*

Open your Stata software. If you have not read or completed **Section 0,** please do so now to clarify the concept of the Command Window, the Review Window the

Results Window, the Do-file Editor and the Viewer.

Data files and the working file

Data from questionnaires that has been entered into Stata are stored in what are called *data files*. If we want to work with a set of data, we must open the corresponding data file so that it is available to the program.

Working Directory

The working directory is the directory where your data files are stored. You can set the working directory through the menus. From the menus select **File, Change Working Directory**. A dialog box opens in Browse mode. Find the directory that you want to work in and then click on **Ok.**
You can, instead, use the **cd** command to change to the directory where you have placed the data files you want to use by typing the command in the Command Window. Type:

The **cd** command

```
cd "name of working directory"
```

Changing to the directory where the files are located eliminates the need to include the directory name in the do-file that we will be creating. If the directory you are changing to has spaces, the directory must be enclosed in quotes. Example of a directory name with spaces:

"C:\Users\Documents\My data"

In the Results window the cd command has been executed. We can copy that command to place it in our do-file so that if we share our do-file with another person, the command can be modified to fit the directory structure that person is using. Example:

```
cd "C:\Users\Documents\Stata Training\data"
```

When a data file is opened, it is loaded from the disk into memory (the computer's "RAM"), making it the working file. This means that the data from this file is now available for you to use. Let's start with the data for Table IA: Household Member Characteristics. The data file that corresponds to this table is c-q1a.dta. To open this file, perform the following steps:

1. From the **File** menu, select **Open**...
   This will open the Open File *dialog box.*
2. If you have run the "cd" command you should see a list of data files to be used with this tutorial. Select the file c-q1a.dta.
3. Click on the **Open** button to open the file. The command appears in the Review window.
   In the Review *Window you will see the text*

   ```
   use "….\c-q1a.dta", clear
   ```

   "…." will be replaced with whatever the name of the folder is where you are working.

Opening a data file: The **use** command

4. We want to create a do-file to save our commands. The command that was just executed appears in the Results window and the Review window. Press <PageUp>. The command which was just run now appears in the Command window. Block the command and press <Ctrl-C>) to copy it.

   Click on the button in the **Tool Bar** to open the Do-File Editor  and paste the command into this file (<Ctrl-V>) or <Right Click> and choose Paste.
5. We want to copy the "cd" command as well. Use the <PageUp> key until the "cd" command is in the **Command** window. Copy and paste it just above the "use" command. We also want to add comments to define what the purpose of the do-file. Above the command to open the data file you can type what the purpose of the do-file is, your name and the date you created the do-file as well as any other comments that will help you remember what the do-file is for. Example:

   /* session 1 - basic functions, descriptives */
   /* "your name here" - "the current date here" */
   (example: /* beaver – 6 June 2016 */)
   /* member level file */

Other commands that are important and should be included are commands to close any log file that may be open, clear the memory work space and drop all macro variables. Below isi an example of the important commands and comments that should be added to any do-file that you create:

```
/* change to directory where files are stored*/
cd "C:\Users\Documents\StataTraining\data"

* define the log file to capture output
* name of log file is "log_session1"

capture log close
log using log_session1, replace

/* Purpose of do-file */
/* Author and date */
/* Tasks to be done in this do-file */

/*program setup */

version 14
clear all
macro drop _all
```

6. Save the do-file. From the **File** menu in Do-File Editor select **Save As...**

7. Enter the filename **session1**
   The .do extension will be added to the name automatically.
8. Click on **Save.**

The do-file is now saved to disk. Note that Stata color codes the text in the do file. Dark blue text is a Stata command, red is a string usually enclosed in double quotes, subcommands are black, comments are green. The syntax colors can be

changed by choosing Preferences under Edit from the Menu while in the do-file editor

We need to run all the commands from the do-file to start the log and record the commands in the log file. Block all the commands and click on the Execute (Do) button 

There data file will be opened again since it will be part of the commands that are blocked. We have opened the household-member data file which is now the current file in memory. *Remember, Stata only allows one file to be open at a time.*

Describing the contents of a data file:

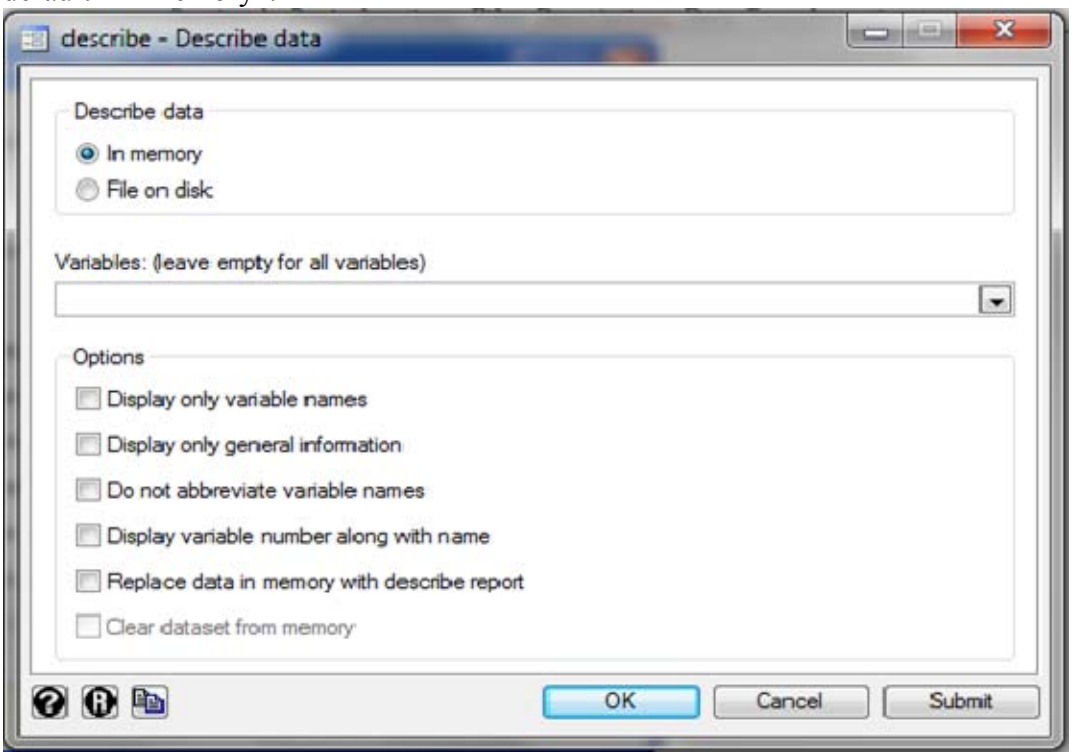
The **describe** command

A key piece of information we need to know about a data file is what variables it contains. We can find this out, along with other information, by using the **Describe data** command on the **Data** menu:

1. From the **Data** menu select **Describe data...**

2. There are several choices under this option: Select **Describe data in memory or in a file**. A dialog box opens:

There are several options in this dialog box. With version 14 there is a choice in the dialog box to describe the data in memory or a file on disk. We will use the default "In memory".



At the bottom of the dialog box, there are three icons on the left. The first (a question mark) opens the "Help" screen to explain the options in the dialog box.

The second (an R)  resets the information in the

dialog box so that nothing has been selected. The third icon  (Copy commands to Clipboard), when clicked, copies the command that is built based on the selections you make in the dialog box to the clipboard. You can then switch to the do-file and paste the command into the do-file.

On the right hand side there are the choices to click on OK, Cancel or Submit. If you choose **Submit** the dialog box remains open so that you can select another option within the dialog box without having to open the box again. If you choose **OK** the dialog box closes. The command is automatically executed, whether you choose Submit or OK.

We want a description of all variables; therefore, we can leave the list of variables blank. Before you click on **OK,** click on the Copy button  . Switch to the do-file, and press <Ctrl V> or right-click and choose **Paste** to paste the command. Switch back to the dialog box and click on **OK.**

In the Results window, you will see the description of the variables. The command to produce the results was describe as you can see in the Review window. To obtain the same results without using the menus, from the Command window you can type

```
describe
```

The output shows the file name, the number of observations, the number of variables, the size and then information about each of the variables, the storage type, the display format the value label and variable label.

```
Contains data from ……\c-q1a.dta
  obs:         1,524
 vars:            11
 size:        73,152 (93.0% of memory free)
-------------------------------------------------------------------
                 storage display         value
variable name    type    format          label       variable label
-------------------------------------------------------------------
district         float   %9.0g           district    district
vil              float   %9.0g           vil         village
hh               float   %9.0g                       household
mem              float   %9.0g                       member number
ca1              float   %9.0g           ca1         does this person work?
ca2              float   %9.0g           ca2         relation to head
ca3              float   %9.0g                       age
ca4              float   %9.0g           ca4         sex
ca5              float   %9.0g           ca5         level of schooling
ca6              float   %9.0g           ca6         marital status
univ             float   %9.0g           univ        where entered
-------------------------------------------------------------------
Sorted by:
```

An explanation of each of the columns follows:

Data storage types

Storage type: Stata has 6 storage types:

byte - integer between -127 and 100
int - integer between -32,767 and 32,740
long - integer between -2,147,483,647 to 2,147,483,620
float - -1.70141173319810^38 to 1.70141173319*10^38 (smaller real numbers, stored in 4 bytes, default storage type unless another type is specified)
double- -8.9884656743*10^307 to 8.9884656743*10^307 (larger real numbers, stored in 8 bytes).

strX – string. The X is replaced by the maximum number of characters allowed for the variable, e.g. it is a fixed length up to 2045 characters (examples: str1 is a length of 1 (1 byte); str2 is a length of 2 (2 bytes); str2045 is a length of 2045 (2045 bytes).
strL – string. Can contain from 0 to 2-billion characters (new to Stata 13). Maximum length is 2000000000.

Since Stata stores the data from the file in memory, when you define a variable, you want to define it with an appropriate storage type to maximize the amount of data that be opened in the program

Display format

Display format: The display format is the third column which describes how the data are to be displayed. Stata will make an assumption with new variables so it is not always necessary to specify the format. Format information always begins with a percent sign "%", to indicate the start of the format information. Refer to the PDF documentation for more details. In this example, the 9 describes the width of the variable. After the decimal the 0 indicates no fixed number of decimals will be displayed. If you wished to see only 2 decimals, the example

would be %9.2g. The letter following indicates what type of format:

e - scientific notation, e.g. 1.00e+03
f - fixed format, e.g. 1000.03
g - general format where Stata chooses the format
c - optional along with either e, f or g; will display a comma, e.g. 1,000.03

Labels

Variable label: Label describing the variable.

Value label: If the variable has value labels the name of the label appears in this column. Stata assigns a name to the label which contains the values and labels. The label is then applied to the variable. More will be said about value labels later.

Documenting variables and labels:

There are several ways to view the labels and values for variables:

The **labelbook** command

If you wish to see what labels have been defined for specific values for the variables that have value labels as indicated above, you can run the command to create a codebook of the labels. From the menus:

1. From the **Data** menu select **Data utilities / Label utilities**
2. Select **Produce codebook of value labels** (towards the end of the dropdown menu)
3. We will accept the default selections. Click on the icon to *copy* the command to the clipboard, and then click on **OK.**
4. Switch to the do-file editor and paste the command.

In the Command window you could have also typed

```
labelbook
```

to obtain the same results. This command describes only those variables with value labels. It is a good command to use to document the value label names.

–more– 

This output is quite long. You will see **–more–** at the bottom of the Results screen. **–more–** indicates there is more information to be displayed, but the display has paused so that you can view the first part of the output. You will need to click on **–more–** several times to see the complete output. To continue to the next screen, you can click the <spacebar> or you can click on the **–more–** (in blue font in the Results window) or you could also click on the green button on the tool bar -  **.** This button only shows on the icon bar if there is more output to be seen in

the Results window.

If you wish to not have the output displayed one screen at a time, you can turn this feature off. The command is:

```
set more off
```

You can include it at the beginning of the do-file so that when you want to run the do-file another time, **–more–** will be turned off.

If you want to stop the listing from completing, you can click on the  . However, if you do that, you will not get a complete listing of the labels for the values. The value label is described with a list of the labels that have been defined and the variable(s) the label has been attached to.

The **label list** command

You can select specific variables to look at those labels only. From the menus:

1. From the **Data** menu select **Data utilities / Label utilities**
2. Select **List value labels**
3. Select **district** and **vil**, click on  and switch to the do-file editor to paste the command. Switch back to the dialog box and click on **OK.**

The listing shows you what values are assigned to a label. *<u>Note</u>: A label name can be assigned to multiple variables. You can create a label name for 1=yes 2=no and assign that label name to several different variables.*

In the Command window you can also type

```
label list district vil
```

The **codebook** command

To document the data and all the variables including those that do not have value labels, another command is available:

1. From the **Data** menu select **Describe data...**
2. Select **Describe data contents (codebook).**
   Click on  to copy the command and switch to the do-file to paste the command. Switch back to the dialog box and click on **OK** .

In the Command window you can also type

codebook

In this output every variable is listed. The type of variable is given, the range of values in the variable, number of unique values, how many cases have a missing value, and it also includes descriptive statistics for variables. The output for the descriptives is based on whether Stata thinks the variables are continuous or categorical. Stata cannot always tell if the variable is categorical, so it does not always display a frequency table for a categorical variable.

Generating descriptive statistics:

After examining the variables we will begin to examine the data by running descriptive statistics (e.g. frequencies, averages, maximum, minimum, and standard deviations) for all variables. This type of analysis helps you to find data entry errors. It also gives you a "feel" for what kind of data are in the file and to see that missing values have been defined correctly. It may be tempting to skip this step for some data sets or for some variables, but this is an important step that will almost always save time later and improve analysis. For example, finding out the average age of all respondents may not be something you are interested in knowing, but if the average age turns out to be 91.3 years, you would be alerted that that something is probably wrong with the data.

The **summarize** and **tabulate** commands

Basic descriptive statistics can be obtained from two commands—**Summarize** and **Tabulate**. **Summarize** is used for continuous variables, while **Tabulate** is used for categorical variables.

There are three types of variables.

Continuous variable

1. A *continuous variable* is a variable that does not have a fixed number of values. It measures something, e.g. age, weight, population. The variable **ca3** (age) is a continuous variable because age can take on many different values.

Categorical variable

2. A *categorical variable* is a variable that has a limited number of values that form categories or groups, e.g. geographic location or relation to head. For example, look at the Annex Table IA: Household Member questionnaire. Variable **ca2** (relation to head) is a categorical variable because its values are limited to 6 categories and the values by themselves have no meaning.

Indicator variable

3. An *indicator variable* is a special type of categorical variable. This type of variable denotes whether something is true or false, e.g. yes/no questions, or whether a person is male or female.

This type of variable contains only 2 categories, i.e., it divides the data into 2 groups.

Descriptive statistics - using one variable

Start by examining the data in the file. Use the Data Editor window to scroll through your data file. To do this, perform the following steps:

1. Click on the Browse button  on the Tool Bar or in the Command Window, type **browse** and press <Enter>. If you want to only look at the data, this is the best choice. If you think you want to change data directly in the data file (not recommended) you could, instead, click on the Data Editor button  .
2. Scroll through the data.
   A period in a field indicates a missing value or system missing value. In Stata you can specify up to 27 different missing values, e.g. .a or .b . These are called "extended" missing values. Extended missing values are used to identify specific reasons why there are no data, e.g. person refused to answer, or a question was not asked.

Scrolling through the data will give you a "feel" for what is in file. It might also help point out obvious errors, e.g. a variable whose values are missing for all listed cases.

Decide which of the variables in this file are continuous and which are categorical (normally you would refer to the questionnaire to make this decision). You need to know this in order to select the correct command to use for each variable. If you mistakenly perform a **tabulate** on a continuous variable, you will probably get more output than you really want, with possibly hundreds of different "categories", one for each different value found. If you perform a **summarize** on a categorical variable, you will usually get meaningless results, since the average value of a variable that uses the numeric value to describe categories has no real significance.

By examining the data, you should have found that variable **ca3** (age) is continuous and the remaining variables are categorical. To run descriptives on **ca3,** do the following:

Descriptives

The **summarize** command

1. From the **Statistics** menu select **Summaries, tables and tests** then **Summary and descriptive statistics** then **Summary statistics**
   This will open the summarize - Summary statistics *dialog box. (This command is also available from "Data", "Describe data" "Summary Statistics".)*
2. The cursor should be in the **Variables** box. There

is a dropdown arrow at the end of the variables box.  Click on the drop down arrow to select the variables you want. Highlight **ca3** and click to select it. To close the drop down box, click in another area of the dialog box. In the **Options** section below the variable box, note that "Standard display" is the default selection for output.

Don't forget to click on the  *icon to copy the command to the clipboard, switch to the do-file editor, paste the command and switch back to the dialog box.*

3. Click on the **Submit** button to run the command. The dialog box will remain open.

The output appears in the Stata Results window. You will see that the mean for age (**ca3**) is 21.33602 years. The Stata command, shown in the Review window, is

```
summarize ca3
```

The Results window displays:

```
    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
         ca3 |      1524    21.33602    17.69252         .5         81
```

Return to the dialog box. (On the task bar you can see "summarize-Summary…", click on this task.) Click on the  in the lower left corner to see more detail about the summarize command. In this help window, you can see that the first two letters of the command are underlined, e.g. <u>su</u>mmarize. In Stata, only the letters that are underlined are absolutely required for the command to be recognized. The following command also works.

```
su ca3
```

Scroll down through the Viewer to see the options available with this command and examples. To close the Viewer, click on the x in the upper right hand corner of the dialog box.

If we wanted to see more summary statistics on this variable we can ask for detail. Switch back to the summarize - Summary statistics dialog box (you can

see the icon on the task bar.)

4. Click on the radio button next to "Display additional statistics". Click on the  to copy the command to the clipboard.
5. Click on the **OK** button to run the command. The dialog box will close.

The results are:

```
                          age
-------------------------------------------------------------
      Percentiles      Smallest
 1%             1             .5
 5%             1             .6
10%             3              1       Obs                1524
25%             7              1       Sum of Wgt.        1524
50%            16                     Mean           21.33602
                        Largest       Std. Dev.      17.69252
75%            32             75
90%            48             76       Variance       313.0252
95%            57             78       Skewness       .9152221
99%            69             81       Kurtosis        3.00135
```

The median age is 16 (50% - Percentile).

The Stata command is

```
summarize ca3, detail
```

Switch to the Do-File Editor and paste the command. Insert comments to explain the commands you have pasted.

Information returned by Stata commands

When you run a command, Stata sends the information to the Results window as well as saves the information in memory in to "scalars". To see what has been saved, you can use the return list command,

In the Command window, type

```
return list
```

The information that is returned from the summarize command is displayed.

```
r(N) =  1524
```

```
                r(sum_w) =  1524
                r(mean) =  21.33602362206289
                 r(Var) =  313.0251689442948
                  r(sd) =  17.69251731507687
            r(skewness) =  .9152220664756392
            r(kurtosis) =  3.001349748747086
                 r(sum) =  32516.10000002384
                 r(min) =  .5
                 r(max) =  81
                  r(p1) =  1
                  r(p5) =  1
                 r(p10) =  3
                 r(p25) =  7
                 r(p50) =  16
                 r(p75) =  32
                 r(p90) =  48
                 r(p95) =  57
                 r(p99) =  69
```

You can use these values stored in memory to perform calculations. For example, to subtract the mean of ca3 from ca3 :

```
generate ca3_mean = ca3-r(mean)
```

Using the information in memory eliminates the need to type specific numbers and will give you more accurate values. These scalars are only available until the next command is run.

Frequencies of categorical variables

Since the variables ca1 (work on a farm or not), ca2 (relation to head), ca4 (sex), ca5 (level of schooling) and ca6 (marital status) are categorical (the values representing categories), we will run a tabulate command. To run a tabulation, do the following:

1. From the menus click on **Statistics** then **Summaries, tables and tests** then **Frequency tables** then **Multiple one-way tables**
   The* tab1 – Multiple one-way tables *dialog box opens.
2. Click on the drop down arrow for the box for Categorical variables to select the variables:
   ca1 ca2 ca4 ca5 ca6
3. Click on the copy button, switch to the Do-File Editor and paste the command then switch back to the dialog box and click on the **Submit** button.
4. The command will be executed.

You will see in the Stata Results window that for ca1 70.67% of the household members work on a farm. There are 1524 cases for this tabulation. The results for **ca4**

show that 51.53% are males and 48.47% are females. How many cases have been included? Only 1508 cases were tabulated. Why?

1. Go back to the dialog box, ***tab1 – Multiple one-way Tables.***
2. There is an option "**Treat missing values like other values**". Place a tick mark ✓ n the box to the left of this option.
3. Copy the command, switch to the do-file, paste the command, write a comment to explain the difference between the first command and this one, then return to the dialog box.
4. Click on **OK**

Looking at the table for **ca4** – there are 16 observations that are missing values. Stata's default is to not show the missing values.

The **tab1** command

The Stata commands are:

```
tab1 ca1 ca2 ca4 ca5 ca6
tab1 ca1 ca2 ca4 ca5 ca6, missing
```

Note: *to produce a tabulation (frequency) of just one variable, you can use the **tabulate** command. However, if you want to list several variables in the frequency command, you must use the **tab1** command. Below, you will see that if you use the tabulate command and list 2 variables, a cross-tabulation is produced.*

Another useful way to examine a continuous variable is to Graph the variable to view the distribution of the values.

1. From the menus select **Graphics, Histogram**
   The dialog box opens labeled "histogram – Histograms for continuous and categorical variables.
2. Click on the drop-down arrow for the Variable box and select ca3. *(The default for Stata is to assume the data are continuous.)*
3. Tick the box ✓ for **Width of bins** and type in **5** in the box next to this option. The ages will be grouped into 5 year ranges.
4. For the Y-axis click on the radio button next to **Frequency.** We will see the number of cases in the different age groups.
5. Click the copy icon and then click on **OK** to run the command. *(A new window opens labeled Graph – Graph.)*

The **histogram** command

All graphs produced by Stata, open in a separate window. Only one graph can be displayed at a time. The Stata command is:

```
histogram ca3, width(5) frequency
```

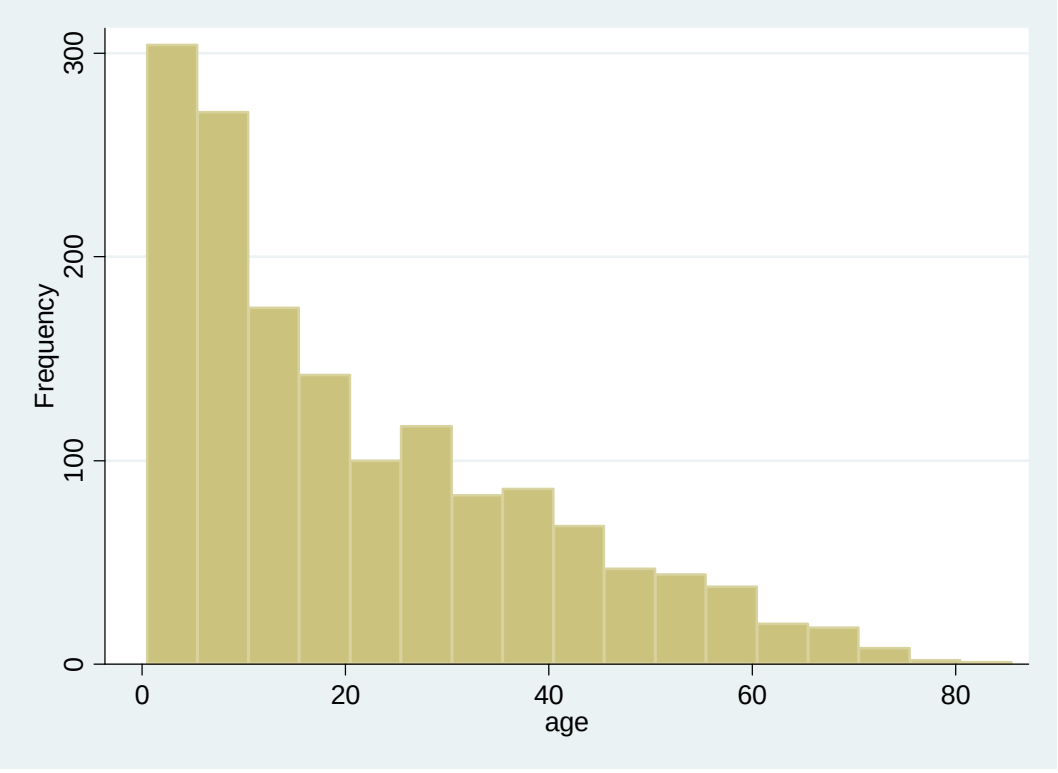
See a copy of the graph below.

Saving a graph to a file

If you want to save this graph to a word processing document, you can <right click> on the graph, select Copy, then switch to your word processor and paste it into the document <ctrl-v>. If you want to save the graph to disk, <right click> and choose "Save As…".

Note: *Only one graph appears in the graph window at a time. If you run multiple graph commands at one time from a do-file, only the last graph will be visible. You must run one command, save or copy the graph, then run the next graph command, save or copy that graph.*

For a more detailed description of the sub-commands available for **summarize** and **tabulate** refer to the PDF documentation or use the "Search" under Help to specifically search for these commands.

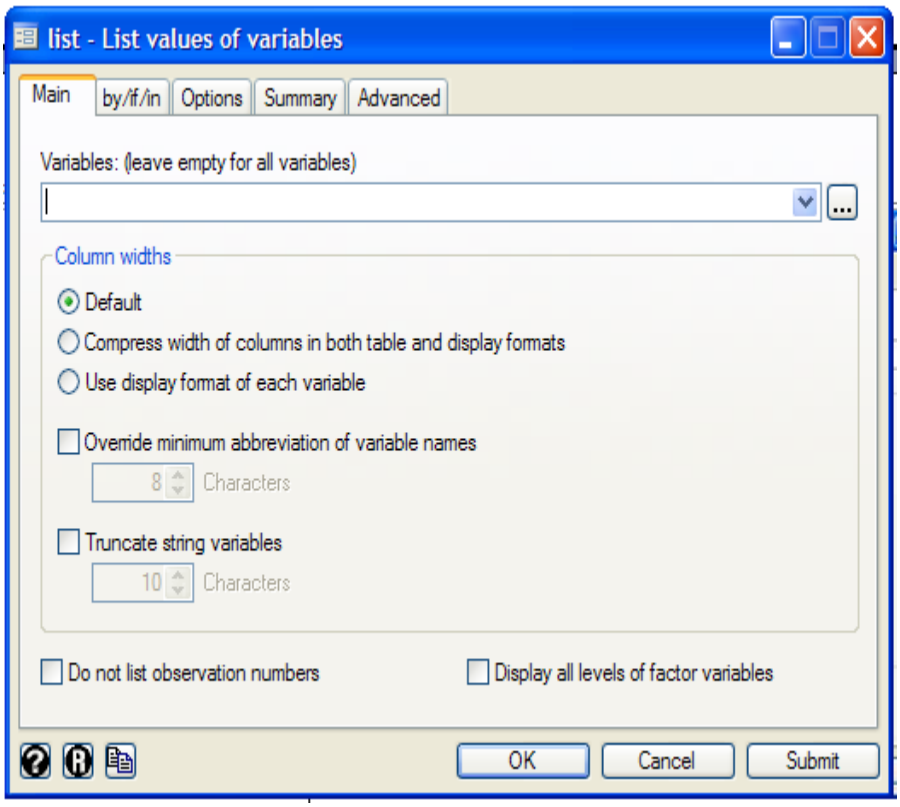


The **list** command

You may want to look at the data selecting only specific cases rather than scrolling down through the data set to find a specific case or

cases. The list command gives you the option to select all or specific cases.

1. From the **Data** then **Describe data** menu select **List data**



The list dialog box list - List values of variables has 5 tabs where you can set specific parameters for the data that you want to list.

On the **Main** tab you can specify the variables to be listed or leave it blank to list all variables. The default column width separates each variable by 5 spaces and shows the variables in "display" format. Below is an example:

```
     +-------------------------------------------------------------------+
1524. | district |       vil | hh | mem | ca1 |       ca2 | ca3 | ca4 |
      |  angoche |    monari | 24 |   6 |  no | son/daugh |   5 |   m |
      |-------------------------------------------------------------------|
      |           ca5      |           ca6      |          univ      |
      |     illiterat      |         single     |       arizona      |
      +-------------------------------------------------------------------+
```

1. Select the variables using the drop-down arrow:
   district vil hh mem ca1 ca2 ca3 ca4 ca5 ca6
   Note: if you wished to include all variables, leave the box empty.
2. Click on the tab labeled "by/if/in"
   In this tab we can limit the number of cases that are displayed.

3. Check the box ✓ next to "Use a range of observations". Specify the range to be from 1 to 10.
4. Click on the "Options" tab. Under "Table options" check the box ✓ next to "**Force a clean table**".
   Note: value labels will be displayed. To see the numeric values, place a ✓ next to the box "Display numeric codes rather than label values".
5. Click on the copy button and then click on **OK** to run the command.
6. In the Results window you see a list of the observations.
   If the information for each observation is wrapping to the next line, you can resize the Results windows so that it is wider. Place your mouse pointer on the right border of the window and when you see a double arrow, click the Left Mouse Button, hold it and drag the right side out to make the window wider.

If you see the **-More-** at the bottom of the Results window, there are several methods you can use to continue:

Press <Enter>
Press any key
Click on the **More** button on the tool bar
Click on the –more– at the bottom of the Results window

If you wish to interrupt a Stata command, you can:

click on the **Break**  button on the Tool bar or press <Ctrl-Break> or type **q** (the letter q for quit) in the Command window.

To rerun the command you just ran, click on the last command in the Review windows. You see the command is now in the Command window. Press <Enter> to run the command.

Copy the command to the Do-file editor and add comments to explain what you have done. The Stata command should look like

```
list district vil hh mem ca1 ca2 ca3 ca4 ca5 ca6 in
1/10, clean
```

If you wish to, you can type the list command in the Command window. If you are typing in the command window, you can pick the variables from the Variable window and the names will be pasted into the Command window.

Note that to list a subset of observations, Stata uses the key word "**in**", e.g. in 1/10. The key word "in" restricts the list to a range of observations. Examples are:

list in 1	lists first observation
list in -1	lists last observation
list in 2/4	lists observations 2 through 4
list in -3/-2	lists 2 observations starting with the 3rd from the last observation.

To limit the listing to a specific criterion use the "if" key word. This command is an excellent way to list data with problems. Examples are:

```
list district vil hh mem ca3 if ca3 > 70
list district vil hh mem ca2 ca3 if ca3 < 15 & ca2 < 3
```

If the variables you want to list are in the order in the file that you want to see the data, rather than list each of the names, you can type the first variable, then a dash (-), then the last variable in the list, e.g.

```
list district-ca3 if ca3 < 15 & ca2 < 3
```

If we want to see the observations with the five lowest values and five highest values, we would first sort by that variable and list the first five cases and the last five cases. Our example question would be: What is the age of the 5 youngest heads of households and what is the age of the 5 oldest heads of households?

To achieve the list for 5 youngest heads we sort ascending by the relation to head variable (ca2) and then the age variable (ca3). The Stata commands are:

```
sort ca2 ca3
list district vil hh mem ca1 ca2 ca3 in 1/5
```

To list the 5 oldest heads we sort by ca2 ascending and ca3 descending (negative symbol in front of the variable) using the Stata command gsort.

```
gsort +ca2 -ca3
list district vil hh mem ca1 ca2 ca3 in 1/5
```

Reminder: Any commands that are typed directly into the Command window should be copied to the Do-file Editor and comments written to explain the commands.

Apply what you've just learned about descriptive statistics by doing the following exercise.

Exercise 1.1

Run descriptive statistics on another of the provided sample files. Use the production questionnaire - Table IV. The data are in file C-Q4.DTA.

Hints:

a. make C-Q4.DTA your working data file.
b. Use the **summarize** command for continuous variables, and **tab1** for categorical variables.
c. **prod** is a categorical variable.
d. Quantities (**p1b**, **p2b**, ...) are continuous variables.
e. Units (**p1a**, **p2a**, ...) are categorical variables.
f. **p4** (month in which stocks ran out last year) **& p6** (month in which stocks will run out this year) are categorical variables.

A small sampling of what you should find from running these frequencies and descriptive statistics follows:

```
Tabulate:
                product |      Freq.     Percent        Cum.
------------------------+-----------------------------------
                 cotton |         83        4.90        4.90
                peanuts |        144        8.51       13.41
            rough rice |        155        9.16       22.56
                bananas |         50        2.95       25.52
          sweet potato |         12        0.71       26.23
         cashew liquor |         24        1.42       27.64
     sugar cane liquor |         11        0.65       28.29
          dried cashew |          2        0.12       28.41
            sugar cane |         13        0.77       29.18
            cashew nut |        130        7.68       36.86
               coconut |         45        2.66       39.52
                 beans |        279       16.48       56.00
        manteiga beans |          7        0.41       56.41
             sunflower |          5        0.30       56.70
               oranges |         13        0.77       57.47
         cashew fruit |         44        2.60       60.07
                manioc |        338       19.96       80.04
               sorghum |        124        7.32       87.36
                 maize |        192       11.34       98.70
              "ossura" |          5        0.30       99.00
               tobacco |          4        0.24       99.23
                tomato |         13        0.77      100.00
------------------------+-----------------------------------
                 Total |      1,693      100.00

Summarize:

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
         p1b |      1670    26.35286    163.4359          0       5000
         p2b |      1598    22.81508    159.5101         .5       5000
         p3b |       173    2.523121    4.574581          0         30
         p5b |      1231    15.61243    86.10356          0       1460
         p7b |       869    4.938435    6.875536          0        100
```

Descriptive Statistics – using two or more variables

Two-way Tables with Categorical Variables (Cross-tabulation)

The **tabulate** command

We would like to produce a table that shows the distribution of cases according to their values using two or more categorical variables. Stata calls this type of table a two-way table.

Look at the household member questionnaire in the annex section, Annex Table IA. One thing you might be interested to know is how the gender of the respondents varied by their relationship to the head of household. This would tell you, for example, how many females are heads of households. The **tabulate** command will produce this type of table. Make the household member file, c-q1a.dta, the working data file.

1. Click on the yellow open folder tool at the top left of the Toolbar
2. Select the file c-q1a.dta.
3. Click on **Open** to open the file.
4. Copy the command for opening the file which appears in the Results window, into the Do-file Editor window.

Reminder: You should add comments to your do-file so that you can remember what and why you were doing specific commands when you developed the do-file. Several days or weeks from now you may not remember. Comments in a do-file start with slash asterisk (/*) and end with an asterisk slash (*/:

```
/* this is a comment
   which runs to two lines */
```

Stata will not run multiple lines as though they are commands if the comment begins and ends with these symbols.

To create a two-way table do the following:

1. From the menus click on
   Statistics
   Summaries, tables and tests
   Frequency tables
   Two-way tables with measures of association
   The tabulate2 - Two-way tables… dialog box opens.
2. In the **Row variable** box choose **ca2** from the drop-down choices.
3. In the **Column variable** box choose **ca4** from the drop-down choices.

We would like to see row percentages and column percentages.

4. Under Cell Contents click in the box next to **Within-column relative frequencies** to put a ✓.
5. Click in the box ✓ next to **Within-row relative frequencies**.
6. Click on the copy button, switch to the Do-File Editor and paste the command. Write a comment and then switch back to the dialog box to click on the **Submit** button. The command will be executed.

The Stata command is:

```
tabulate ca2 ca4, column row
```

The Key box in the Review window specifies which statistics appears on each row in the cells.

```
+-------------------+
| Key               |
|-------------------|
|     frequency     |
|  row percentage   |
| column percentage |
+-------------------+

   relation to |          sex
          head |         m          f |     Total
---------------+----------------------+----------
          head |       321         21 |       342
               |     93.86       6.14 |    100.00
               |     41.42       2.88 |     22.74
---------------+----------------------+----------
  wife/husband |         2        306 |       308
               |      0.65      99.35 |    100.00
               |      0.26      41.98 |     20.48
---------------+----------------------+----------
  son/daughter |       374        336 |       710
               |     52.68      47.32 |    100.00
               |     48.26      46.09 |     47.21
---------------+----------------------+----------
 mother/father |         1          5 |         6
               |     16.67      83.33 |    100.00
               |      0.13       0.69 |      0.40
---------------+----------------------+----------
other relative |        77         61 |       138
               |     55.80      44.20 |    100.00
               |      9.94       8.37 |      9.18
---------------+----------------------+----------
         Total |       775        729 |     1,504
               |     51.53      48.47 |    100.00
               |    100.00     100.00 |    100.00
```

How many total cases are included? Only 1,504 cases are included in this table. What about cases with missing values?

1. Return to the dialog box and place a ✓ mark in the box next to "**Treat missing values like other values**".
2. Click on the copy button, switch to the Do-File Editor and paste the command. Write a comment and then switch back to the dialog box to click on the **OK** button. The command will be executed.

```
tabulate ca2 ca4, column miss row
```

Now we see the missing data included. We wanted counts, row percentages, and column percentages. Row percentages sum to 100 across all the cells in a row, while column percentages sum to 100 down the cells in a column. The table produced by this command tells you that there are 21 female household heads, and that 6.12% of the total heads of households are female (row percent). Of the total sample of females, those who are heads represent 2.87% (column percent).

Summary statistics on a continuous variable for each value in a categorical variable

The **by … sort: summarize** command

For this analysis the same command is used as for general summary statistics with a slight modification. This command will show how the mean and other statistics for a continuous variable differ by the values of one or more categorical variables.

Suppose we want to know how the age of the member varied by his/her relationship to the head of household. If we did this with **tabulate** we would get a table with dozens of cells for the different ages represented. The table would not be usable. Instead we will use **summarize** with the "by" key word.

1. From the **Statistics** menu select
   Summaries, tables and tests
   Summary and descriptive statistics
   Summary statistics
   The summarize - Summary statistics dialog box opens.
2. Select **ca3** from the drop-down box for Variables
3. Under "Options" in this tab, select **Standard display** .
4. Click on the "**by/if/in**" tab.

5. Place a ✓ in the box "**Repeat command for groups**"
6. In the box below this option, labeled Variables that define groups:, select **ca2**
7. Click on the copy button, switch to the do-file editor and paste. Switch back to click the **OK** button. The command will be executed.

This command calculates the means of the variable **ca3** (age) separately for each different value of the variable **ca2** (relation to head) including the system missing value. The Stata command is:

```
by ca2, sort : summarize ca3
```

Note that the command begins with "**by**". This command is first sorting the data by **ca2** before it runs the summarize command. You could also sort the file by **ca2** first and then just use the "**by**" key word, e.g.

```
sort ca2
by ca2 : summarize ca3
```

From this output you find that the average age of heads of households is 41.5277 years while the average age of their spouses is 33.1871 years. Four observations have no value for **ca2**.

```
. by ca2, sort : summarize ca3

-------------------------------------------------------------------------------
-> ca2 = head
    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
         ca3 |       343     41.5277    14.12719         18         81
-------------------------------------------------------------------------------
-> ca2 = wife/husb
    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
         ca3 |       310     33.1871    11.80466         13         76
-------------------------------------------------------------------------------
-> ca2 = son/daugh
    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
         ca3 |       718    8.133844    5.797507         .5         48
-------------------------------------------------------------------------------
-> ca2 = mother/fa
    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
         ca3 |         6    48.16667    22.09449         20         69
-------------------------------------------------------------------------------
-> ca2 = other rel
    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
         ca3 |       143    12.55245    10.06785          1         75
-------------------------------------------------------------------------------
-> ca2 = .
    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
         ca3 |         4          15    12.24745          6         33
```

Data Transformations

After examining the results of the descriptive statistics you will often want to do data transformations. A data transformation is an operation that takes an existing variable and either changes the values in a systematic way or uses the values to calculate a new variable. The following example shows a common data transformation: the conversion of a continuous variable to a categorical variable.

The information we received from the **summarize** command is interesting, but it might also be useful to see the actual distribution of the ages into groups or categories, so we can tell, for example, how many heads of household are older than 60. Since the age variable, **ca3**, is continuous, we cannot do this directly—first we have to transform it. Let's suppose we're interested in four categories: 0-10 years old, 11-19 years, 20-60 years, and over 60 years of age.

Converting continuous variables to categorical

To categorize a variable, we can use the **generate** command. Categorizing a continuous variable makes detailed information more general. To keep the detailed information as well as the new general information, you must recode the variable into a new variable. If

variables

The **generate** command
The **replace** command
The **label variable** command
The **label define** command

you recode into the same variable the original values will be lost.

There are several methods that can be used to recode a continuous variable.

First method:

First method: If you wish to see the category values of 1, 2, 3, and 4 where

1 = 0-10,
2 = 11-19,
3 = 20-60 and
4 = over 60

you can do the following:

The **generate** command

1. From the **Data** menu select **Create or change data** then **Create new variable**
   The generate - Create a new variable dialog box opens.
2. Under the **Main** tab, type the name of the new variable in the **Variable name** box: **age_gp**
3. For the **Contents of variable** box we will specify a value or an expression. Type in the box a value of
   1
   This is the value that you want the new variable to have.
4. In the drop down box for the **Variable type** select **byte**.
5. Click on the **if/in** tab.
6. We will restrict observations to a specific set of data using the If. In the **If: (expression)** box, type in
   ca3 >=0 & ca3 <=10
   Note: you must use the ampersand symbol (&), not the word "and".
7. Click on the copy button, switch to the do-file editor, paste and switch back to the dialog box and click on **OK**

The Stata command is:

```
generate byte age_gp= 1 if ca3 >=0 & ca3 <=10
```

Stata will indicate in the Results window how many missing cases were generated:

(949 missing values generated)

That means that from the total of 1524 cases, 949 were not assigned a value. Now that the new variable has been created, another command is used to assign the codes for the cases with no values for this new variable. The command is the **replace** command.

8. From the **Data** menu select **Create or change variables** then **Change contents of variable**.
   The replace - Replace contents of existing variable dialog box opens.

The **replace** command

9. In the **Variable** box select the name of the variable that was just created: **age_gp**
10. Type **2** in the **New Contents** box
11. Click on the **if/in** tab.
12. In the **If: (expression)** box, type in
    ca3 >10 & ca3 <=19
13. Click on the copy button, switch and paste in the do-file editor, switch back and click on **Submit**. The dialog box remains open and the command is run.
    The Results window indicates how many changes were made: (271 real changes made).
14. Now make the changes to assign values to the other categories: In the **If: (expression)** box, change the criteria to: **ca3 >19 & ca3 <=60**
15. Click on the **Main** tab and type **3** in the **New Contents** box
16. Click on the copy button, switch and paste in the do-file editor, switch back and click on **Submit**. The dialog box remains open and the command is run. *(629 real changes made).*
17. Type 4 in the **New Contents** box
18. Click on the **if/in** tab.
19. In the **If: (expression)** box, change the criteria to: **ca3 >60**
20. Click on the copy button, switch and paste in the do-file editor, switch back and click on **OK**
    (49 real changes made).

The Stata commands created and run are:

```
generate byte age_gp= 1 if ca3 >=0 & ca3 <=10
(949 missing values generated)

replace age_gp = 2 if ca3>10 & ca3 <=19
(271 real changes made)

replace age_gp = 3 if ca3>19 & ca3 <=60
(629 real changes made)

replace age_gp = 4 if ca3>60
(49 real changes made)
```

Note that the Results window shows how many observations were modified after each command was run.

The next step is to verify that the changes were made correctly. Run the **tabulate** command on the new variable.

1. From the menus click on
   Statistics..
   Summaries, tables and tests
   Frequency tables
   One-way table
   The tabulate1 - One-way Tables dialog box opens.

2. For the **Categorical variable** box, select the variable **age_gp** from the drop-down box.
3. Place a ✓ in the box next to Treat missing values like other values
4. Click on the copy button, switch and paste in the do-file editor, switch back and click on the **OK** button.

The Stata command is:

```
tabulate age_gp, missing
```

There should be 4 codes in the frequency table—1, 2, 3, and 4 with no missing data. We can use the Data Browser to check to see what changes were made. Click on the **Data Editor (Browse)** button. Compare the value in ca3 with the new variable – do the values in age_gp fit the criteria we used to assign the values? Close the browser window when you are finished.

The values do not have any value labels to define what the values of 1, 2, 3, and 4 mean. A categorical variable is not useful unless labels are assigned. We want to add both a variable label and give labels to the values in this variable.

To assign a variable label:

The **label variable** command

1. Click on **Data**, then **Data utilities**, then **Label utilities**, then **Label variable**.
2. We want the default selection to Attach a label to a variable
3. In the **Variable**: box, select the name of the variable: **age_gp**
4. In the **New variable label** box, type
   Age group
   Note: Label may be up to 80 characters.
5. Click on the copy button, switch and paste in the do-file editor, switch back and click on the **OK** button.

The Stata command is:

```
label variable age_gp "Age group"
```

To assign value labels to a variable we first have to define a label and then assign value labels to the values in that label:

The **label define** command

1. Click on **Data**, then **Data utilities**, then **Label utilities**, then **Manage value labels**.
   Remember, Stata assigns a name to a group of value labels.
2. Click on the top button the right "**Create Label".** Another dialog box opens.

3. In the **Label name** box where there is a prompt <Enter new label name here>, type **age_group**.
4. In the **Value** box type **1**. In the **Label** box type **0 to 10**. Click on the **Add** button below the **Label** box. The dialog box remains open.
5. Continue defining the labels for the values:
   Type 2 in the **Value** box and in the **Label** box type 11 to 19, and click on the **Add** button.
   Type 3 in the **Value** box and in the **Label** box type 20 to 60, and click on the **Add** button.
   Type 4 in the **Value** box and in the **Label** box type 61 and older, and click on the **Add** button.
6. All the values have been assigned a label. To close the dialog box, click on the **OK** button to close the **Create label** dialog box.
7. Click on the **Close** button to close the **Manage value labels** dialog box.

As you can see in the Results window, the Stata command is:

Copy this command to your do-file. The command creates a label

```
label define age_group 1 "0 to 10" 2 "11 to 19" 3 "20 to 60" 4 "61 and older"
```

name (age_group) and defines the labels for the four values.

Now that the label has been defined, we can assign this label to the categorical variable we created.

The **label values** commands

8. Click on **Data**, then
   Data utilities then
   Label utilities then
   Assign value label to variables.
   The label values – Assign value label to a variable *dialog box opens. The default choice is to attach a value label to variables.*
9. In the Variables: box select **age_gp**.
   This is the variable that we want to attach a label to.
10. In the Value label box, select "**age_group**".
11. Click on the copy button, switch to the do-file editor, paste the command, switch back and click on the **Ok** button.

```
label values age_gp age_group
```

The Stata command is:

Run a tabulate on this variable to check to see there are labels for the values.

```
. tab age_gp

   Age group |      Freq.     Percent        Cum.
-------------+-----------------------------------
     0 to 10 |        575       37.73       37.73
    11 to 19 |        271       17.78       55.51
    20 to 60 |        629       41.27       96.78
61 and older |         49        3.22      100.00
-------------+-----------------------------------
       Total |      1,524      100.00
```

Second method:

Another method we can use create a new variable, assign the new values and assign the labels for the values in one step:

1. Select **Create or change data** from the **Data** menu
2. Select **Other variable-transformation commands**
3. Select **Recode categorical variable**
4. In the "**Main**" tab, select **ca3** in the Variables box.
5. In the **Required** box, specify the range you want and the new value to be assigned as well as the label for that new value using the exact format below which includes brackets:
   (0/10 = 1 "0 to 10")
6. In the Optional boxes continue to specify the ranges and value to be assigned:
   (10.001/19 = 2 "11 to 19")
   (19.001/60 = 3 "20 to 60")
   (60.001/max = 4 "61 and older")
   *Note: examples on how to specify the value can be see if you click on the "**Examples**" button.*
7. Click on the "**Options**" tab. Click on the radio button next to "**Generate new variables**".
8. In the box, type the name of the new variable: **age_gp1**
9. We can also specify a name for the value labels. Click in the box next to "**Specify a name for the value label defined by the transformation rules**".
10. In the box, type **age_label**.
11. Click on the copy button, switch to the do-file editor, paste the command, switch back and click on **OK.**

Note that the command for this process is on one line in the do-file. To make the command more readable, we can make multiple lines. However, Stata must know that the command continues to the next line. To do this, you must add three (3) forward slashes (/) at the end of the line. Reformatting the command your do file should look like below:

```
recode ca3 (0/10 = 1 "0 to 10")          ///
  (10.001/19 = 2 "11 to 19")             ///
  (19.001/60 = 3 "20 to 60")             ///
  (60.001/max = 4 "61 and older"),       ///
  generate(age_gp1) label(age_label)
```

There is a limit to the line length that Stata will read, so if the command is long you will need to place the last part of the command on a new line and use the continuation symbols ///

Let's add a variable label to the new variable: The Stata command is:

```
label variable age_gp1 "Age group - second method"
```

Now, compare the **age_gp** variable with the **age_gp1** variable. Use a cross tabulation (tabulate2 command). The counts should be identical.

Variation on the second method

The **recode** function

The same results can be achieved by using a function along with the command to create a variable. The function we will use is called recode() We will combine that function with the Generate command. The recode() function takes three or more arguments. The first argument is the variable name that you want to categorize. The rest of the arguments are used to determine how to code the new variable.

1. Select **Create or change variables** from the **Data** menu
2. Select **Create new variable**
3. Click on the reset button in the lower left hand corner of the dialog box -  if you need to remove any information that appears in the box.
4. Under the **Main** tab, type the name of the new variable in the **Generate Variable** box:
   agecat
5. Click on the **Generate variable as type** drop down box and change to **int**.
6. For the **Contents of variable** box, click on the **Create** button.
7. In the **Expression builder** box, under the **Category** section, select **Functions** and then **Programming**
8. A list of available functions is displayed. Scroll down to the **recode()** function and highlight that function. You will see a description of the function at the bottom of the dialog box.
9. Double click on this function. The function will be pasted in the window at the top of the dialog box so that you see:

   recode(**x**,x1,x2,...,xn)

The first "x" is highlighted. Replace the first "x" with the variable name, **ca3**, so that the expression now looks like:

recode(**ca3**,x1,x2,...,xn)

Replace the "x1" with the value of the highest age that you want to recoded for the first group, e.g.

recode(ca3,**10**,x2,...,xn)

Continue replacing the values with the next group to be coded until all groups are defined, e.g..

recode(ca3,10,**19,60,100**)

Stata will use the value as the code assigned to all cases that fall within that group. The value of 10 will be assigned to all observations with ages between 0 and 10, the value of 19 will be assigned to all observations that fall between ca3 >10 and <=19, and so on.

10. Click on **OK** to exit the expression builder dialog box.
11. Stata 14 has added a new option to place the variable in a specific location. The default is to add to the end of the dataset. We can choose from the dropdown box "Insert after specified variable". Another box opens where we can specify **ca3**
12. Click on the copy button, switch to the do-file editor, paste the command and switch back. Click on **OK** to run the command.

The Stata command is:

```
generate int agecat = recode(ca3,10,19,60,100), after (ca3)
```

Run a **tabulate** on the new variable - **agecat** - and compare the number of cases in each category between the new variable and the **age_gp** variable. The numbers will be the same. You would need to add a variable label and create a value label with labels associated with the values to complete the variable.

These new variables are not yet part of the data file stored on disk. We must save the data file for these variables to be included permanently in the data file. It is a good practice to save the file under a different name in case we want to go back to a previous version of a file. For this reason we will use the **Save as** command from the **File** menu. The new file name will be **q1a-age.dta**.

1. From the **File** menu select **Save as...**
   The cursor should be in the box under File name: *above* the Save as type: *Stata data (*.DTA) drop-down box. Since *.dta in the File name: area is blocked, you can immediately start typing the new file name.*
2. Type **q1a-age** (The .DTA extension will be added automatically.)
3. Click on **Save** to run the command.

The Stata command is:

```
save "q1a-age.dta"
```

Copy this command from the Results window to the do-file editor. We do not want to include the specific directory so delete the part of the command that references the specific directory. If we want to share the do-file with another colleague that person will only have to change the initial "cd" (change directory) command at the beginning of the do-file to be able to run the do-file.

To be able to rerun the do-file successfully, an error will be generated when the processor reaches this "save" command. Stata will not save a file if the file already exists on disk. To make sure the command will run, you must add further instructions to replace the file if it already exists. Add ", replace".

```
save "q1a-age.dta", replace
```

Now each time the data file Q1A-AGE.DTA is opened, the **age_gp** variable as well as the other two **age_gp1** and **agecat**, will be included.

You might want to analyze this new categorical variable using the **tabulate** command to determine how many people in each age group are heads of households, spouses, or children.

1. From the menus click on
   Statistics
   Summaries, tables and tests
   Frequency tables
   Two-way tables with measures of association
   The* Tabulate2 - two-way tables *dialog box opens.
2. Use **age_gp** for Row variable and **ca2** (relation to head) for Column variable.
3. Check the proper selections in the Cell contents choices, for we want both Row and Column percentages.
4. Click on the copy button, switch to the do-file editor, paste the command and switch back. Click on **OK** to run the command.

The Stata command is:

```
tabulate age_gp ca2, column row
```

From the table you can see that 11.95% of heads of households are 61 years of age or older. Also, of the people 61 years or older, 83.67% are heads of households.

Apply what you have learned about data transformations and descriptive statistics in the following exercise.

Exercise 1.2

Using the Household Data and Questionnaire (available in the annex), find out the number of households in each district that have 1-4, 5-7, and more than 7 persons per household.

Hints:

a. Use the file c-hh.dta.
b. Recode **h1** into **hhsize** using the following groups: (1 thru 4) (5 thru 7) (8 thru Highest).
c. Add a variable label and value labels.
d. Produce a cross-tabulation table showing the districts in the columns and the new variable in the rows. Ask for a row percent and a column percent.

Looking at the results, you can see 34.76% of all 1 to 4 member households are found within Monapo and that 60.75% of all households in Monapo have 1 to 4 members in a household.

```
+-------------------+
| Key               |
|-------------------|
|     frequency     |
|  row percentage   |
| column percentage |
+-------------------+
   Household |              district
        size |    monapo     ribaue    angoche |     Total
-------------+---------------------------------+----------
 1-4 members |        65         48         74 |       187
             |     34.76      25.67      39.57 |    100.00
             |     60.75      40.34      64.35 |     54.84
-------------+---------------------------------+----------
 5-7 members |        39         56         36 |       131
             |     29.77      42.75      27.48 |    100.00
             |     36.45      47.06      31.30 |     38.42
-------------+---------------------------------+----------
8-12 members |         3         15          5 |        23
             |     13.04      65.22      21.74 |    100.00
             |      2.80      12.61       4.35 |      6.74
-------------+---------------------------------+----------
       Total |       107        119        115 |       341
             |     31.38      34.90      33.72 |    100.00
             |    100.00     100.00     100.00 |    100.00
```

We have completed Section 1. Before we close down the session, we need to close the log file that has been recording the commands and output. The command to close the log file is `log close`

We can type this command in the Command window and run it and then copy and paste the command in the do-file.

Before exiting Stata save the do-file. The file contains all of the commands. It is useful to keep this file so you can rerun the commands if you want review the commands and the output that is produced. If you have not yet saved the file follow these instructions. Otherwise, click on the Save icon  on the tool bar.

1. If you have not saved the do-file, make the Do-file Editor the active window using its icon on the Windows taskbar.
2. From the **File** menu select **Save as...**
3. Enter the filename **session1**
   The .do extension will be added to the name automatically.
4. Click on **Save.**

To exit Stata, switch back to the Stata window:

1. From the **File** menu select **Exit**
   A dialog box will open to say that "Data have been changed without being saved. Do you really want to exit?"
2. Click on Yes
   We do not need to save the newly created categorical variable. We will not be using it again.

If you want to look at the log file that we just created, open Stata.

1. From the **File** menu select **View**
   A dialog box will open "Choose File to View"
2. Click on the browse button. You will see listed a file called "session1.smcl".
3. Select that file, click on **Open**, then click on **OK**

The Viewer opens and displays the log file that has saved all the commands and output from Section 1 of the tutorial.

To close the Viewer, click on the **x** in the upper right hand corner of the Viewer.

STATA 14 - SAMPLE SESSION

SECTION 2 - Restructuring Data Files - Table Lookup & Aggregation

Restructuring Data Files

For some types of analysis the data files may need to be restructured to a different level. The data from the four sections of the questionnaire—household, member, production and sales—are in four separate data files because the data are at different levels. The household data is at the most general, or highest, level - one case per household. The other three files contain more detailed data, which is usually thought of as being at a lower level - there are multiple cases per household. If you are not familiar with the concept of levels of data, read "Computer Analysis of Survey Data -- File Organization for Multi-Level Data" by Chris Wolf, before continuing on with this section. This paper is available at http://fsg.afre.msu.edu/survey/index.htm

The analysis we did in Section 1 was done using the variables in a single file. However, other types of analysis require combining data from more than one file. Let's look at an example.

Suppose we want to create a table of calories per adult equivalent produced per day from the principal food crops. Furthermore, we want to see how this varies by district and calorie-production quartile.

TABLE:1 Food Production in calories per adult equivalent per day

	Calorie Production Quartile			
Districts	1	2	3	4
Monapo				
Ribaue				
Angoche				

The data in their current form cannot produce this table. Many transformations are required to restructure the data to be able to provide the results for this table. The above table is an example of the complications you will encounter in real-world data analysis. This entire section will be devoted toward the goal of creating this table.

To begin, let's look at the files we have and at the variables we need to use from each of these:

- **c-q1a.dta**: This file contains data on household roster characteristics. It is at the household-member level. We need to use the variables **ca3** (age) and **ca4** (sex) in this exercise to compute the number of adult equivalents per household.
- **c-q4.dta**: This file contains data on crops produced by the household. The variables we need to calculate the total production of the household are:

    a. **prod** - contains the codes for the agricultural crop produced.
    b. **p1a** - contains the codes for the unit in which the production was measured (100 kg sack, 50 kg sack, etc).
    c. **p1b** - contains the number of units produced for the year.

Note that the unit of production is not a standard unit for each crop. For example, a "100 kg sack", as the term is used in Mozambique, weighs 100 kg only when the sack is filled with maize. When it is filled with manioc root, it weighs much less than 100 kg. Thus, we need *conversion factors* to be able to convert each of the units in which production was actually measured to our standard unit, which is the kilogram.

- **conver.dta**: This is a *table-lookup file*. This file was created specifically to handle the problem of converting non-standard units to a standard unit. For each product-unit combination there is a conversion factor to convert the measurement to equal the weight in kilograms. In other words, there is a different conversion factor for each product-unit combination. For example, the conversion factor for a 50 kg sack of rough rice is 39.44; for a 50 kg sack of cotton it is 17.5, while a 50 kg sack of peanuts is 41.67. The variables in this file are:

    a. **prod** - product (crop) code
    b. **unit** - unit of measure
    c. **conver** - conversion factor (equal to the number of actual kilograms for the combination of **prod** and **unit**)

Below, a sample of data from CONVER.DTA shows that:

rice (**prod**=7) measured in a 20 liter can (**unit**=8) weighs 19 kg;
rice (**prod**=7) measured in a 50 kg bag (**unit**=24) weighs 53 kg;
beans (**prod**=30) measured in a 20 liter can weighs 17 kg;
beans (**prod**=30) measured in a 50 kg bag weighs 47 kg.

prod (Product)	unit (unit)	conver (conversion factor)
...	...	...
7	8	19
7	24	53
...	...	...
30	8	17
30	24	47
...	...	...

- **calories.dta**: This also is a *table-lookup file*, created for convert kilograms of food into calories of food. It contains two variables:

  a. **prod** - the product (crop)
  b. **calories** - number of calories per kilogram of each of the crops

To create a data files that will produce the output table described above, we need to combine the data from different files. There are different methods that can be used to combine files, depending on what is desired. In Stata, we can

1. **Append** datasets. Appending data sets means that the data in different files have the same variables and the desire is to add one data set of observations to the end of another data set (or append one file to the end of another file). An example would be that you entered data for harvest in one file for one district and entered data for harvest for another district into another file. We want the data to be in the same file. To do that, we would use the append command.

2. **Merge** datasets. Merge combines datasets horizontally matching corresponding observations. An example is a survey asking questions about the household in Part 1 and another set of questions about the household in Part 3. Each part of the survey is entered into a different data file. To combine Part 1 and Part 3 (where both sets of data are at the household level), we would use the merge command.

3. **Joinby** datasets. This type of merge combines datasets horizontally matching all pairwise combinations possible. An example is a set of data on parents and a set of data on children. Joinby would match the parents to every observation of the children within that family. The key word "unmatched" is used and within parentheses the type of join is specified). There

are four types of joins:

none - all unmatched observations are ignored (this is the default), i.e. if there is not a matching observation in both files, the observation is dropped from the final dataset.

both - unmatched observations from the "master" (or file that is in memory) and "using" (file that is not in memory) data are included.

master - unmatched observations from the "master" data are included but not unmatched observations from the "using" file.

using - unmatched observations from the "using" data are included but not unmatched observations from the "master" file.

4. **Cross** datasets. In this type of merge, the first observation in the first file is joined horizontally with every observation in the second data set. The second observation in the first file is then joined with every observation in the second data set and so on. The result is a very large dataset. This type of file combination is rarely used.

In this tutorial we will use the "**merge**" and the "**joinby**" commands.

With this information in hand, we can now think about the specific steps we must take to create the file we need to produce the output we want. Logically, there are three steps:

1. We need to know how many calories each household produced for the year. We can generate a file with this information using data we have stored in three files—the production file (c-q4.dta), and two table-lookup files (conver.dta and calories.dta).

2. We need to know how many adult equivalents are in each household. We can generate a file with this information using data from the member file (c-q1a.dta).

3. We need to combine the results from steps 1 and 2 into one file so we can compute calories produced per adult equivalent per day.

Step 1: Generate a household level file containing the number of calories produced per household.

While executing this step, we must keep three things firmly in mind.

First, all production is currently measured in non-standard units. Each unit can have a different weight for each of the products. Thus, we must first convert all production into kilograms.

Second, we want to know many calories are produced by each household, not kilograms. Thus, after converting all production to kilograms, we must convert kilograms to calories.

Third, an examination of the file shows that we have data for each product produced by the household. But we want to know the total calories produced by the household for specific food products, not the total calories from each separate product. After we convert all production to calories, we need to select only specific food products and then sum the calories within each household to create a household level file that contains the total calories produced.

Let's begin by creating a new do-file. Open the Do-File Editor. Start by including comments about the purpose of the do-file, your name as the creator of the do-file and the date. Other items to include are the Stata version, the "cd" command to switch to the directory where you want to work, the log command to record the session. Example:

```
/* change to directory where files are stored*/
cd "C:\Users\Documents\StataTraining\data"

* define the log file to capture output
capture log close
log using log_session2, append

/* Purpose of do-file */
/* Author and date */
/* Tasks to be done in this do-file */

/*program setup */
version 14
clear all
macro drop all
```

We are now ready to open c-q4.dta, the production file.

1. Select **File** / **Open...**
2. Select the file name c-q4.dta
3. Click on **Open** to run the command.

4. Copy the command to open this datafile from the Results window, switch to the Do-File Editor and paste the command into the do-file. Delete the reference to the folder. (Why do we delete the folder reference?)
5. Save the do-file to the name session2.do

We now want to convert all production from the different crops into kilograms. To find the conversion factor appropriate for each case in the production file (c-q4.dta), we need to look up the product and unit in the conver.dta file. We will merge the information from this file into the file in memory (the production file). The variable with the conversion factor will then be available to calculate the total kgs produced. In Stata we want to use the "joinby" command for this merge. It can be found through the menus with the following choice:

Data
Combine datasets
Form all pairwise combinations within groups.

The input files for a merge must be sorted by the *key variable(s)* (*key variables are those variables you are using to match by between the two files*). Since there is a unique conversion factor for each product-unit combination, both our product variable and our unit variable are the key variables.

Both data files must be sorted by the variables we will match by. The CONVER.DTA file is already sorted by **prod** and **unit**. However, if we want to sort that file we will have to open the file (which closes the current file we have open) to sort it, then we can save it. Then we can reopen the production file. Once we have sorted the conver.dta file and saved it, it will never need to be sorted again. Therefore, we do not want to put that code into our do-file. We can just write a comment that the conver.dta has been sorted correctly.

Our production file, the current working file that is in memory, must be sorted also by the variables we want to match by. Note that the unit variable is named p1a. To sort the cases:

1. From the **Data** menu select
   Sort
   The sort - Sort data *dialog box will open.*
2. There are two choices at the top of the dialog box: Standard sort (ascending) and Advanced sort (mixed ascending / descending). The default is Standard sort

(ascending). We do not need to change anything.

3. In the **Variables:** box select **prod** and **p1a**
4. Click on the copy icon and then click on **Ok**.
4. Switch to the do-file editor and paste the command.

The Stata command is:

```
sort prod p1a
```

Let's look at the two variables using the tab1 command. We can type in the Command window

```
tab1 prod p1a
```

There are 1,693 cases with a product code. Many of the cases are the same product, i.e. maize has 192 cases. For the tabulation of p1a we see two values that have no labels (0 and 1) and note that there are only 1670 cases that contain a value for p1a. There are possible data problems. We would expect to see a value in p1a for every crop that was harvested. How would you determine if there are missing data in the p1a variable? If it were possible, corrections should be made before proceeding further.

Rename any key variables in both files to the same name

The variable in the conver.dta file that contains the code for the unit has a name of **unit**. The variable in our active file that contains the code for the unit is named **p1a**.

We cannot merge the two files unless the variables that we want to merge by have the same names. We will rename **p1a** to **unit**.

1. From the **Data** menu select **Data utilities** then **Rename groups of variables**
   The rename - Rename groups of variables *dialog box will come up.*
2. In the **Existing Variable names** box select **p1a**. In the **New variable names** box type **unit**.
3. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **Ok**.

The Stata command is:

```
rename (p1a) (unit)
```

Note in the Variables window that the name has changed.

The **joinby** command

The files are now ready to be merged. We are doing a "File - Table" merge where the second file is our "Lookup Table". We want to keep all records in the "master" file (or the file in memory) and keep only those records in the "using" file that match the data in the master file.

1. From the **Data** menu select **Combine datasets**, then select **Form all pairwise combinations within groups**
   The joinby - Form all pairwise combinations within groups *dialog box will open.*
2. To fill in the box labeled **Filename of dataset on disk**: click on the **Browse** button, Select the filename conver.dta and click on **Open.**
3. In the box labeled **Join observations by groups formed from specific variables: (optional),** select **prod unit**
4. Click on the Options tab.
5. Under Unmatched observations, select **Include from data in memory**
   This option will keep cases in the "master" data set (in memory) that do not have a match in the lookup data set.
6. Click on the copy button, switch to the do-file editor, paste the command, delete the directory reference that appears in the part where the data file is selected, switch back to the dialog box and click on **OK**

The Stata command is

```
joinby prod unit using "conver.dta",
unmatched(master) _merge(_merge)
```

The above command tells Stata to merge the working data file or "master" (the file in memory) with the conver.dta file or "using" data file, (using conver.dta as a table lookup). We had renamed **p1a** to **unit**. The variable **conver** will be added to the working data file at the end of the variables.

Key variables are required in any procedure to merge two files when one of the files is being used as a keyed table. Our key variables specify how to merge the lookup file using product and unit (the grouping variables), because we have a different conversion factor for each product-unit combination. If we had used only **prod**, Stata would expect each product to have only a single conversion factor, with the same value regardless of the unit of measurement used. For example, it would expect the

same conversion factor for rice whether it was in a 100 kg bag or a 20 liter can. This would be incorrect.

Check the resulting data file

The new working file produced by the join contains the needed conversion factor variable, **conver**. For every product-unit combination, **conver** is equal to the number of kilograms in that unit. It is always important to verify if the join was successfully completed.

Stata provides a variable that tells us how the observations from the two files matched. That information is stored in a variable called **_merge** . Let's run a tabulation on this variable to look at how the merge was done. In the Command window type:

```
tab _merge
```

From the Results window you should see there is the same number of records in the file as there was before the merge, i.e. 1,693. There are 27 cases where there was not a match for the prod-unit combination in the look-up file.

Click on the Data Editor (Browse) button to look at some of the cases to verify that the conversion factors match the products.

We could also use the list command to see if a 20-liter can filled with maize grain has a conversion value of 18 kilograms (prod = 47 unit = 8).

The Stata command is:

```
list prod unit conver if prod==47 & unit ==8
```

Note: ***Two equal signs (==) are required.***

The two equal signs distinguish relational equality from the =*exp* assignment phrase. For example, if you want to create a variable where you will be assigning values to that variable, you will use an expression (*exp*) and need only 1 equal sign (example: gen newvar = oldvar*2.5). In the above example, prod already has values and we want to see only records where **prod** has the value of 47. Therefore, it is a relational equality and we must use two (2) equal signs (e.g. show me only records where prod ==47 and unit == 8).

If you wanted to look at the 27 observations where there is no conversion factor, how would you specify the "list" command to look at these 27 cases?

As part of data verification and to make sure you are using a good set of data you will want to investigate further to see if the records without a conversion look-up value are crops that you want to have included in the analysis you are doing. If they are, correct the lookup file and/or the production file and run your procedure again (easy to do since you have a do-file with all the commands you need).

Compute total kilograms produced

We can now calculate total kilograms produced by multiplying the quantity of production (i.e. 25 of whatever unit was specified in p1a) by the conversion factor. The variable with the quantity is **p1b**.

The **generate** command

1. Select **Create or change variables** from the **Data** menu
2. Select **Create new variable**
   The generate - Create a new variable *dialog box opens.*
3. Under the **Main** tab, change the Variable type to **double**.
4. Type the name of the new variable in the **Variable name** box: **qprod_tt**
5. For the **Contents of variable** box, type in **p1b * conver**
6. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **Ok**
7. Add a comment in the do-file to explain what you have done.

The Stata command is:

```
generate double qprod_tt= p1b * conver
```

Note that there were 49 cases where no value was generated. We had 27 cases with no conversion value. Why do the rest of the cases (22 cases) not have values? (Look at the data in the browser where there are no values if you are not sure. Are there issues you might want to try to fix?)

You should rename the variable that had to be changed for the joinby back to the original name if you plan to save the data file to a new name. Otherwise you might forget what the variable originally was. The command is the same as above, only reverse the variables:

```
rename (unit) (p1a)
```

Now that the kilograms have been calculated we need to look up the value of a kilogram in calories for each product. This information is in the table lookup file called calories.dta. This file has two variables — product (**prod**) and number of calories (**calories**) per kilogram. The key variable is product (**prod**). In order to add the calorie-conversion variable to the working data file we need to do another merge with keyed table lookup (**joinby**). This time the key variable only needs to be the product variable. The data file has already been sorted by product (see the previous merge), so we don't need to sort it again. Stata will reuse the _merge variable again with the next join we do, so we should drop this variable first since we no longer need it. The command to delete a variable is called **drop**

The **drop** command

The Stata command is:

```
drop _merge
```

Now we are ready for the next join:

1. From the **Data** menu select **Combine datasets**, then select **Form all pairwise combinations within groups**
   The joinby - Form all pairwise combinations within groups *dialog box opens.*
2. To fill in the box labeled **Filename of dataset on disk**: click on the **Browse** button, Select the filename calories.dta and click on **Open.**
3. In the box labeled **Join observations by groups formed from specific variables,** select **prod** only
4. Click on the Options tab.
5. Under Unmatched Observations, select **Include from data in memory**
   This option will keep cases in the original data set that do not have a match in the lookup data set.
6. Click on the copy button, switch to the do-file editor, paste the command, delete the folder reference, switch back to the dialog box and click on **Ok**
7. Add comments to the do-file.

The Stata command is:

```
joinby prod using "calories.dta", unmatched ( master )
_merge(_merge)
```

The new working data file produced by the merge now contains the needed calorie variable, **calories**, but check

to make sure. Maize grain (PROD=47) should have the value of 3590 in the **calories** variable. We can browse the data and/or we can use the list command again.

The Stata command is:

```
list prod calories if prod==47
```

Also check the _merge variable to see how the merge was done:

```
tab _merge
```

Note that there are 87 cases with no value in the **calorie** variable. How would you check to see which products have no calorie value?

Calculate the total calories produced

We can now compute total calories produced.

1. Select **Create or change variables** from the **Data** menu
2. Select **Create new variable**
   The generate – Create a new variable *dialog box opens. We have used this dialog box earlier. To clear the contents, click on the "Reset" icon in the lower left corner of the dialog box.*
3. Under the **Main** tab, change the **Variable type** to "double".
4. Type the name of the new variable in the **Variable name** box: **cprod_tt**
5. For the **Contents of variable** box, type in **qprod_tt * calories**
6. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **Ok**
7. Add a comment in the do-file to explain what you have done.

The Stata command is:

```
generate double cprod_tt= qprod_tt * calories
```

Note that missing values were generated for 131 cases.

Assign variable labels

The two new variables do not yet have variable labels. To assign a variable label:

1. Click on **Data**, then **Data utilities**, then **Label utilities**, then **Label variable**.
2. In the **Variable**: box, select the name of the first

variable: **qprod_tt**

3. In the **New variable label** (may be up to 80 characters) box, type
   Total production in kgs
4. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on the **Submit** button.
   Clicking on the "submit" button leaves the dialog box open so we can then define the label for the cprod_tt variable without having to select it again from the menus.
5. In the **Variable**: box, select the name of the second variable: **cprod_tt**
6. In the **New variable label** (map be up to 80 characters) box, type
   Total calories produced
7. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on the **OK** button.
8. Add a comment to the do-file to explain what you have done.

The Stata commands are:

```
label variable qprod_tt "Total production in kgs"
label variable cprod_tt "Total calories produced"
```

This gives us a new working data file with total calories produced per product for each household.

Select only staple food products

The final output table asks only for information about the staple food crops. These are defined as:

peanuts	(prod=5))
rice	(prod=6)
nhemba bean	(prod=30)
manteiga bean	(prod=31)
manioc	(prod=41)
sorghum	(prod=44)
maize	(prod=47)

We can find the product code by looking at **prod** in the questionnaire. Since we are only interested in those products, we need to exclude the rest of the cases about other crops. Stata uses the "keep" command. Once you run this command you will no longer have the complete data set available. You must remember that you should never save a file to the same name after you have selected out a set of data. You will overwrite the original data and

no longer have the complete set.

The **keep if** command

To select just a subset of cases:

1. Click on **Data**, then **Create or change variables**, then **Keep or drop observations**. *You should see the* drop - Drop or keep observations *dialog box.*
2. Under the **Main** tab select the round radio button next to Keep observations
3. In the **Observations to keep if (expression):** box type
   ```
   prod == 5 | prod == 6 | prod == 30 |
   prod == 31 | prod == 41 | prod ==44 |
   prod == 47
   ```
   The "|" is a symbol for the word OR. We are telling Stata to select all cases with **prod** *equal to 47 (double equal) or* **prod** *equal 30 or* **prod** *equal 31 and so on ...*
4. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **Ok**
5. Add a comment to explain what you have done.

The Stata command is:

```
keep if prod==5 | prod==6 | prod==30 |
prod==31 | prod==41 | prod==44 | prod==47
```

Only cases with these product codes will now be used for analysis. Note that 464 observations were dropped. You can use the **tabulate** command to verify that you now have only 7 crops in the file. In the Command window you can easily type

```
tab prod
```

There should be 1,239 cases remaining for the 7 crops that are considered staple foods.

Now, we need to know how many calories were produced **per household** for all these 7 staple food products combined. To do this, we need to sum, for each household, the values of **cprod_tt** for all of the food crops the household produced. In other words, we need to create a new household-level file, where there is only one case per household, from the current household-product level file where there are multiple cases per household. Stata uses the command "collapse" to aggregate the number of cases at one level to a new level.

We will sum all the cases for each household to create just one case for household.

Create a new file which is a household level file rather than a household-product level file

To create the new household-level file, we use the command: **collapse**. Stata always uses the working data file as the file to be collapsed.

The **collapse** command

1. From the **Data** menu, select **Create or change variables** then select **Other variable transformation commands** then select **Make dataset of means, medians, etc.**
   The collapse - Make dataset of summary statistics *dialog box will appear.*
5. On the **Main** tab in the **Statistics:** box for 1: change "Mean" to "Sum" by clicking on the drop-down arrow. In the **Variables:** box select **cprod_tt** .
6. Click on the **Options** tab and in the **Grouping variables** box, select **district vil hh** in that order because those variables represent the identification of an individual household.
   The Grouping variable(s) *is used to specify the variables to be used for combining cases in the collapsed file. Any cases from the original file that have identical values for all 3 of the grouping variables will be combined into a single case in the collapsed file. We want the collapsed file to have one case per household, so we use the variables that identify a household in our survey*–**district***,* **vil***, and* **hh***.*
4. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **Ok.**
5. Add a comment to explain what you have done.

The Stata command is

```
collapse (sum) cprod_tt, by(district vil hh)
```

In the Variables window you should see only 4 variables. Look at the resulting file (click on the **Data Editor (Browse)** tool). You should see only one case per household. The collapse command created a new variable **cprod_tt**, which we calculated by summing **cprod_tt**, total calories produced, across all cases (all the different food crops) for each household. The only variables which are contained in a collapsed file are the grouping variables and any new collapsed computed variables created (e.g. **cprod_tt**). Stata automatically added a variable label which is the function and variable used to create the resulting new variable.

You can look at the variable definitions using the **describe** command. The computed variable **cprod_tt** does not have a very descriptive label any more so we need to change the label to reflect what the variable is.

1. Click on **Data**, then **Data utilities**, then **Label utilities**, then **Label variable**.
2. In the **Variable**: box **cprod_tt** should be selected
3. In the **New variable label** (may be up to 80 characters) box, type
   Calories produced in staple foods
4. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on the **Ok** button.
5. Run the **describe** command again.

The Stata commands are:

```
describe
label variable cprod_tt "Calories produced in staple foods"
describe
```

The new working data file now contains what we need, total number of calories from staple foods produced per household. We can also look at this variable by doing a descriptives. Use the "summarize" command to run a mean on the new variable **cprod_tt**. You should find that the average number of calories produced per household per year is 4,483,965.

Save this data file using the **Save as...** command.

1. Use **Save as...** from the **File** menu
2. Name the file **hh_file1**
3. Click on **Save.**
4. Copy the command from the Review window and paste it into the do-file editor, delete the reference to the folder, and add a comment to explain what you have done.

Remember to save your do-file regularly. You must be in the Do-file editor to save the do-file.

Step 2: Generate a household level file containing the number of adult equivalents per household.

The data needed to calculate adult equivalents per household is in the member file, c-q1a.dta.

1. Click on the "**Open**" icon on the Stata Toolbar
2. Select the file name **c-q1a.dta** and open the file.

3. Copy the command from the Review window and paste it into the do-file editor, delete the folder reference, and add a comment to explain what you have done.

We want to calculate the adult equivalents for the household. The adult equivalents value helps us to evaluate whether the household is producing enough food to sustain the household. The variable is calculated using the age and the gender of each member of the household. Some members need more food than others and these variables help to assign that value. For example, the adult equivalent value, on average, for a female 10 to 19 years old, is about 84% as many calories as a male 10 years or older, who is given a value of 100%. Children under 10 need only 60% as many calories as the typical male 10 years and older. The child (male or female) under age 10 is assigned a value of .60 adult equivalents.

For each person (observation) in the member file we need to look at the variables sex, **ca4**, and age, **ca3**, to calculate adult equivalents.

There are many different possibilities of values that could be assigned for adult equivalents. We will use a very simple table for this exercise. The rules we will use for calculating adult equivalents for this survey are:

Males, 10 years and older	= 1.0
Females, 10 to 19 years old	= 0.84
Females, 20 years and older	= 0.72
Children, under 10 years old	= 0.60

Create a variable with the adult equivalent for each person

The **generate…. if** command

The **generate.../if...** command is used to compute the adult equivalents for each member. We will name the adult equivalent variable that we create as **ae**.

1. Select **Create or change variables** from the **Data** menu
2. Select **Create new variable**
   The generate - Generate a new variable *dialog box opens.*
3. Under the **Main** tab, type the name of the new variable in the **Generate Variable** box:
   ae
4. For the **Contents** box, type the value of **1**
5. Click on the **if/in** tab.
6. Type the statement **ca4 == 1 & ca3 >= 10**
7. Click on **OK**

The **replace…. if** command

From the results window you should see that 1003

missing values were generated from the command. Now that the new variable has been created, another command is used to assign the codes for the other adult equivalent groups that have not yet received a value. We use the **replace** command.

8. Select **Create or change variables** from **Data**
9. Select **Change contents of variable**.
   The replace - Replace contents of variables *dialog box opens.*
10. In the **Variables** box select the name of the variable that was just created: **ae**
11. Type .84 in the **New Contents** box
12. Click on the **if/in** tab.
13. In the **Restrict observations if** (expression) box, type in **ca4==2 & (ca3 >=10 & ca3 <=19)**
14. Click on **Submit** . The dialog box remains open and the command is run. *(143 real changes made)*
15. In the **Restrict to observations if** box, change the criteria to: **ca4 == 2 & ca3 >=20**
16. Click on the **Main** tab.
17. Type .72 in the **Contents** box .
18. Click on **Submit**. The dialog box remains open and the command is run. *(331 real changes made)*
19. Type .6 in the **Contents** box
20. Click on the **if/in** tab.
21. In the **Restrict to observations if** box, change the criteria to: **ca3 <10**
22. Click on **Ok** *(520 real changes made)*.

The statements we need are detailed in the table below.

Numeric value	If statement
1	ca4 == 1 & ca3 >=10
.84	ca4 == 2 & (ca3 >=10 & ca3 <=19)
.72	ca4 == 2 & ca3 >=20
.6	ca3 <10

23. Copy the 4 commands from the Review window and paste them into the do-file editor and add a comment to explain what you have done.

The new variable does not yet have a variable label. To assign a variable label:

1. Click on **Data**, then **Data utilities**, then **Label utilities**, then **Label variable**.
2. In the **Variables**: box, select the name of the variable name: **ae**
3. In the **Attach label to variable** (up to 80 characters) box, type

Adult equivalents

4. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on the **Ok** button. Add a comment to explain what you have done in the do-file.

The Stata commands are:

```
generate ae= 1 if ca4 == 1 & ca3 >=10
replace ae = .84 if ca4==2 & (ca3 >=10 & ca3 <=19)
replace ae = .72 if ca4==2 & ca3 >=20
replace ae = .6 if ca3 < 10
label variable ae "Adult equivalents"
```

To verify that the new adult equivalent variable, **ae**, has been calculated, display a frequency table for it.

1. From the menus click on **Statistics.**.then **Summaries, tables and tests** then **Frequency tables** then **One-way tables** *The* tabulate1 - One-way tables *dialog box opens.*
2. Select the variable name **ae** in the **Categorical Variable** box which is found under the tab labeled **Main**.
3. Check the box ✓ next to **Treat missing values like other values**

4. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on the **Ok** button.

The Stata command is:

```
tabulate ae, missing
```

You should see there are 1524 total cases. Ideally there should be four values represented in the table —1, .72, .84, and .60— and no missing cases. You can see we have nine missing cases. This tells us that our data file is missing either the age or the sex for nine people. This problem should have been identified during the cleaning process. At this point it would be ideal for the researcher to go back to the original questionnaires to determine the reason why these data are missing. Since we can't do this, we will use an alternative method.

Replace "missing values" with a mean value

If we leave these values missing, the total adult equivalents of those households will appear to be slightly

smaller, which may distort the results. We could avoid this problem by eliminating the households with missing information from our analysis, but then we can't use the information about the food production from those households. Instead, we will try to make a reasonable assumption about those nine missing members. We know that the adult-equivalent values range from a low of .6 for children to a high of 1.0 for adult males, which is not a very wide range. We can determine the mean (average) adult-equivalent value for the whole sample and use that value to fill in the missing data. To find out the average adult-equivalent value for our sample, click on ...

1. **Statistics** then **Summaries, tables and tests** then **Summary and descriptive statistics** then **Summary statistics**
2. In the **Variables**: box select the variable: **ae**
3. Don't forget to copy the command into the do-file editor, then click on the **Ok** button

The Stata command is:

```
summarize ae
```

We can see that the mean (average) value of **ae** for all individuals is .79, with a standard deviation of only .17. We will assume that the nine individuals with missing age or sex codes are all "average" individuals, and assign them the adult-equivalent value of .79. (*Warning: be very cautious about "filling in" missing data this way. Careless use of this technique can give you misleading results. We are using this example to illustrate the use of Stata commands and not recommending that you do this routinely to compensate for missing data.*)

We will use the **Replace** command to change the system missing values (.) in the **ae** variable to the mean. We want to use the scalar mean rather than entering a specific value because the data could change with further cleaning, meaning the fixed value is no longer correct.

1. **Data** then **Create or change variables** then **Change contents of variable**
   The replace - Replace into same variable *dialog box will appear.*
2. Under the **Main** tab, select **ae** in the Variable: box
3. In the **New Contents** box type **r(mean)**
4. Under the **if/in** tab in the **Restrict to observations if:** box type

ae==.
The "period" represents system missing.

5. Don't forget to copy the command into the do-file editor, then click on the **OK** button. *(9 real changes made)*
6. Check the results of your **replace** command by rerunning the **tabulate** command.

You should see 9 cases in the frequency with a value of .786429. Remember: you can only use the scalar mean immediately after running the summarize command.

The Stata commands are:

```
replace ae = r(mean) if ae==.
tabulate ae, missing
```

Calculate the adult equivalents for the household

The **collapse** command

Now we need to calculate the number of adult equivalents for each household. The current file is at the member level, but we need the value at the household level. Again we use **Collapse** to go from the member level to the household level. The new variable **ae** will be calculated by summing **ae** across all members of a household.

Reminder: The Grouping variable(s) specify the variables to be used for combining cases in the collapsed file. Any cases from the original file that have identical values for all of the grouping variables will be combined into a single case in the collapsed file. We want the collapsed file to have one case per household, so we use the variables that identify a household in our survey—**district**, **vil**, and **hh**.

1. From the **Data** menu select **Create or change variables** then **Other variable transformation commands** then **Make dataset of means, medians, etc.**
   The collapse - Make dataset of means, medians, etc. *dialog box will appear.*
2. On the **Main** tab in the **Statistics:** box for 1: change "mean" to "sum" by clicking on the drop-down arrow. In the **Variables:** box select **ae** .
3. Click on the **Options** tab and in the **Grouping variables** box, select **district vil hh** in that order because those variables represent the identification of an individual household.
   The Grouping variable(s) *is used to specify the variables to be used for combining cases in the collapsed file. Any cases from the original file that have identical values for all 3 of the grouping variables will be combined into a single case in*

the collapsed file. We want the collapsed file to have one case per household, so we use the variables that identify a household in our survey—**district**, **vil**, *and* **hh**.

4. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **OK**
5. Add a comment in the do-file to explain what you have done.

The Stata command is

```
collapse (sum) ae, by(district vil hh)
```

Collapse creates a new working file. The new working data file is at the household level, with one case per household. The variable **ae** is the total adult equivalents for that household. Look at the resulting file (click on the Data Editor (Browse) icon). You should see four variables with only one case per household. You can also look at the variable definitions using the **describe** command. The computed variable **ae** does not have a very descriptive label any more so we need to change the label to reflect what the variable is.

1. Click on **Data**, then **Data utilities**, then **Label utilities**, then **Label variable**.
2. In the **Variables**: box, select the name of the first variable: **ae**
3. In the **New variable label** (may be up to 80 characters) box, type
   Adult equivalents per household
4. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **Ok**
5. Run the **describe** command again.

To verify that this variable was created, **summarize** the variable **ae**.

1. **Statistics** then **Summaries, tables and tests** then **Summary and descriptive statistics** then **Summary statistics**
2. In the Variables box you should see **ae**
3. Don't forget to copy the command into the do-file editor, then click on the **Ok** button.

You should find that the average adult equivalent over all households is 3.494221.

The Stata commands are:

```
label variable ae "Adult equivalents per household"
summarize ae
```

This completes Step 2. Save this file as hh_file2.dta.

1. Click on **File**/**Save As...**
2. Filename is hh_file2
3. Click on the **Save** button.
4. Copy the command from the Review window and paste it into the do-file editor, delete the reference to the folder, and add a comment to explain what you have done.

The Stata command is:

```
save "hh_file2.dta"
```

If you run the syntax again and try to save the "hh_file2.dta", you will get an error message. To save to a file that already exists on the hard disk, an additional subcommand must be added, ", replace"

```
save "hh_file2.dta", replace
```

Step 3: Merge the two files created in steps 1 & 2 to compute calories produced per adult equivalent.

The **merge** command

We have created two files: hh_file1.dta, which contains the calorie-production data for all households, and hh_file2.dta, which contains the adult-equivalent data for all households. We need to combine these files matching by district, village and household, to get both sets of data into one file. To do this, we use **Combine datasets / Merge two datasets** under the **Data** menu choice.

We noted earlier that key variables are required for any merge. When you're joining two files which are at the same data level, as we're about to do, it may not seem important to include key variables, but it is. The key variables determine which observations are to be combined.

Note: *You should never use **Combine datasets** without Key Variables because without them you have no guarantee that the program will combine the cases in the manner that you wish.*

The command will execute without any warnings or error messages, but the results may be incorrect.

At this point, if you have not closed Stata, hh_file2.dta is

still the working file.

A very important point: Stata cannot merge two datasets unless they are both sorted in the order of the key variables. One way to check to see if Stata knows the file is sorted is to use the **Describe** command. In the Results window you can see at the end of the list of variables, the words "sorted by" and the list of variables that the file is sorted by. Because we created hh_file1.dta by collapsing the file, it is already sorted by district, vil and hh. hh_file2.dta was also created by collapsing the file so it is also sorted by district, vil and hh. We are ready to merge the two files.

1. Select **Data** then **Combine datasets** then **Merge two datasets**
   The merge - Merge dataset in memory with dataset on disk *dialog box will appear*. *The default type of merge is one-to-one on key variables – this is the merge we want to do.*
2. We are doing a one to one on key variables – type of merge, the default selection. In the **Key variables (match variables)** box, select
   district vil hh
   These are the Key Variables
3. For the Filename of dataset on disk box, click on the **Browse** button. Select the file hh_file1.dta and click on **Open**
4. Click on the **Options** tab. Under this tab, you see the box labeled N**ame of new variable to mark merge results:** The default name is _merge. This variable received a code of 1 or 2 or 3 to describe what type of merge occurred. The code definition is:
   1 = observation is from file in memory
   2 = observation is from file on disk
   3 = observations are from both files
   It is very important to look at the values in this variable after you have run the merge.
5. Click on the copy button, switch to the do-file editor, paste the command, delete the folder reference, switch back to the dialog box and click on **OK**.
6. In the do-file insert comments to remind you what you've done.

The Stata command is:

```
merge 1:1 district vil hh using "hh_file1.dta"
```

In the results window, you see a summary of the number of observations not matched and matched.

```
Result                           # of obs.
-------------------------------------------
not matched                             0
matched                               343  (_merge==3)
-------------------------------------------
```

Now that you have run the merge, run a tabulate on the _merge variable. You can abbreviate the name to "_m", e.g. **tab _m**. You should see only the value of "3" for 343 observations. That means that there was an observation for each "district - vil - hh" combination in each of the two files.

Calculate the total calories produced per adult equivalent per household for the year

Merge files created a new working data file. The two variables you need to compute calories produced per adult equivalent are now in the working file. **Total calories produced (cprod_tt**) per household for the year divided by total adult equivalents per household (**ae**) divided by 365 days per year gives us calories produced per adult equivalent per day (**cprod_ae**).

1. Select **Data** then **Create or change variables** then from **Create new variable**
   The `generate - Create a new variable` *dialog box opens.*
2. If you see information in the dialog box, click on the **Reset** icon to clear the contents.
3. Under the **Main** tab, type the name of the new variable in the **Generate variable** box: **cprod_ae**
4. Change the **Variable type** to "double".
5. For the **Contents of new variable** box, we can use the **Create ..** button to help us build the expression. Click on **Create .** Under Category: select Variables. Double click on the variable **cprod_tt** It will appear in the box above the Category. On the right hand side click on the "***/***". Now click on **ae** Click again on the "***/***". Now click on the numbers **365**. The expression should look like: "**cprod_tt / ae / 365**". Click on **Ok** to close the **Expression builder** dialog box.
6. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **OK**.
7. Add a comment in the do-file to explain what you have done.

The new variable does not yet have a variable label. To assign a variable label:

1. Click on **Data**, then **Data utilities**, then **Label utilities**, then **Label variable**.
2. In the **Variables**: box, select **cprod_ae**
3. In the **New variable label variable** (may be up to

80 characters) box, type
Calories produced per adult equivalent per day

4. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **OK**.
5. Add a comment to explain what you have done.

The Stata commands are:

```
generate double cprod_ae = cprod_tt / ae / 365
label variable cprod_ae "Calories produced per adult equivalent per day"
```

Computing quartiles

The **xtile** command using **if**

Before we can produce the table we want, we have to create one more variable, denoting which calorie-production quartile each household falls into within each district. The Stata command to use is called **xtile**. The definition of xtile is that it is a command that categorizes a variable into the specified quantiles and places the information into a new variable. You can go to the Help to search for this command to get a detailed explanation. Examples can be found under the Examples: heading. Since we want to divide the data into quartiles within each district, we can use the "if" subcommand, e.g.,

1. Click on **Statistics** then **Summaries, tables and tests** then **Summary and descriptive statistics** then **Create variable of quantiles**
2. The dialog box opens.
   The *xtile - Create variable containing quantile categories* dialog box opens.
3. In the **New variable name** box: type **q1**.
4. In the **Expression**: box type **cprod_ae**.
5. In the "Options" section, select **4** quantiles.
6. Click on the "**if/in** tab and in the I**f:** expression type **district == 1**.
7. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **OK**.

The command is:

```
xtile q1 = cprod_ae if district == 1, nq(4)
```

where

q1 is the new variable that is created
cprod_ae is the variable used to rank the data
district is the controlling variable
nq(4) is short for nquantiles (number) which specifies the number of quantiles to use.

This command has to be repeated for the other two districts so that 3 variables are created where the observations for that district are divided equally into 4 groups.

Using the "if" expression works where you have only a few codes within the variable. We have 3 districts so it would not be a problem to use this command**,** but what if we had 20 districts? This method would be a bit cumbersome.

The **for z in num 1/3** looping command

Another method is to use a counter. Add the command "for z in num 1/3" in front of the xtile command, where z is a temporary variable that loops through the values specified with the "num 1/3". The value of 3 would be replaced with the number of values in the district variable. Note that the "z" is added to the "quart" variable and that "z" is used instead of the actual numeric value for the value to use for the value for district.

```
for z in num 1/3: xtile quartz = cprod_ae if district==z, nq(4)
```

The **foreach** looping command

Stata provides another looping command that we can use to compute the new ranking variable. It is not available through the menus. The looping command can be found in the Programming manual and is called **foreach**. We use a command called **levelsof** to store the values of the district in a temporary local variable called r(levelsof). The local variable is used to cycle through the values form the district variable.

The **levelsof** command

1. Type the following command in the Command window:

```
levelsof district
```

The results should display the values of the districts, e.g. 1 2 3

2. Now let's store that information in a local variable. To make a temporary local level, we include the word "local" which means the variable only exists with the do-file. We will work in the do-file to create all the commands needed. Switch to the do-file editor and type

```
levelsof district, local(levels)
```

3. We can now create variables containing the rank of the household within each district. There are 3 lines we will type into the do-file exactly as shown below. The right curly bracket (}) must be on a line by itself. Also, a left quote (`) which can be found above the <Tab> key is used to indicate the the local macro name (z) along with a right quote (‘), e.g..`z’. The command will not work unless you use the left quote and right quote around the z in the xtile command (not to be used in the foreach line):

```
foreach z of local levels {
  xtile quartile`z’ = cprod_ae if (district == `z’), nq(4)
}
```

‘z’ is a local macro name which is set to each value in the variable “levels”. The values we know are 1, 2, and 3. In the first loop of this programming command z is equal to 1, in the second loop z is equal to 2, etc.

quartile`z’ refers to a variable name where the value of z is appended to the name quartile, e.g. quartile1, quartile2, quartile3, etc.

district = `z’, means that for the first loop district is equal to 1, for the second loop district is equal to 2, etc.

Very important note: The macro name `z’ must be surrounded by a “left” single quote (found in the upper left hand corner or the keyboard to the left of the key with the number 1) and a “right” single quote (found on the key to the left of the <Enter> key). If you do not use the left single quote, you will see an error message that says in red:

```
' invalid name
```

```
Be sure that you end the first line with a
left curly brace, e.g. { and that you
place on a line by itself after all
commands that you want to be included in
the loop, a right curly brace, e.g. }
```

Since we have 3 districts, 3 new variables will be created with names of quartile1, quartile2, quartile3.

7. Now that we have each district divided into 4 equal groups, we want all the information to be in just one variable. We will create another variable and fill it with the information from the variables created above. We create a new variable and fill it

with system missing.

```
generate quartile = .
```

5. We now replace the data in **quartile** with the data from the 3 variables created with the xtile command. Remember, we must rerun the levelsof command as well since that information is just temporarily stored in memory for the previous command. Type the following lines, block and run them.

```
/*replace values in quartile with information from
the 3 quartileZ variables created above */

levelsof district, local(levels)
foreach z of local levels {
  replace quartile=quartile`z' if district==`z'
}
```

This commands cycle through the values for z and replaces the contents of quartile with the contents of quartile1 if district is equal to 1 in the first loop, then replaces the contents of quartile with the contents of quartile2 if district is equal to 2 in the second loop, then replaces the contents of quartile with the contents of quartile3 if district is equal to 3 for the final loop.

4. The next step is to delete the temporary variables. Type the following, block and run the commands:

```
/*delete temporary variables */
levelsof district, local(levels)
foreach z of local levels {
  drop quartile`z'
}
```

Always check the new variables that are created to see if the values are what you expect to see. We can use the **tabulate** command with 2 variables - district and quartile - to check the variables

1. From the menus click on **Statistics** then **Summaries, tables and tests** then **Tables** then **Two-way tables with measures of association**
   The tabulate2 - Two-way tables *dialog box opens.*
2. In the **Row Variable** box select **quartile**
3. In the **Column Variable** box select **district**

4. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **OK**.
5. Write a comment in the do-file to explain what the commands are doing.

The number of cases in each cell should be almost the same counts plus or minus a case or two, e.g.

quartile	district: monapo	ribaue	angoche	Total
1	28	30	29	87
2	27	30	29	86
3	27	30	29	86
4	27	29	28	84
Total	109	119	115	343

The new variable requires a label:

1. Click on **Data**, then **Data utilities**, then **Label utilities**, then **Label variable**.
2. In the **Variables**: box, select the name of the first variable: **quartile**
3. In the **Attach label to variable** (up to 80 characters) box, type
   Calorie production quartile
4. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **OK**.

The Stata command is:

```
label variable quartile "Calorie production quartile"
```

Examples of the **foreach** looping command

Examples of the use of the **foreach** command are:

Computing new variables:

```
foreach var of varlist inc1-inc12 {
  generate tax`var' = `var' * .10
}
```

Collapsing across variables:

```
foreach qtr of numlist 1/4 {
  local m3 = `qtr'*3
  local m2 = (`qtr'*3)-1
  local m1 = (`qtr'*3)-2
  generate incqtr`qtr' = inc`m1' + inc`m2' + inc`m3'
}
```

This command computes the quarterly income variables **incqtr1-incqtr4** using the **foreach** command.

Display the final output table

We can now display a table showing the average caloric production in quartiles for each of the districts.

1. From the menus click on **Statistics** then **Summaries, tables and tests** then **Summary and Descriptive Statistics** then **Summary statistics**
   The summarize - Summary statistics *dialog box opens.*
2. In the Variables: box select **cprod_ae**.
3. Click on the "**by/if/in**" tab.
4. Place a ✓ in the box next to "**Repeat command by groups**"
5. In the box below Variables that define groups: select **district quartile**
6. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **OK**.
7. Add a comment to explain what you have done.

The Stata command is:

```
by district quartile, sort: summarize cprod_ae
```

You should note that the mean for the 2nd quartile in Monapo is 2,539.364. The output from the **summarize** command gives you the numbers necessary for the table. However the output is difficult to read. There is another command which can also be used to produce the final table. We will discuss this command in Section 3 of the tutorial.

Before you save the file, you should sort the file by the key variables, then save this file as hh_file3,dta.

1. Sort the file by the key variables. Type in the Command window:
   sort district vil hh
2. We no longer need the variable _merge so it

should be dropped. Type in the Command window:

```
drop _merge
```

3. Click on **File**/**Save as...**
4. Filename is hh_file3
5. Click on **Save**.
6. Copy the three commands and paste them into the do-file.
7. Close the log file. Type in the Command window

```
log close
```

8. Copy this command into the do-file.

Remember to save the contents of the Do-file Editor to a permanent file so you can use it another time.

1. The Do-File Editor should be the active window
2. Click on **File**/**Save as...**
3. Use the filename session2

The .do extension will be added automatically.

This file now contains all the commands that you pasted either from the Command window or from the Review window or from dialog boxes.

Note: *Whenever you do any substantial amount of work, you should always copy the commands to a do-file and save the file so that you have documentation on what analysis you have done and so you can repeat the analysis without building all the commands again.*

Document the do-file with comments

Documenting the do-file with comments can save you much time trying to remember what analysis you did and why.

Let's see how you would retrieve the do-file you just created. To exit Stata

1. Click on **File** then **Exit**

Stata will prompt you if you have not saved the data file and will give you an opportunity to return to the program to save the data file. If you do not want to save your data file, click on "yes" to exit.

Start Stata again. To open our do-file:

1. Click on **Window** then **Do-file editor** then **New**

Do-file or press **<CTRL 8>** or you can click on the Do-file editor icon on the tool bar.
The Do-file editor *window will open.*

2. Click on the yellow file folder tool and select the file session2.do
3. Click on **Open**

You can then re-execute these same commands or edit them as you wish.

There is one icon on the tool bar to the far right that allows you to run all the commands in the do-file or just commands that you have blocked:  . If you block lines in the do-file and move your mouse over this icon you will see **Execute selection (do).** Clicking will run the commands you've blocked. In the Results window you will see the commands and any output from analysis. In the Review window you will not see the commands, only the one command **do "STD00000000.tmp"** where the blocked command was stored in the STD00000000.tmp temporary file.

If you do not block any lines and move your mouse over this icon you will see **Execute (do).** Clicking on this icon, Stata will run the complete do-file, showing all the commands and the output. In the Review window you will see the command

do "session2.do"

telling Stata to run the do-file completely. There are key strokes you can use as well to run the do-file while in the do-file editor. Click on Tools from the menu to see the different commands you can use to execute commands from the do-file. If you want to execute all the commands and not see any output in the Results window, the command to use is run in place of do.

Your "session.do" file should look similar to lines below; your documentation comments may not match exactly what has been included in this listing. Comments start with "/*" at the beginning of each comment and ending each comment with a */. You can also just use an "*" if the command is one line.

```
* change to the working directory - modify for your computer
cd "C:\Users\beaverm\Documents\StataTraining\data"

* define the log file to capture output
* name of log file is "log_session2"
capture log close
```

```
log using "log_session2.smcl", append
/*STATA do file – section 2 – Cross-sectional Stata Tutorial
 Purpose:  Calculate food production in calories per adult equivalent per day by district
 M Beaver - June 2016 */

/* Tasks:  1)  Compute total kgs produced, compute value of production in calories for specific food crops and
aggregate to the household level to obtain total food calories produced
            2)  Compute adult equivalents and aggregate to the household level
            3)  Merge the two files and calculate food production in calories per adult equivalent per day
            4)  Produce a table showing average food production in calories per adult
                equivalent in quartiles for each district   */

/* Stata recommends you include the version that the do file was written in */

version 14
clear all
macro drop _all

* turn off "more" set more off

************************************
*Step 1
************************************

/* open production data file */

use "c-q4.dta", clear

/* sort variables to match by to merge in the conversion value to convert to kgs */

sort prod p1a
tab1 prod p1a

/* rename the p1a variable to unit to match the conver data file */
rename (p1a) (unit)

joinby prod unit using "conver.dta", unmatched( master ) _merge(_merge)

*check to be sure merge done correctly
tab1 _merge

/* check to see if got what was expected using list command */
list prod unit conver if prod==47 & unit ==8

* calculate kgs produced
generate double qprod_tt= p1b * conver

/* merge in the lookup conversion value for calories and calculate total calories */

drop _merge

joinby prod using "calories.dta", unmatched( master ) _merge(_merge)

*check to be sure merge done correctly
tab1 _merge

*compute total calories produced
generate double cprod_tt= qprod_tt * calories

/* add variable labels */
label variable qprod_tt "Total production in kgs"
```

```
label variable cprod_tt "Total calories produced"

/* select only staple crops */

keep if prod == 5 | prod == 6 | prod == 30 | prod == 31 | prod == 41 | prod ==44 | prod == 47

/* check to see that there are only 7 crops listed */
tabulate prod

/* need to sum all calories produced by the household
  Using the collapse command*/

collapse (sum) cprod_tt, by(district vil hh)
label variable cprod_tt "Calories produced in staple foods"
describe

/* verify you have the right average calories produced over whole sample */

summarize cprod_tt

/*  save the file */

save "hh_file1.dta", replace

************************************
*Step 2  calculate adult equivalents based on age and gender
************************************

use "c-q1a.dta", clear

generate ae = 1 if ca4 == 1 & ca3 >=10
replace ae = .84 if ca4==2 & ca3 >=10 & ca3 <=19
replace ae = .72 if ca4==2 & ca3 >=20
replace ae = .6 if ca3 < 10

label variable ae "Adult equivalents"

/* check the variable */

tabulate ae, missing

/* calculate mean to determine average ae across the whole population
  To fill in the missing values*/
summarize ae

/* replace all system missing with the value of .79 */
replace ae = r(mean) if ae==.
tabulate ae, missing

/* need to sum the adult equivalents for each household */

collapse (sum) ae, by(district vil hh)
label variable ae "Adult equivalents per household"
summarize ae

* save file for later use */
save "hh_file2.dta", replace

************************************
*Step 3 combine both the hh_file1 with hh_file2
*  match files by district vil hh
```

```
************************************

use "hh_file2.dta", clear

*matching the two files which are at the same level (hh level)

merge 1:1 district vil hh using "hh_file1.dta"

*check to see which file the variables are coming from
tab _merge
*3 = variables came from both files
drop _merge

/* calculate the calories per adult equivalent per day */

generate double cprod_ae= cprod_tt / ae / 365
label variable cprod_ae "Calories per adult equivalent per day"
sum cprod_ae

/* rank the new variable by district into quartiles
  check for number of districts */

tabulate district
/* there are 3 districts so we want to loop 3 times */


/***********************
   first method
***********************/

xtile q1 = cprod_ae if district == 1, nq(4)
xtile q2 = cprod_ae if district == 2, nq(4)
xtile q3 = cprod_ae if district == 3, nq(4)


/***********************
   second method – uses a loop creating 3 variables with one command
***********************/

for z in num 1/3: xtile quartz=cprod_ae if district == z, nq(4)

/* combine the 3 variables into one variable
  initialize variable */
gen quart=.

/*replace values with information from the 3 variable into just one variable */
for z in num 1/3: replace quart=quartz if district==z

*delete variables that are no longer needed (quart1, quart2, quart3)
for z in num 1/3: drop quartz

/* check results  - should see equal number of cases in each category */
tabulate quart district


/***********************
   third method – uses a loop where the user does not need to know how many values are in the loop
***********************/

*the following command stores the values of district into a local variable
levelsof district, local(levels)
```

```
*foreach command loops through the values stored in the local levels variable creating new variables

foreach z of local levels {
 xtile quartile`z' = cprod_ae if (district==`z'), nquantiles(4)
}

*create a new variable to transfer the values from the quartile`z' variables into one variable
generate quartile = .

*replace values from quartile1, quartile2, quartile3 into quartile

levelsof district, local(levels)
foreach z of local levels {
 replace quartile= quartile`z' if district == `z'
}

/*delete the 3 extra variables */
levelsof district, local(levels)
foreach z of local levels {
 drop quartile`z'
}

tabulate quartile district
label variable quartile "Calorie production quartile"

/* produce the table */
by district quartile, sort: summarize cprod_ae

/* sort file by key variables */
sort district vil hh
save "hh_file3.dta", replace

*close log file
log close
```

Exercise 2.1

Produce similar output using calories retained (production minus sales) instead of calories produced. The final output should show calories retained per adult equivalent per day from the total of the same seven food crops. The output should be broken down by district and calories retained quartile.

Hints:

a. The procedure is very similar to the work that we just completed. You can continue with the same do-file that we used for the Session2 or you can create a new do-file.
b. Sales data can be found in the file c-q5.dta.
c. Be sure you understand which variable contains the quantity of the product that is sold. Note that the product codes are the same as for c-q4.dta. Also check for the variables by which to sort.
d. You can start from a blank file and build all the commands necessary to produce the calories retained, or you can copy the commands used to generate the table from section 2 and adjust the

commands as necessary to calculate the calories retained. Changes must be made for file names and variables.

e. Computing the calories sold involves the same basic steps as computing the calories produced. (Step 1). Average calories sold should be 1,407,493
f. Merge this newly created file, (the file containing calories sold), with the file containing calories produced, hh_file3.dta. Check the _merge variable (tab _merge) and explain why you see a value of (2) and a value of (3).
g. Keep in mind that only 257 households sold products, but all 343 households produced and retained calories. If the "calories sold" variable is missing, it means the household did not sell food, so it should be recoded to zero.
h. Compute calories retained = calories produced - calories sold. The average calories retained per adult equivalent for the whole population should be 3044.261
i. Rank the calories retained variable into quartiles.
j. Use the **Tabulate** command to show calories retained by **district** and **quartile**.
k. Save the data file to the name, hh_file4.dta.
l. Save the contents of the do-file editor.

Below is an example of the output you should produce:

```
-------------------------------------------------------------------------------
-> district = monapo, quarts = 1
    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
     cret_ae |        28    1171.714    420.7546   224.4898   1806.867
-------------------------------------------------------------------------------
-> district = monapo, quarts = 2
    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
     cret_ae |        27    2239.088    199.4202    1888.33   2554.892
-------------------------------------------------------------------------------
-> district = monapo, quarts = 3
    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
     cret_ae |        27    3343.003    461.9159   2685.971   4303.122
-------------------------------------------------------------------------------
-> district = monapo, quarts = 4
    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
     cret_ae |        27    7619.101    3557.135   4359.737   20873.97
-------------------------------------------------------------------------------
-> district = ribaue, quarts = 1
    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
     cret_ae |        30    1251.391    358.8783   429.2929   1790.432
-------------------------------------------------------------------------------
-> district = ribaue, quarts = 2
```

```
    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
     cret_ae |        30    2171.697    205.3644   1835.298   2566.006
-------------------------------------------------------------------------------
-> district = ribaue, quarts = 3
    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
     cret_ae |        30    3165.192    330.2283   2578.604   3731.045
-------------------------------------------------------------------------------
-> district = ribaue, quarts = 4
    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
     cret_ae |        29     5828.97      1632.9   3825.879   9464.901
-------------------------------------------------------------------------------
-> district = angoche, quarts = 1
    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
     cret_ae |        29    929.4182    388.3228   207.9077   1395.962
-------------------------------------------------------------------------------
-> district = angoche, quarts = 2
    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
     cret_ae |        29    1718.789    166.1601   1447.059   1984.059
-------------------------------------------------------------------------------
-> district = angoche, quarts = 3
    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
     cret_ae |        29    2442.247    347.8035   1997.711   3063.996
-------------------------------------------------------------------------------
-> district = angoche, quarts = 4
    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
     cret_ae |        28     5022.29    2443.454   3134.742   12674.86
```

STATA 14 SAMPLE SESSION

SECTION 3 – Tables and Other Types of Analysis

Tables

Using the **table** command you can calculate various statistics and present them in a variety of ways that are completely under your control. **table** allows you to choose how you want to assemble variables and statistics for display in rows, columns, and super-columns or super-rows. A super-column or super-row has a variable nested below it. Variables can be stacked one on top of the other. Variables can be nested, meaning that all of the values for one variable are displayed below the individual values of another variable. With the **table** command you can manipulate table structure, content, and presentation format.

With this command there a few limitations:
a) up to 4 variables can be specified in the by()
b) up to 5 statistics can be displayed in each cell
c) the sum of the number of rows, columns, super-columns, and super-rows is called the number of margins. A table may contain up to 3000 margins, e.g. a one-way table may contain 3000 rows, a two-way table may contain 2998 rows and 2 columns, or 2997 rows and 3 columns and so forth

Commands that produce similar results are:

tabstat -	displays summary statistics for a series of numeric variables in a single table
tabsum -	produces one- and two-way tables of means and standard deviations - this command is faster, but the table command is more flexible
tabulate -	one- and two-way tables of frequencies
tab1	produces one-way tabulation for each variable
tab2	produces two-way tabulations of all combinations of the variables

Let's compare the **tabulate** command with the **table** command to create two-way tables.

Create a do-file with all the proper commands at the beginning of the do-file. Refer to the do files you have already created. You can copy several of the commands that you need and comments. Remember to start the log file for this session.

Open the member file we created from Section 1 that

contains the age variable, q1a-age.dta.

1. **File**/**Open...**
2. Select q1a-age.dta
3. Click on **Open**
4. Copy the command, paste it into the new do-file and add comments.

First, do a simple two-way table using the **tabulate**.

1. From the menus click on **Statistics** then **Summaries, tables, and tests** then **Frequency tables** then **Two-way tables with measures of association**
   The tabulate2 - Two-way tables *dialog box opens.*
2. In the **Row variable** box select **ca2**
3. In the **Column variable** box select **age_gp**
4. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **Ok**.

The Stata command is:

```
tabulate ca2 age_gp
```

Below is the output.

```
. tabulate ca2 age_gp

   relation to |                    Age group
          head |   0 to 10   11 to 19   20 to 60  61 and ol |     Total
---------------+--------------------------------------------+----------
          head |         0          6        296         41 |       343
  wife/husband |         0         25        280          5 |       310
   son/daugher |       503        184         31          0 |       718
 mother/father |         0          0          3          1 |         4
other relative |        70         55         18          2 |       145
---------------+--------------------------------------------+----------
         Total |       573        270        628         49 |     1,520
```

The **table** command

Let's use **table** to produce a similar table. The **table** command is generally used for summary statistics. Frequency and Totals are possible to select from this command.

1. From the menus click on **Statistics**, then **Summaries, tables, and tests** then **Other tables** then **Flexible table of summary statistics.**
   The *table - Flexible table or summary statistics* dialog box opens.
2. Under the **Main** tab select **ca2** in the Row variable: box
3. Click in the box ✓ next to **Column variable** and select **age_gp** in the box below.
4. In the **Statistics, 1**, replace **None** with select **Frequency** from the drop down box.
5. Under the **Options** tab tick ✓ **Add row totals** and also tick ✓ **Add column totals**
6. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog

box and click on **Submit**.

7. Write a comment in the do-file to explain what the command does.

The Stata command is:

```
table ca2 age_gp, contents( freq ) row col
```

Note: the word "contents" can be abbreviated to "c", e.g. c(freq).

The results are:

```
. table ca2 age_gp, contents(freq ) row col

------------------------------------------------------------------------------
relation to    |                              Age group
head           |      0 to 10      11 to 19      20 to 60  61 and older         Total
---------------+--------------------------------------------------------------------
          head |                          6           296            41           343
  wife/husband |                         25           280             5           310
   son/daugher |          503           184            31                       718
 mother/father |                                       3             1             4
other relative |           70            55            18             2           145
               |
         Total |          573           270           628            49         1,520
------------------------------------------------------------------------------
```

Note that where the value was 0 in the tabulate command, it is blank in this table. The label for the last column shows completely here, whereas in the tabulate command the last 3 characters were dropped.

We want to put something in place of the blanks for the cells with no data.

1. Go back to the dialog box and under the **Options** tab, tick ✓ Show missing statistics with period.
2. Click on the *Main* tab and tick ✓ Superrow variables: Using the drop-down arrow, select district
3. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **OK**.
4. Write a comment in the do-file to explain what the command does.

The table now shows a period (full stop) where there are no data and there are sub-tables for each district.

Comparison of the commands **summarize**, **tabulate** and **table**

The following is a comparison of computing averages using **summarize**, **tabulate** and **table**, based on an example from section 2.

1. Click on **File**, then **Open**
2. Select hh_file3.dta, Click on **Open**

3. Copy the command from the Review window and paste it into the do-file editor

First we will use the **summarize** command:

1. From the **Statistics** menu select **Summaries, tables, and tests** then **Summary and descriptive statistics** then **Summary statistics**
   The summarize - Summary statistics *dialog box opens.*
2. Select **cprod_ae** in the "**Variables**" box.
3. Be sure that under "Options" in this tab, **Standard Display** has been selected.
4. Click on the "**by/if/in**" tab.
5. Click in the box **Repeat command by groups.**
6. In the box below this option, select **district quartile**
7. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **Ok**.

For each combination of district and quartile, we see the summary statistics. This output is difficult to read.

Next we will use the **tabulate** command:

1. From the menus click on **Statistics** then **Summaries, tables, and tests** then **Other tables** then **Table of means, std. dev., and frequencies**
   The tabsum – Table of means, std. dev., and frequencies *dialog box opens.*
2. In the Variable 1: box select **district**
3. In the Variable 2 (optional): box select **quartile**.
4. In the Summarize variable: box select **cprod_ae**.
5. For output we are only interested in the mean, so tick the boxes next to
   - ✓ Suppress standard deviations
   - ✓ Suppress frequencies
   - ✓ Suppress number of obs.
8. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **Ok**.

In the Results window we see:

```
           Means of Calories produced per adult equivalent per day

           |       Calorie production quartile
  district |         1          2          3          4 |     Total
-----------+--------------------------------------------+----------
    monapo | 1248.7023  2539.3641  3997.4884  9150.0217 | 4206.5071
    ribaue |  1502.242   2554.488  4062.3014   7607.719 | 3900.7966
   angoche | 1297.9691   2465.509   3698.807    8495.49 | 3950.2608
-----------+--------------------------------------------+----------
     Total | 1352.5022  2519.7353  3919.3795  8399.3828 | 4014.5181
```

Notice that the number of decimals is not uniform. We can fix that with the **table** command.

1. From the menus click on **Statistics** then **Summaries, tables, & tests** then **Other tables** then **Flexible table of summary statistics.**
   The table – Flexible table of summary statistics *dialog box opens.*
2. Press the Reset button  to clear the boxes. Under the **Main** tab select **district** in the Row variable: box
3. Click in the box ✓ next to **Column variable** and select **quartile** in the box below.
4. In the **Statistics 1**, select **Mean** from the drop down box.
5. In the box to the right specify the variable to use for the **Mean** statistic - **cprod_ae**

We would also like to see the minimum and maximum values.

7. Click on the drop down box next to #2 and scroll down to **Maximum** and select that statistic. For the variable select **cprod_ae**
8. Click on the drop down box next to #3 and scroll down to **Minimum** and select that statistic. For the variable select **cprod_ae**
9. Under the **Options** tab check ✓ **Add row totals** and also check ✓ **Add column totals**
10. To format the numbers, check ✓ next **Override display format for numbers in cells**. Click on the **Create** button to the right of this box.
11. In the "**Create a display format**" dialog box , under **Numeric Type,** click on **"Fixed numeric".**
    Change **Total digits** to 11.
    Change **Digits right of decimal** to 2.
    check ✓ next to **Use commas in numeric output**
    You will see in the box below "Customize format" the format you have specified: **%11.2fc**
    The Help format... button shows different formats that can be specified. This format says to use a width of 11 with 2 decimals. (fc) means fixed format with a comma. Click on **OK.**
12. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **Submit**.
13. Looking at the Results, we decide we don't like the 2 decimals. Go back to the dialog box, Click on the **Create** button to the right of this box and changes the decimals to 0. Click on **OK.** Click on the copy

button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **OK**.

14. Return to the do-file to write the comments to explain the difference.

For each district, the first row is the mean, the second row is the maximum and the third row is the minimum.

The three Stata commands to produce these tables are:

```
by district quartile sort: summarize cprod_ae

tabulate district quartile, summarize(cprod_ae)
nostandard nofreq noobs

table district quartile, contents( mean cprod_ae
max cprod_ae min cprod_ae ) row col
format(%11.0fc)
```

```
----------------------------------------------------------------------------
          |                    Calorie production quartile
 district |         1            2            3            4        Total
----------+-----------------------------------------------------------------
   monapo |     1,249        2,539        3,997        9,150        4,207
          |     1,973        3,176        5,067       28,466       28,466
          |       294        1,984        3,226        5,107          294
          |
   ribaue |     1,502        2,554        4,063        7,608        3,901
          |     2,030        3,141        4,984       13,124       13,124
          |       429        2,082        3,190        5,152          429
          |
  angoche |     1,298        2,466        3,699        8,495        3,950
          |     2,024        2,996        4,692       20,485       20,485
          |       354        2,037        3,009        5,022          354
          |
    Total |     1,353        2,520        3,919        8,399        4,015
          |     2,030        3,176        5,067       28,466       28,466
          |       294        1,984        3,009        5,022          294
----------------------------------------------------------------------------
```

The **table** command permits you to specify more than one variable to summarize and also permits formatting of the contents of the table.

Print a table from the Viewer

A simple way to print a table, you have just created, is to open the **Viewer**, select the table and print.

1. Open the Viewer - Click on **File** then **View**. A dialog box opens, asking for the name of the file
2. Click on the **Browse** button and select the file session3.smcl and click on **Ok**

3. Scroll down to the table you want to print and block it.
4. Click on **File** then **Print** then **Viewer**. The **Print** dialog box opens. Under **Page Range** click on the radio button next to **Selection**. Then click on **Print** .
5. Another dialog box opens labeled **Output Settings** In this box you can specify a Header, a Name and a Project. If you do not want line numbers and the Stata logo to print, you should remove the ticks next to the boxes labeled Print Line #'s and Print Logo.
6. Click on **OK** to print the selection.

Exercise 3.1

Produce a similarly formatted table using calories retained using the data file that was created in Exercise 2.1. **Include totals** by retained quartile. Your table should look similar to the table below:

district	Calories retained quartile 1	2	3	4	Total
monapo	1,171.71	2,239.09	3,343.00	7,619.10	3,571.01
	1,806.87	2,554.89	4,303.12	20,873.97	20,873.97
	224.49	1,888.33	2,685.97	4,359.74	224.49
ribaue	1,251.39	2,171.70	3,165.37	5,828.97	3,081.46
	1,790.43	2,566.01	3,734.49	9,464.90	9,464.90
	429.29	1,835.30	2,578.60	3,825.88	429.29
angoche	929.42	1,718.79	2,442.25	5,022.29	2,506.50
	1,395.96	1,984.06	3,064.00	12,674.86	12,674.86
	207.91	1,447.06	1,997.71	3,134.74	207.91
Total	1,118.42	2,040.13	2,977.30	6,135.48	3,044.26
	1,806.87	2,566.01	4,303.12	20,873.97	20,873.97
	207.91	1,447.06	1,997.71	3,134.74	207.91

Multiple Response Questions

One of the types of question used in survey research asks the respondent to select multiple answers. A single variable cannot record the answers to this type of question adequately, because a variable can have only one value. The solution is to record each possible response in a different variable. The responses can be analyzed separately using commands you have already seen (**tabulate**), but ideally we want to analyze these related variables jointly.

1) Multiple dichotomy (yes/no questions)

Multiple dichotomy - yes/no questions: If a survey question asks the respondent to "check all that apply" from a set of ten choices, a separate variable is required for each of the ten responses. Each variable has a value to indicate whether the response was checked (1) or yes, or not checked (2) or no. An example of this type of question can be found in the household level survey questions (see appendix), Section V - Agricultural Sales, question 64 - have you increased the quantities sold over the last five years? All of the variable names associated with this question begin with H64.

Open the file:

1. Select **File** then **Open**
2. Select c-hh.dta
3. Click on **Open**.
4. Copy the command and paste it in the do-file editor. Delete the folder reference.

In this survey 1 = yes and 2 = no. Questions you might ask are:

A. How many respondents increased sales quantities of maize?

To answer this question you can count the number of times the value of 1 appears in the variable associated with maize. To count the number of times a value appears in the variable. The command is **count.**

The **count** command

1. From the menus click on **Data**, then **Data utilities**, then **Count observations satisfying condition**
   The count – Count observations satisfying condition *dialog box opens.*
2. If the box below **If: (expression)** type
   h64a == 1
   You could also double-click on the variable from the "Variables" box. The variable name appears in the If: expression box eliminating the need to type the variable name.
4. Copy the command and paste it in the do-file editor, switch back to the dialog box and click on **OK**. The command is:

```
count if h64a == 1
```

In the Results window you see the value of 86. You could also run a frequencies:

```
tabulate h64a
```

The tabulate shows that 147 did not increase sales of maize as well as 86 households who did. There are 343 households in the sample. To find out how many did not answer the question, include the ", missing" in the command. Now we change the question.

The **recode** command

B. How many crops increased in sales within the household?

For this question we can sum the number of 1's in the variables associated with this question using the **egen** command. We need to recode the value of 2 (no) to 0.

Recode:

1. Select **Create or change variables** from the **Data** menu
2. Select **Other variable transformation commands** then **Recode categorical variable**
   The recode - Recode categorical variable *dialog box opens.*
3. Under the **Main** tab, click in the **Variables** box and select all the variables that start with h64, e.g. h64a h64b h64c h64d h64e h64f h64g h64h
4. In the box for **Required**: type
   (2=0)
5. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **OK**.

The Stata command is:

```
recode h64a h64b h64c h64d h64e h64f h64g h64h (2=0)
```

The **egen** command

The values in the h64x variables are now 0 or 1=yes. We are ready to count the number of crops that increased in sales:

1. Select **Create or change variables** from the **Data** menu
2. Select **Create new variable (extended)**
   The egen - Extensions to generate *dialog box opens.*
3. Under the **Main** tab, type the name of the new variable in the **Generate Variable** box: **ncrops**
4. For the **egen function** box, scroll down and highlight **Row total** .
5. In the box for **Generate variable as type**: select **Integer**
6. Click on the **Egen function argument – Variables:** box type **h64***
   *In Stata we can use the * (asterisk) to indicate to Stata to use all variables that start with h64.*
6. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **OK**.

The Stata command is:

```
egen int ncrops = rowtotal(h64*)
```

Now you can do a frequencies on the new variable:

```
tabulate ncrops
```

This table tells you how many households increased sales on the number of crops asked about. We see that 136

households did not increase sales in any crop. On the other extreme two households had increased sales on all crops asked about (ncrops = 8), You must ask yourself if the data are reasonable. Can a household have 8 cash crops that it is growing?

C. Which crops have had increased sales the most?

The **tabstat** command

For this question we can use the **summarize** command, but we could also use the **tabstat** command:

1. From the menus click on **Statistics** then **Summaries, tables, and tests** then **Other tables** then **Compact table of summary statistics.** The *tabstat – Compact table of summary statistics* dialog box opens.
2. Under the **Main** tab type **h64*** in the Variables: box
3. Under "Statistics to display" place a tick in the first box and select from the dropdown list **Sum** as the statistic.
4. Under the **Options** tab in the **Use as Columns** change to **Statistics**.
5. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **OK** .

The Stata command is:

```
tabstat h64*, statistics( sum ) columns(statistics)
```

You see all the h64* variables with a count of the number of cases where yes was specified. Manioc (h64b) was the most frequent crop for which households had increased sales (115), sorghum (h64g) was the least (14).

2) Multiple response

Multiple Response: The other type of multiple response question is where the survey question asks the respondent to "list up to xx choices" from a set of ten choices. If four responses are requested, four variables must be used to code the responses. The set of possible responses are assigned sequential values and the same set of values are used for each of the 4 variables. The respondent must record a different value in each of the 4 variables. These types of variables are called *multiple response* variables.

Question 35 in the household questionnaire is an example of a multiple response question. It asks about crops grown principally to be sold. Each household is asked to specify up to three main crops which are coded into variables **h35a**, **h35b**, and **h35c**. Codes are provided for five of the

most common crops. The question is left open-ended, however, since a code of 6 is allowed for a crop not on the list. The name of the crop is written down on the questionnaire and later assigned a code.

Because the question was open-ended, more categories were added to these variables than what appears in the annex. After the data are collected, the researcher assigns a code to each of the crops specified for "6-other" - this procedure is called "post-coding". Codes and value labels are entered into the data file and the data changed from the value of 6 to the appropriate code. As you will see, using the **tab1** command, eleven different crops were specified for question 35.

Stata does not have a command included in the application that will tabulate data collected in this format. We can do frequencies of each variable or develop commands to pull out specific information. Since Stata is open source anyone can write a procedure to do different analyses. These user-written procedures are given an extension .ado and included in the installation of the program. For analysis of the multiple response type of question, we can go to the Help menu and search to see what has been written.

1. From the menus click on **Help**, then **Search…,**
   The *Keyword Search* dialog box opens.
2. In the **Keywords:** box type **multiple response**
3. Click on **OK**

Several listings appear in the Viewer window. One item labeled FAQ gives us an article to read that discusses multiple response. You can click on that link to read further.

Go back to the **Help**, then **Search…,** dialog box and this time select **Search net resources** with the Keywords **multiple response.**

A different listing appears in the Viewer window stating that 12 packages were found either in the Stata Journal or the SB listings. The first listing looks promising.

st0082 from http://www.stata-journal.com/software/sj5-1
SJ5-1 st0082. Tabulation of multiple responses / Tabulation of multiple responses / by Ben Jann, ETH Zurich / Support: jann@soz.gess.ethz.ch / After installation, type help mrtab, mrgraph, and _mrsvmat here is a user-written "ado" command called tabw (Peter Sasieni, STB-25; Stata 3.1).

Further down is another command "mrtab" which might be useful.

mrtab from http://fmwww.bc.edu/RePEc/bocode/m
'MRTAB': module to compute one- and two-way tables of multiple responses / mrtab tabulates multiple responses which are held as a set of / indicator variables or as a set of polytomous response variables. d / KW: multiple responses / KW: indicator variables / KW: tabulations / Requires: Stata

To get either program, click on the link.

For example, if you have an internet connection click on the link for "st0082 from …."

1. In this screen, click on (**click here to install**)
2. The program will be installed in the folder:
   C:\ado\plus\m
3. To read the help screen, in the Command window type **help mrtab**. To use the program, in the Command window type

```
mrtab h35a h35b h35c, poly response(1/11)
```

```
. mrtab h35a h35b h35c, poly response(1/11)

                |              Percent of     Percent
                |  Frequency   responses    of cases
----------------+-----------------------------------
 1       cotton |         89       27.99       42.79
 2      peanuts |         84       26.42       40.38
 3       sesame |          3        0.94        1.44
 4    sunflower |          1        0.31        0.48
 5         rice |         85       26.73       40.87
 6 maize, beans |         41       12.89       19.71
 7       banana |          4        1.26        1.92
 8       manioc |          7        2.20        3.37
 9   sugar cane |          4        1.26        1.92
----------------+-----------------------------------
          Total |        318      100.00      152.88

Valid cases:        208
Missing cases:      135
```

The table shows cotton was the most frequent primary cash crop. 89 households grew this crop, peanuts and rice were the next most often grown for cash. You could have also used the **tab1** command.

```
tab1 h35*
```

Using the tab1 you have to add the number of observations yourself. If you add the number of observations for cotton in h35a to the number of observations for cotton in hh35b, what do you get? Can you explain why the tab1 totals are different from the mrtab command output?

Other Types of Analyses

Weights

Stata provides for a method to analyze data using different types of weights. The type of weight that is to be used with a set of data will depend on the type of sampling that has been used.

See the table below for an explanation of the available weight types.

Sub-Command	type of weight	Definition
fweight or frequency	frequency weights	number of replicated observations, this value is always an integer. If the fweight associated with an observation is 5, it means the observation represents 5 identical observations.
pweight	Sampling weights	inverse of the probability that this observation is included in the sample due to the sampling design. A pweight of 100 indicates that this observation represents 100 subjects in the population. There are qualifications to this weight when used with survey analysis commands
aweight or cellsize	analytic weights	inversely proportional to the variance of an observation. The observations typically represent averages and the weights are the number of elements that produced the average
iweight	Importance weights	relative "importance" of the observation. This weight is generally used by programmers who want to produce a specific computation.

To read more about weights look in Help weights. If you use the generic "weight" sub-command, Stata will tell you which weight it assumes you want to use. Not all commands will allow a weight to be included. The format is

[type_of_weight=variable_in_file].

Let's use one of the Stata's sample data files to explore this sub-command.

1. Click on **File** then **Open** A dialog box should open telling you that the data have changed and "Do you want to continue and lose unsaved data?". We don't want to save any changes to the data file, click on **Yes** to continue.
2. Select census.dta.
3. Click on **OK.** - Remember to copy the command and paste it into the do-file editor.

Use the **Browse** button to look at the data. There is one observation for each state. The variable called **pop** is the total population for the state. The variable called **medage** is the median age of the population. First let's get the population-weighted mean.

1. From the **Statistics** menu select **Summaries, tables, and tests** then **Summary and descriptive statistics** then **Summary statistics**
   The Summarize - Summary Statistics *dialog box opens.*
2. Select **medage** in the "V**ariables**" box.
3. Click on the "**Weights**" tab.
   Note that only 3 types of weights are available to choose from. There is also a help button on weights.
4. Select **Analytic weights**
5. In the Analytic weight: box select **pop**
5. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **Submit.**

Look at the output. The sum of the weight is 225,907,472. This is the population of the U.S. in the 1980 census. The weighted mean is 30.11. Now, return to the dialog box.

6. Click on **None** under the **Weight** tab.
7. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **Ok**

The unweighted mean is 29.54 (which does not take into account the population differences between the states). Using the weight option takes the population of each state into account before calculating the mean. The Stata commands are:

```
use "census.dta", clear
summarize medage [aweight=pop]
summarize medage
```

Survey weights are discussed in the next section.

Indicator variables

An indicator variable is a special case of a categorical variable. An indicator variable has two groups only, whereas other categorical variables can have more than two groups. Usually the values in indicator variables are 0 and 1 or no/yes.

Examples of indicator variables are:

Is a person a citizen of the U.S.? (no/yes).
Does a farmer use fertilizer? (no/yes).

Stata can convert continuous variables to categorical and indicator variables and it can also convert categorical variables to indicator variables.

Converting continuous variables to indicator variables

Suppose we want to create a new variable that indicates whether a person is 18 years old or older. You could have generated a new variable and assigned it a value of 1 if ca3 > =18. Then you would need a second step to recode the system missing to 0.

There is another way to create this variable.

We will use the file c_q1a.dta. Open the file and then create a new variable using the **generate** command following the steps below:

1. Click on **File** then **Open .**
2. Select c_q1a.dta and click on **Open**. Copy the command to the do-file editor. Delete the reference to the folder.
3. Check to see if there are any missing values in the age variable - **ca3**. Use the list command
   list if ca3 >=.
   We are checking to see if there are missing values because Stata considers missing values to be greater than any number.
4. Select **Create or change variables** from the **Data** menu
5. Select **Create new variable**
   The generate - Generate a new variable *dialog box opens.*
6. Under the **Main** tab, type the name of the new variable in the **Generate Variable** box: **age18p**
7. For the **Contents** box, type in
   ca3>=18
8. Click on the **Generate variable as type** drop down box and change to **byte**.
9. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **OK**
10. Run a **tabulate** to look at the results.
    Note: if there had been a missing value for an observation, that observation would have been assigned a value of 1.

It would have been better to put a qualifier on the command to assign the values to cases where ca3 was not missing (e.g. ca3>=18 & ca3 < .).

The command would be:

```
generate byte age18p = ca3>=18 & ca3 <.
```

Then, any missing values in **ca3** would also be missing in the new variable **age18p**.

Converting categorical variables to indicator variables

Suppose that you want to do regression analysis and control for effects of the different geographic regions. We have a variable called district which has 3 categories. We want to create indicator variables for the three districts. These types of variables are also called dummy variables. First let's run the describe command to look at the contents of the file:

```
describe
```

Next let's look at the values and labels for the variable **district**:

```
label list district
```

To make 3 indicator variables we can type:

```
tabulate district, generate(district)
```

Now, run the **describe** command again:

```
describe
```

Three new variables have been created, called district1, district2, and district3. We can examine the variables using the **tab1** command.

```
tab1 district*
```

The variables district1, district2, and district3 can now be used for regression analysis as dummy variables. They contain either a 0 or a 1.

Stata 14 SAMPLE SESSION

SECTION 4 - Tables and Graphs (copying to a word processor), Overlaid graphs, Survey estimation to account for design effects

How to move Stata results into other applications

The objective of this section is to give you the tools necessary to prepare reports, i.e. to learn how to move Stata results into other applications. The method is simple: once a graph or a table has been produced, it can be printed or incorporated into reports prepared using word processors or publishing programs. Incorporating tables from Stata can be done using the copy and paste procedure. You should save the log file as well in case you need other tables that were created. Find the table in the session3.scml file that showed the count of the "relation of head" to "age group" cross-tabulation:

Tables

1. Click on **File** then **Log** then **View...** In the **Choose File to View** dialog box, click on the **Browse** button.
2. Select session3.smcl .
3. Click on **Open** , Then click on **OK**
4. Locate a table that you want to copy to your word processor. Use your mouse to block the table.
5. Press **Ctrl-C** (copy). This key sequence copies what you have blocked.
6. Now open your word processor software if it is not already open.
7. Place your cursor where you want the table to appear. Press **Ctrl-V** (paste) to paste the table.
8. In your word processor, block the text that you just pasted. Now change the font to a fixed font, e.g. Courier New or Letter Gothic. Click on **Format, Font**, and select the font. The size of the font may need to be adjusted depending on the margins of your paper. The default will be 12 and you may want to select 10 or 9 or 8.

Below is an example of a table copied into a word processor before the font is changed to a fixed pitch:

relation to head	age_gp 0 to 10	11 to 19	20 to 60	61 and older	Total
head	6	296	41		343
wife/husband	25	280	5		310
son/daugher	503	184	31		718
mother/father		5	1		6
other relative	70	55	16	2	143
Total	573	270	628	49	1,520

Below is the same table after the font is changed to a "fixed pitch" and the font size is adjusted so that the table will fit on the page.

relation to head	Age group 0 to 10	11 to 19	20 to 60	61 and older	Total
head		6	296	41	343
wife/husband		25	280	5	310
son/daughter	503	184	31		718
mother/father			5	1	6
other relative	70	55	16	2	143
Total	573	270	628	49	1,520

Copying tables from the Results window

You can also copy the information from the Results window into your word processor. Stata provides three choices from the Edit menu for copying tables. Click on **Edit** to look at the choices.

1. Copy text - Ctrl-C - copies the table as straight text and uses plain text for the lines.
2. Copy table - Shift-Ctrl-C - copies the table and includes tabs where it thinks there should be tabs, no lines are included. You can try to convert this into a table within Word. It will require a bit of editing.
3. Copy table as HTML - Shift-Ctrl-Alt-C - copies the table into HTML format which is used on the web.
4. Copy as picture – copies the text into a picture format which can be converted in Word to be able to edit it as a picture.

You may encounter problems with the second and third options if you use these. The fourth option is difficult to edit. Stata determines if there should be tabs and may not make the correct decision. You might need to increase the width of the columns in the output to make sure that tabs are included. Below is an example of the same table using the Shift-Ctrl-C

relation to head	0	to 10	11	to 19	Age 20 to 60	group 61	and ol	Total	
head		0		6	296		41	343	
		0.00		1.75	86.30		11.95	100.00	
		0.00		2.22	47.13		83.67	22.57	
wife/husband			0		25	280		5	310
		0.00		8.06	90.32		1.61	100.00	
		0.00		9.26	44.59		10.20	20.39	
son/daughter			503		184	31		0	718
		70.06		25.63	4.32		0.00	100.00	
		87.78		68.15	4.94		0.00	47.24	
mother/father			0		0	5		1	6
		0.00		0.00	83.33		16.67	100.00	
		0.00		0.00	0.80		2.04	0.39	

Quite a bit of editing is required to make the above table presentable.

Using Excel to create columns from the table

Another method is to copy the table from the Results window into Excel. Then use the method to convert text to columns that is provided in Excel. The left most cells in each column will contain the text for the entire row. Click on "Data", then "Text to Columns". The "Text to Columns Wizard will start. Follow the instructions in the wizard to divide the text into columns. Upon completion of the wizard, block the columns, copy and paste into your word processor. The table will be now in a Table in the word processor where you can easily manipulate the widths and other formatting as required. Below is an example of output from the Results window converted to columns in Excel and pasted into Word.

Relation to head	0 to 10	11 to 19	20 to 60	61 and older	Total
head	0	6	296	41	343
	0	1.75	86.3	11.95	100
	0	2.22	47.13	83.67	22.57
wife/husband	0	25	280	5	310
	0	8.06	90.32	1.61	100
	0	9.26	44.59	10.2	20.39
son/daugher	503	184	31	0	718
	70.06	25.63	4.32	0	100
	87.78	68.15	4.94	0	47.24
mother/father	0	0	5	1	6
	0	0	83.33	16.67	100
	0	0	0.8	2.04	0.39
other relative	70	55	16	2	143
	48.95	38.46	11.19	1.4	100
	12.22	20.37	2.55	4.08	9.41
Total	573	270	628	49	1,520
	37.7	17.76	41.32	3.22	100
	100	100	100	100	100

Exercise 4.1.

Select another table from your Session3.SMCL file. Use all of these methods to copy another table from your log file into a word processor.

Graphs

The process to copy output to a word processor is basically the same for Graphics, such as pie charts and histograms, but there is more flexibility in the ways to save the file, along with more difficulties in getting just the look you want. As an example, we will look at the distribution of cashew tree ownership across households in the Mozambique data, using a histogram.

Open a new do file and place the requisite information at the top, e.g.

```
cd "C:\user\Documents\StataTraining\data"


capture log close
log using session4, append

/* session 4 - copying Tables and Graphs to
a word processor */
/* tasks:
/* Your name - date */

version 14
clear all
macro drop _all
```

Save this do file under the name session4.do.

We are now ready to open the household file that contains the tree ownership variable, c-hh.dta.

1. Click on **File** then **Open**
2. Select c-hh.dta and click on **Open**
3. Paste the command from the Review window to the do-file editor. Remove the folder reference.

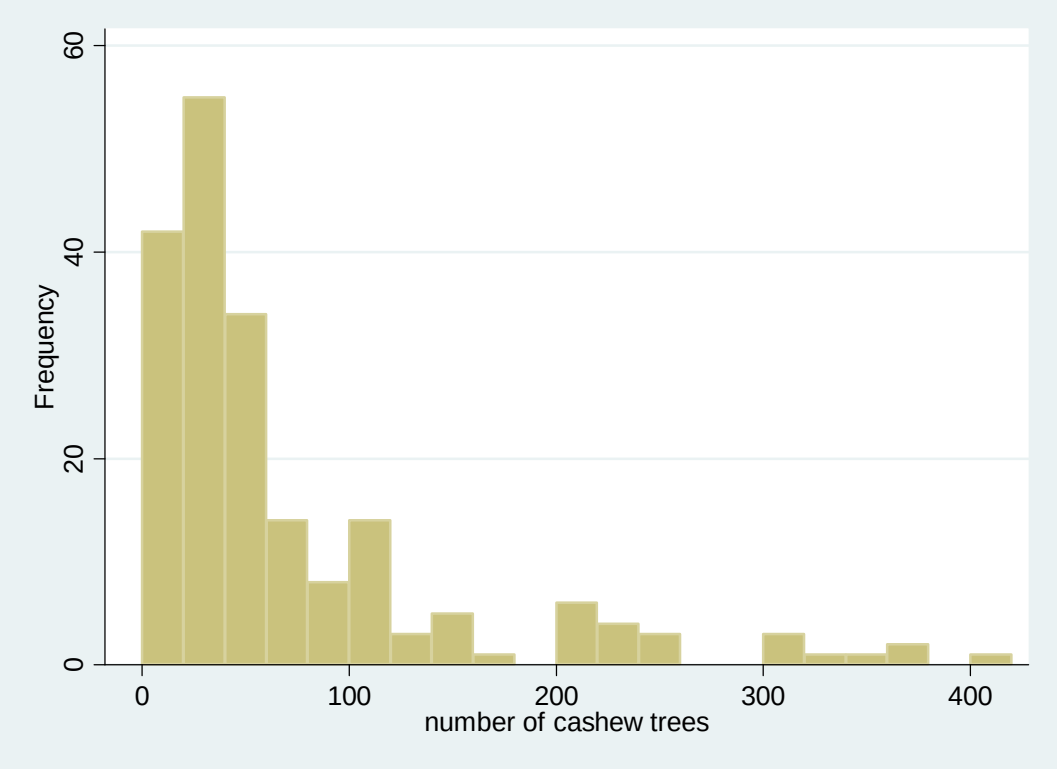
Create the Histogram chart using the variable **H57** (number of trees owned):

4. Select **Graphics** then **Histogram**.
5. In the Variable box select **H57** (Number of cashew trees) .
   Note: you can specify whether the variable is continuous or discrete.
6. Under **Bins**, ✓ check the box next to **width of bin** and type **20**
7. Under **Y-Axis**, click on the radio button next to **Frequency**
8. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **OK**.

The Stata command is:

```
histogram h57, bin(20) frequency
```

Another window will open and you should see a histogram chart that looks like the one below:



To copy this graph to your word processor,

1. In the Graph window, click on **Edit / Copy graph.**
   `You could also right-click on the graph itself and select "Copy Graph".`
2. Open your word processor and click on **Paste** or <right-click> and **Paste**

You will not be able to edit this graph, other than the size, placement, wrapping of text and other basic aspects allowed by your word processor unless you convert it to a Microsoft office drawing. You can edit the graph in Stata first before copying into Word. There is an icon in the graph window  that will open the graphics editor. You can add text, lines, markers and adjust the grid.

You can also save a Stata chart to a file. If you have edited the graph, you may want to do this.

1. Click on **File** then **Save**.
2. A dialog box opens where you can type the name of the file. The default extension is .gph which is the format that Stata recognizes as a graph file. If you save the file with a .gph extension, you can then open the graph again within Stata. In the filename box, type **Cashew_trees** and click on **Save**.
3. Copy the command from the results window, switch to the do-file editor and paste the command.

You can also save the graph into several different formats,

such as "windows metafile (wmf)". Click on the drop-down arrow next to the box labeled as "Save as Type": to see the different formats. Word processors can import a graph with the extension wmf or tif into a graphic box.

Once the graph window has been closed, you cannot reopen it unless you have saved the graph to a file. You can rerun the command that created the graph to see the graph again. You cannot have more than one graph window open at a time.

Scatter plot using "by" subcommand

Let's look at another graph. We will use the file created in the last session, hh_file4.dta. We can plot adult equivalents per household with total calories produced.

1. Click on **File** then **Open**
2. Select hh_file4.dta and click on **Open.** Copy the command to open the file to the do-file editor.
3. Select **Graphics / Two-way graphs (scatter, lines, etc.).**
4. The dialog box opens for the twoway graph. Click on the **Create** button to define the graph. The default type of plot is **scatter**. You could pick Line, Connected, Area, Bar, Spike, or Dropline.
5. For the **Y variable** select **ae** from the dropdown arrow**,** for the **X variable**, select **cprod_tt** from the dropdown arrow.
6. Click on the **Accept** button. You now see that **Plot 1** has been defined and is highlighted.
7. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **Submit**.

You can now view the graphic.

8. Close the graph and return to the dialog box. We want to see the distribution by district. Click on the "**By**" tab. ✓ check the box next to **Draw subgraphs for unique values of variables.**
9. In the **Variables** box select **district**
10. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **OK** button to view the graphic.

    What are these graphs telling you?

Close the graph. Note you could have also added a title and other options as well.

Overlaid graphs

Graphs can also be overlaid.

1. Select **Graphics / Two-way graphs (scatter, lines, etc.).**

    You will see Plot 1 already defined
2. Click on the **Create** button to define a second plot. Click on the radio button next to **Fit plots**. Highlight **Linear prediction** in the box labeled Fit plots

(select one).

3. For the **Y axis** select the variable **ae.** For the **X axis**, select the variable **cprod_tt**.
4. Click on the **Accept** button. You now see that **Plot 2** has been defined and is highlighted.
5. Click on the "**By**" tab. Remove the ✓ mark from the box next to **Draw subgraphs for unique values of variables.**
6. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **Submit**. to view the graphic.
   What are these graphs telling you?
7. Close the graph, Return to the dialog box, highlight **Plot 2** and click on **Edit** .
8. Change the type of plot to **quadratic prediction plot w/CI**. Click on the **Accept** button.
9. Click on the **Submit** button to view the graphic.
   What are these graphs telling you?
10. If we want to see the distribution by district, click on the "**By**" tab. ✓ check the box next to **Draw subgraphs for unique values of variables** In the **Variables** box select **district**
10. Click on the **OK** button to view the graphic.
   What are these graphs telling you?

The Stata commands are:

```
twoway (scatter ae cprod_tt)

twoway (scatter ae cprod_tt), by(district)

twoway (scatter ae cprod_tt) (lfit cprod_tt)

twoway (scatter ae cprod_tt) (lfit ae cprod_tt),
by(district)

twoway (scatter ae cprod_tt) (qfitci ae cprod_tt)

twoway (scatter ae cprod_tt) (qfitci ae cprod_tt),
by(district)
```

Survey Estimation - Accounting for Design Effects

Stata provides statistical commands that have been developed specifically for survey analyses. The Stata User's Guide discusses these commands as well as the manual called Survey Data. Most of these commands begin with the letters **svy**. There are a few of the survey commands that do not begin with these letters.

Survey data generally have three importance characteristics:

1. The weights applied to survey data are sampling weights - also called probability weights
2. The sample is clustered

3. Stratification is used in selecting the sample

If data meets any one of the above characteristics, the survey commands can be used for analysis. Briefly, sampling weights are used in analysis to give estimators that are approximately unbiased for whatever is being estimated for the whole population, i.e. one observation represents many elements in the population from which the sample is drawn.

Clustering by districts or villages is used in almost all survey sampling rather than selecting an independent sample. Further sub-sampling may occur within a district or a village as well. Units at the first level of sampling are called the "*primary sampling unit*" or "PSU" or cluster.

To summarize, weights are used to obtain the correct point estimates. Clustering and stratification are used to get the correct standard errors.

The svy commands also calculate the design effects of deff and deft. ***Deff*** *is equal to the design-based variance estimate divided by an estimate of the variance that would have been obtained if the survey was carried out using simple random sampling.* ***Deft*** *is approximately equal to the square root of deff.* Further explanation of these two terms can be found in the Survey Data manual under the command **svymean.**

We will use a data set from Zambia from the Post harvest survey of the 2001/2002 agricultural season where the area planted for specific types of crops is tested.

1. Click on **File** then **Open**
2. Select Zambia_PHS0102_crop_area.dta and click on **Open.**
3. Paste the command into the do-file editor and delete the reference to the folder.

Use the Data Editor (Browse) icon or type in the browse command to look at the data or click on the browse icon.

```
browse
```

In Zambia for surveys conducted in the 1990s and early 2000, a stratified random sampling method was used. This method divided the districts into census supervisory areas (CSA). Within the CSA, Standard Enumerator Areas (SEA) were defined. The primary sampling unit (PSU) for this sample is the SEA. To identify each SEA as being unique the three variables - district, CSA and SEA, must be combined into one variable. District has 3 numbers, CSA has 3 numbers and SEA has 2 numbers. To create a new variable with these variables one must multiply the district variable by 100,000, add CSA multiplied by 100, and add SEA. The Stata command is:

```
gen float cluster1 = dist*100000 + csa*100 + sea
```

We want to change the format of this variable so that we can easily read it to verify the variable has been created correctly. Use the format command.

```
format cluster1 %9.0f
```

Clusters may further be sampled in groups which are called strata. The Zambia example uses province - district as the strata. Strata are considered to be statistically independent and can be analyzed as such.

A weight has already been calculated for each household. The variable which contains this value is called **hhwgt**.

We need to compute the cluster variable. We can use dist for the strata variable since it already contains the province value as part of the district code.

Close the browser and use the **gen** command to create the variable "cluster1".

To be able to use the survey commands, we must first define the stratified random sampling method that was used to account for weighting, clustering and stratification. We will use the **svyset** command to specify the method.

1. Click on **Statistics** then **Survey data analysis**
2. Then click on **Setup & utilities** then **Declare survey design for dataset**
3. In the **Primary sampling unit:** box select **cluster1**
4. In the **Strata:** box select **dist**
5. Click on the **Weights** tab
6. Click on the radio button next to **Sampling weight variable**.
7. Click on the drop-down arrow for the **Sampling weight variable:** box and select **hhwgt**
8. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **OK .**

The Stata command is:

```
svyset cluster1 [pweight=hhwgt], strata(dist)
vce(linearized) singleunit(missing)
```

After running the command we see a summary of the command in the Results window:

```
      pweight: hhwgt
          VCE: linearized
Single unit: missing
     Strata 1: dist
         SU 1: cluster1
        FPC 1: <zero>
```

We can use the syvdesc command to look at the strata and PSU arrangement of the dataset.

1. Click on **Statistics** then **Survey data analysis**
2. Then click on **Setup & utilities** then **Describe survey data**
3. We can specific a variable or just run the command to look at the complete dataset. If we were interested to know which strata have only one sampling unit, we could put a tick next the box labeled "Display only the strata with a single sampling unit"
4. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **OK .**

Once the survey design has been specified and the file saved, it is no longer necessary to specify it again. The specification is saved with the data file.

We can use the **svytotal** command to look at the total estimates.

1. Click on **Statistics / Survey data analysis**
2. Then click on **Means, proportions, ratios, totals** then **Totals**
3. In the **Variables** box select **maisea ricea milleta sunfa**
4. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **Submit**

```
. svy linearized : total maizea ricea milleta sunfa
(running total on estimation sample)

Survey: Total estimation

Number of strata =      69          Number of obs    =    6601
Number of PSUs   =     394          Population size  =  807414
                                    Design df        =     325

--------------------------------------------------------------
             |             Linearized
             |      Total   Std. Err.     [95% Conf. Interval]
-------------+------------------------------------------------
      maizea |   649230.9   25105.89      599840.3    698621.5
       ricea |   14472.95   2360.009      9830.125    19115.77
     milleta |   61770.91   7346.125      47318.95    76222.87
       sunfa |   24319.15   3418.858      17593.26    31045.04
--------------------------------------------------------------
```

To see the deff/deft results we would run the following command immediately:

```
estat effects, deff deft
```

This command can be found under **Statistics / Postestimation .** To learn more about this topic look at the PDF file.

Let's run the same analysis with only the weight specified to see the difference of the sample design is not specified.

5. Click on the tab labeled **SE/Cluster** then click on the button labeled **Survey settings** .
6. Click on the button labeled **Clear settings**
7. Click on the **Weights** tab
8. Click on the radio button next to **Sampling weight variable**.
9. Click on the drop-down arrow for the **Sampling weight variable:** box and select **hhwgt**
10. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **OK.**
11. Click on the task **svy:total -…** on the Windows task bar.
12. Click on the copy button, switch to the do-file editor, paste the command, switch back to the dialog box and click on **OK**

Note, we have gotten the same point estimate as the design-based estimate, but the standard errors are much smaller and the 95% confidence interval is also different. The second table does not account for the sampling design but assumes the sample is random rather than stratified random.

```
. svyset _n [pweight=hhwgt], vce(linearized) singleunit(missing)

      pweight: hhwgt
          VCE: linearized
  Single unit: missing
     Strata 1: <one>
         SU 1: <observations>
        FPC 1: <zero>

. svy linearized : total maizea ricea milleta sunfa
(running total on estimation sample)

Survey: Total estimation

Number of strata =       1          Number of obs    =    6601
Number of PSUs   =    6601          Population size  =  807414
                                     Design df        =    6600

--------------------------------------------------------------
             |             Linearized
             |      Total   Std. Err.     [95% Conf. Interval]
-------------+------------------------------------------------
      maizea |   649230.9   14013.13      621760.6    676701.2
       ricea |   14472.95   1327.559       11870.5    17075.39
     milleta |   61770.91   3942.684      54041.97    69499.84
       sunfa |   24319.15   1907.919      20579.01    28059.29
--------------------------------------------------------------
```

Annexes

ANNEX I – Stata Commands

This annex provides a brief reference guide and to explain the various functions of the Stata commands most commonly used. This annex was developed by Ellen Payongayong. The commands in the table below do not contain the full Stata syntax.

Note that commands can be abbreviated. In the Help Syntax Viewer, the syntax explanation will show how much of the command must be typed, e.g. "Summarize" can be shortened to "su" or "sum". In this Help viewer, the letters that are required for the command are underlined.

Command	Description
pwd	tells you which directory you're in
cd *{c | d | e...)*:	cd c: changes drives to c drive
cd ..	changes directory one level higher
cd *(path)*	changes current directory to that specified in path
cd	takes you to the root directory
dir	lists contents of current directory
use *filename1*	loads file into memory
save *filename2*	saves current file in memory into *filename1*. if filename already exists, stata will not let you overwrite it
save *filename2*, **replace**	saves current file in memory into *filename2*, overwriting any file in working directory that is currently named *filename2*
save, replace	saves current file in memory into filename of that which is currently in memory
edit	brings up the data editor
browse	brings up the same data "editor'' as in **edit,** but will not allow you to change data
describe	gives a description of the data file: number of observations, number of variables, list of variables, variable type and width, variable labels (if any)
summarize	gives basic summary statistics: number of valid observations, mean, standard deviation, minimum value and maximum value
list	lists observations
keep	retains in memory only those variables **or** cases specified
drop	discards from memory all variables **or** cases specified
tabulate	generates one- and two-way frequency tables
tab1	generates one-way table for each variable specified after the command.
log using *filename*	saves **all commands and related output** into specified file. the default format is SMCL for Stata Markup and Control Language. file is given extension .smcl
log using *filename, text*	saves all commands and related output into an ASCII file with extension .txt.
log { off | on | close}	**off** temporarily suspends the log file (switches it "off"); **on** switches the log "on" and **close** closes the log file
log using *filename*, **append**	adds subsequent commands to an existing log

Command	Description
log using filename**, replace**	saves all commands and related output into the specified file, overwriting said file if it already exists
By opening a log file with **cmdlog** *instead of* **log***, you record only what you type in the command window (results are suppressed). The same basic syntax applies for both cmdlog and log. You can open both an smcl file and a log file.*	
clear all	clears data set from memory
help *command*	accesses help feature of Stata
exit	exits stata
sort *varlist*	sorts observations in ascending order according to the specified variable.
(1) **note:** "..." (2) **note** *varname* **:** "..." (3) **notes**	(1) allows you to enter notes about the dataset (2) allows you to enter notes about variable varname (3) calls up all notes in memory. Notes are saved in the dataset.
label variable *varname "lblnamel"*	assigns a variable label to variable specified
(1) **label define** *lblname # "label1" [# "label2"]...* (2) **label values** *varname1 lblname*	(1) assigns labels to integers (#) and stores these in the value label *lblname* (2) associates the value label lblname to the variable v*arname1* e.g. label define gender 1 "female" 2 "male" label values sexhead gender
label list	lists all value labels
recode	modifies the value of a variable using rules specified
generate	creates a new variable
set memory	changes the amount of memory allocated to the data area; Stata suggests setting the memory to at least one and half times the size of the file you want to load in the memory of the computer.
replace	changes the value of an existing variable
count	when used with **if,** it counts the number of observations that meet the specified condition; otherwise, it counts the number of observations in the dataset
rename	changes the name of an existing variable
collapse	converts the data file in memory into another data set of means, medians, etc.
merge *varlist* **using** filename	merge joins corresponding observations from the dataset currently in memory (called the master dataset) with those from the Stata-format dataset stored as *filename* (called the using dataset) into single observations; performs a match merge on *varlist* when these are specified. the variable _merge, which gives information on the results of the merge command, is added to the file. _merge==1 obs. from master data _merge==2 obs. from using data _merge==3 obs. from both master and using data
merge *varlist* using filename, nokeep	"nokeep" causes merge to ignore observations in the using data that have no corresponding observation in the master.
do	executes a do-file

Command	Description
assert	assert verifies that an expression is true. if it is, the command produces no output; if it is not, assert informs you that the "assertion is false".
append using	append appends a STATA-format dataset stored on disk to the end of the dataset in memory.
mvencode *varlist*, **mv (#),** [override]	changes all occurrences of missing to # in the variable listing specified. override specifies the protection provided by mvencode is to be overridden. without this option, mvencode refuses to make the requested change if # is already used in the data.
mvdecode *varlist*, **mv (#)**	changes all occurrences of # to missing in the variable list
egen	creates a new variable equal to the specified functions and its arguments
regress *depvar varlist*	regress estimates a model of the dependent variable on variables in *varlist*
xi: regress ....i.variable	constructs categorical dummy variables for variables omitting the first category.
predict variable	stores the predicted values from the regression in *variable*. what this command can do is determined by the previous command.
probit	probit estimates maximum-likelihood probit models.
search	searches the keyword database. Use search when you are not certain of the command, e.g., search string shows all commands associated with strings.
tables	calculates and displays tables of statistics.
reshape	converts data from wide to long form and vice versa. 'wide' and 'long' refer to how data are organized. See **reshape** notes below.
fillin varlist	adds observations with missing data so that all combinations of *varlist* exist, thus rectangularizing the file. the variable _fillin is added to the data. _fillin is 1 for created observations and 0 for previously existing observations.
(**svy** commands)	these are commands prefixed with 'svy' and they pertain to commands used in analyzing survey data.
tables	calculates and displays tables of statistics.
format varlist %fmt	formats numeric variables as follows--number before the decimal indicates the length of the variable, number after the decimal indicates number of decimal places: %#.#g - general numeric format (%5.0g) %#.#f - fixed numeric format (e.g., %5.2f) %#.#e -base 10 power strings are formatted as follows and can be 81 chars long: %#s (e.g., %10s)

Reshape notes: The **reshape** command is particularly useful for files such as that shown in the following example:

> Households were asked about the number of livestock owned for three types of livestock coded 330, 331 and 335. To save on data entry time, only those entries reporting any livestock were entered. Missing livestock codes in the file therefore means that the household did not own the livestock associated with the code. The file looks like this.

```
 hh  animcode      num
206       331       70
217       331       65
217       335        8
221       330     1200
221       331      200
```

The above file could have been organized such that each household has only one line of information, and the three animal types appear as three different variables. Such a file would be the wide form of the data. The file as it is organized now is the long form of the data.

The following reshape command converts the file from long to wide form such that each animal code is now a variable, and the file becomes a household-level file.

```
. reshape wide num, i (hh) j (animcode)
. list, nol nod noo

 hh   num330   num331   num335
206       .       70        .
217       .       65        8
221    1200      200        .
```

When followed by this next command, the file is re-converted from wide to long. But note that the file has become rectangularized, that is, the three animal codes now appear for each household.

```
. reshape long num, i (hh) j (animcode)
. list, nol nod noo

 hh   animcode      num
206       330        .
206       331       70
206       335        .
217       330        .
217       331       65
217       335        8
221       330     1200
221       331      200
221       335        .
```

The command **fillin** would have also generated the same rectangularized file as in the preceding example.

Do-file suggested commands to place at the beginning of a do-file to set the parameters before starting to work:

1. Commands in a do-file may be delimited by a carriage return or a semi-colon. To set the semi-colon as the delimiter, the command is:

   #delimit ;

   This command will only work in a do-file. The delimiter cannot be changed from the console.

   If you wish to revert back to the carriage return as the delimiter, the command is:

   #delimit cr

2. The next command will clear the memory:

   clear all;

3. There are several "set" commands that are useful to put at the beginning of the do-file as well.

   set memory 70000; (sets the size of memory)

   set matsize 100 ; *(limits number of variables that can be specified in an estimation command)*

ANNEX II - Questionnaire

Socio-Economic Survey of Family Sector Farms
in the Province of Nampula
(Angoche, Monapo e Ribaúe)
July/August 1991
Departamento de Preços e Mercados
Food Security Project

Name of Household Head _____

Household Number _____ HH

Aldeia _____ VIL

Distrito _____ DIST

(Subset of questions from original questionnaire) Filename: c-hh.dta

I. **HOUSEHOLD CHARACTERÍSTICS**

H1 _____ 1. How many persons are in this household?

H4 _____ 4. Has your family always lived in this village?
1=yes 2=no

H8_____ 8. Is your family registered as "deslocada"?
1=yes 2=no

H19_____ 19. Do you presently have lands in fallow?
1=yes 2=no

H21_____ 21. What is the total area of these fallowed parcels? (hectares)

H24_____ 24. Do you have lands that you have completely abandoned?
1=yes --> question 25 2=no --> question 27

H25_____ 25. What is the total area of these abandoned lands? (hectares)

H26_____ 26. What was the principal motive for abandoning these lands?
1=no security
2=lands lost fertility
3=lack of labor
4=insect attacks
5=other

[**We would like to ask you about the food crops you grow**.]

H29_____ 29. Over the last five years, have you increased or decreased the amount of land in food crops?
1=increased 2=decreased 3=no change

H31_____ 31. During a normal year, is your farm production sufficient to feed your entire family?
1=yes 2=no

[**We would like to ask you about the cash crops you grow on your farm?**]

H34_____ 34. Do your grow any crops that are principally destined for the market?
1=yes 2=no

35. Which crops are grow principally to be sold? (List the three most important)

H35A ____ 1=cotton 4=sunflower
H35B ____ 2=peanuts 5=rice
H35C ____ 3=sesame 6=other

H36_____ 36. Over the last five years, have you changed the area grown in these cash crops?
1=increased
2=decreased
3=no change

H39_____ 39. Do you normally grow cotton?
1=yes 2=no

H52 _____ 52. Since your involvement with the cotton companies, have you reduced your area dedicated to food crops, such as maize and manioc?
1=yes 2=no

IV. PRODUCTION

H56_____ 56. Do you have cashew trees?
1=yes 2=no

H57_____ 57. How many trees do you presently have? (number)

H57A ____ 57A. Of these trees, from how many did you harvest during the last year? (number)

V. AGRICULTURAL SALES

We would like to ask about the marketing of your agricultural products since August of 1990.

64. Over the last five years, have you increased the quantities marketed of the following crops:

H64A ____ a. maize 1=yes 2=no
H64B ____ b. manioc 1=yes 2=no
H64C ____ c. rice 1=yes 2=no
H64D ____ d. cotton 1=yes 2=no
H64E ____ e. peanuts 1=yes 2=no
H64F ____ f. beans 1=yes 2=no
H64G ____ g. sorghum 1=yes 2=no
H64H ____ h. cashew nuts 1=yes 2=no

H65 _____ 65. Compared with five years ago, has the marketing of these products been more difficult or easier?
1=more difficult --> question 66
2=easier --> question 67

H66 _____ 66. If more difficult, why?
1=fewer buyers
2=transportation problems
3=security problems
4=low prices
5=lack of consumer goods
6=other

H67 _____ 67. If easier, why?
1=more buyers
2=better transportation
3=better security
4=attractive prices
5=more consumer goods
6=other

H83 _____ 83. Does your family usually receive traditional gifts or participate in exchange relations?
1=yes 2=no

H84 _____ 84. If yes, how often?
1=only when there is a lack of food
2=only during feasts and rituals
3=frequently

XI. **TYPICAL CONSUMPTION PATTERNS**.

H86 _____ 86. How many meals did these people have yesterday? (Number of meals)

H89 _____ 89. Do you consider these meals adequate to maintain the health of all the household members?
1=yes 2=no

We would also like to ask you about your diet during the hungry period (January to May).

H91 _____ 91. How meals do you customarily prepare daily during hungry period?

H92 _____ 92. In general, are these hungry period meals adequate to maintain the health of all household members?
1=yes 2=no

H96 _____ 96. During the hungry period, was there always food available to purchase from the market or from your neighbors?
1=yes 2=no

I. HOUSEHOLD CHARACTERISTICS

Table IA: Household Characteristics Filename: c-q1a.dta

Name	Family Member Number	This person works on-farm or off-farm 1=yes 2=no	Relation to Head 1=head 2=spouse 3=child 4=parent 5=other kin 6=other	Age	Sex 1=m 2=f	Level of Schooling (enter the last completed year) 0=illiterate 12=post-high school 98=no formal schooling but literate	Marital Status 1=monogamous 2=polygamous 3=single 4=widowed 5=divorced 6=emigrant wife (husband out longer than six months
	MEM	CA1	CA2	CA3	CA4	CA5	CA6
	1		Head 1				
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						

IV. PRODUCTION

Table IV: Characteristics of Production Filename: c-q4.dta

Product	**Quantity harvested**		**Quantity harvested in a normal year**		**Existing stocks at harvest time**		**Month in which last year's stock ran out**	**Amount to be stored from this year's harvest for consumption**		**How long will this year's stocks last?**	**Quantity reserved for seed**	
3=cotton 5=peanuts 6=rice 21=cashew nut 30=beans 31=manteiga bean 41=dry manioc 47=corn 44=sorghum	Unit 1=sack 100 2=sack 50 3=kilo 4=liter 5=can 20	Qty	Unit 1=sack 100 2=sack 50 3=kilo 4=liter 5=can 20	Qty	Unit 1=sack 100 2=sack 50 3=kilo 4=liter 5=can 20	Qty	(enter the month)	Unit 1=sack 100 2=sack 50 3=kilo 4=liter 5=can 20	Qty	(enter the month or "all year", if appropriate)	Unit 1=sack 100 2=sack 50 3=kilo 4=liter 5=can 20 other	Qty
PROD	**P1A**	**P1B**	**P2A**	**P2B**	**P3A**	**P3B**	**P4**	**P5A**	**P5B**	**P6**	**P7A**	**P7B**

V. AGRICULTURAL SALES

Table V: Sales of Farm Products Filename: c-q5.dta

Sale #	Crop	Quantity sold		Period of sale	Motive for sale at this time	Buyer	Locale of sale	Distance from the farm	Why sold to this buyer	Value of Sales		Who in the household is responsible for the sale
	3=cotton 5=peanuts 6=rice 21=cashew nut 30=beans 31=manteiga bean 41=dry manioc 47=corn 44=sorghum	Units 1=sack 100 2=sack 50 3=kilo 4=liter 5=can 20	No. of Unit	1= planting (Aug-Dec.) 2= hungry period (Jan-April) 3=this year's harvest 4= various times	1=needed money 2=buyers available 3=consumer goods available 4=attractive price	1=lojista 2=wholesaler 3=AGRICOM 4=ambulante 5=brigada 6=company	1=farmgate/ house 2=village 3=locality 4=district 5=province	(enter the kms between farmer and point of sale)	1=the only one available 2=always sell to this one 3=best price 4=transportation provided 5=carries consumer goods	meticais	Unit 1=unit price 2=total value	1=husband 2=wife
VEN	**PROD**	**V2A**	**V2B**							**V9A**	**V9B**	
1												
2												
3												
4												
5												
6												
7												
8												
9												

N.B. Not all of the variables that appear in the printed table are in file c-q5.dta. Only variables **VEN, V2a, V2b, V9a** and **V9b** were kept for this exercise.