

Session VII: National population projections

9 March 2016

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Population Estimates and Projections Section

www.unpopulation.org

Regional Workshop on the Production of Population Projections
Addis Ababa, 7-11 March 2016



Outline

- I. Software packages for population projections
- II. Step-by-step guide to setting up a national population projection in Spectrum

Software packages for population projections

- Packages implement cohort-component method
- Output a variety of demographic measures for any specified year of the projection period
- Packages reviewed:
 - Spectrum (Avenir Health)
 - Rural-Urban Projection (RUP, US Census Bureau)
 - Mortpak PROJCT (UNPD)

Spectrum

SPECTRUM is a suite of easy to use policy models which provide policymakers with an analytical tool to support the decision making process.

SPECTRUM consists of several software models including:

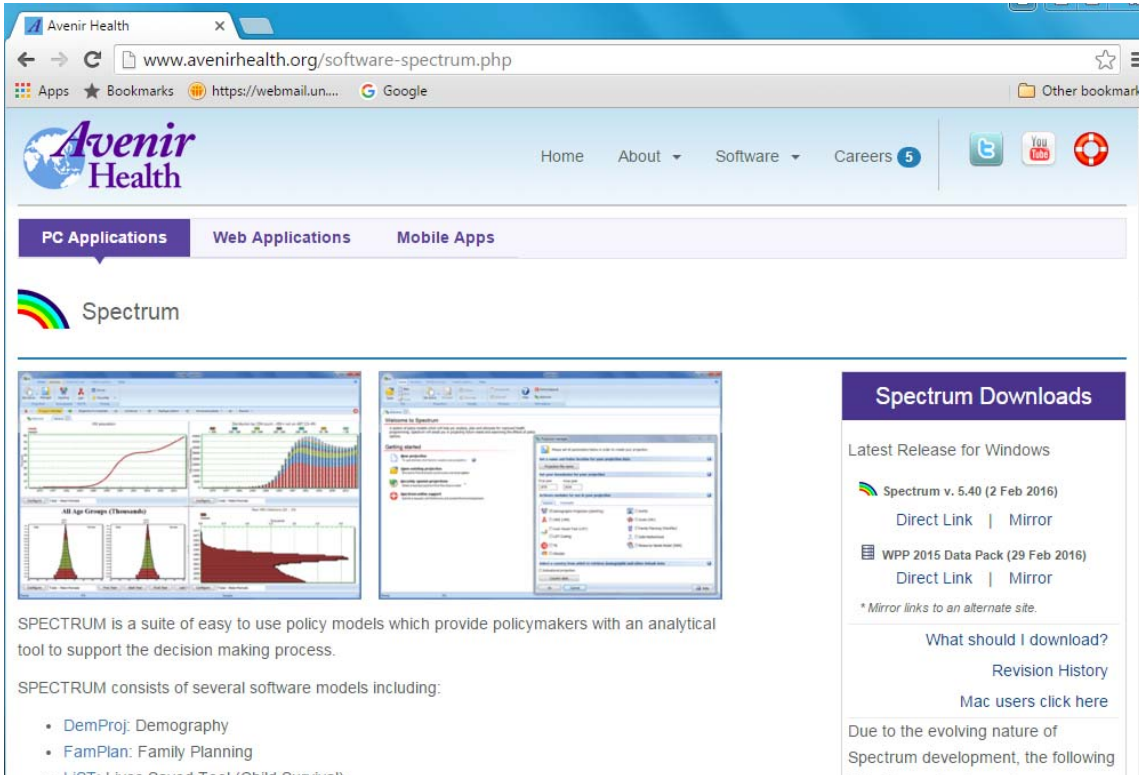
- DemProj: Demography
- FamPlan: Family Planning
- LiST: Lives Saved Tool (Child Survival)
- AIM: AIDS Impact Model
- Goals: Cost and impact of HIV Intervention
- Resource Needs Module: Costs of implementing an HIV/AIDS program
- RAPID: Resources for the Awareness of Population Impacts on Development
- TIME: TB Impact Model and Estimates

Using Spectrum

- Advantages:
 - Reliable and well tested
 - Appealing user-interface
 - User base is large, but concentrated among health and policy professionals (UNAIDS)
 - Support, on-site training available
- Disadvantages
 - Ease of use means some loss of flexibility in inputs
 - Complex package due to integration into a variety of other tools (AIDS, POLICY, RAPID, etc.)
 - Obtaining results can be a bit cumbersome

Obtaining and installing Spectrum

www.avenirhealth.org/software-spectrum.php



The screenshot shows the Avenir Health website's 'Software' page for Spectrum. The page features the Avenir Health logo, navigation links (Home, About, Software, Careers), and social media icons. Below the navigation bar, there are tabs for 'PC Applications', 'Web Applications', and 'Mobile Apps'. The 'Spectrum' section is highlighted, showing a rainbow logo and a description of the software as a suite of policy models. It includes a list of models: DemProj, FamPlan, and LST. To the right, the 'Spectrum Downloads' section lists the latest release for Windows (Spectrum v. 5.40) and the WPP 2015 Data Pack, with direct links and mirrors provided for each.

Spectrum


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- DemProj: Demography
- FamPlan: Family Planning
- LST: Lives Saved Tool (Child Survival)

Spectrum Downloads

Latest Release for Windows

 Spectrum v. 5.40 (2 Feb 2016)
Direct Link | Mirror

 WPP 2015 Data Pack (29 Feb 2016)
Direct Link | Mirror

* Mirror links to an alternate site.

What should I download?
Revision History
Mac users click here

Due to the evolving nature of Spectrum development, the following

- Updated regularly; check back for most recent version
- Current version is 5.41
- For this workshop: on memory stick at E:/Tools/Spectrum
 - SpecInstall.exe
 - WPPDataInstall.exe
 - SpectrumManualE.pdf

RUP

- US Census Bureau Rural-Urban Projection Program
- Available interfaces:
 - RUPEX – Excel interface
 - NEW: Demographic Analysis and Population Projections System (DAPPS)
 - User-friendly spreadsheet interface for RUP

RUP

○ Advantages:

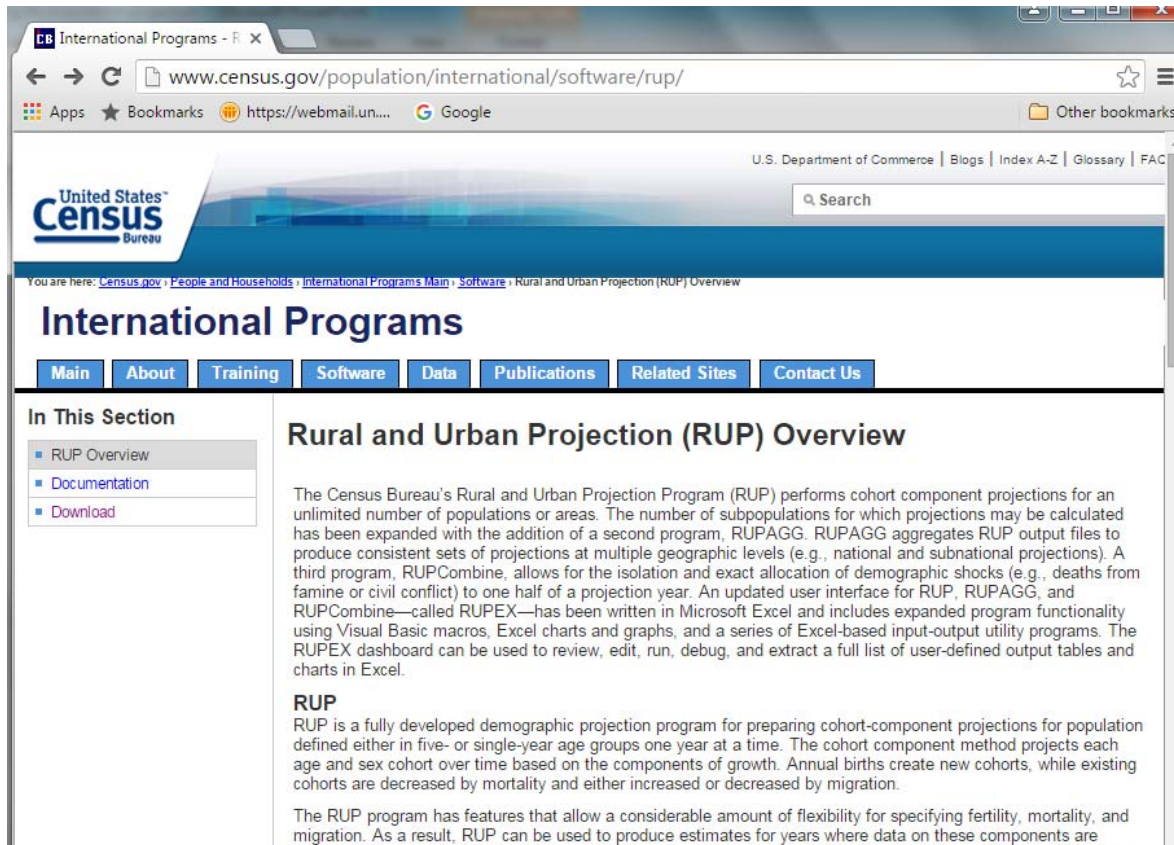
- Reliable and well-tested methodology
- Flexibility in inputs
- Large user base
- Support and training available
- Well-developed toolkits
 - Population Analysis Spreadsheets (PASEX)
 - Subnational Toolkit

○ Disadvantages

- Data format of input file text-based and not self-explanatory
- Flexibility of inputs puts the burden on user to specify

Obtaining and installing RUP applications

<http://www.census.gov/population/international/software/rup/>



- For this workshop: on memory stick at E:/Tools/US Census Bureau/USCBtools.exe
- Installs RUPEX, PASEX, Subnational Toolkit
- Separate installation for DAPPS: .../DAPPS/Dapps20.exe

DAPPS Interface

The screenshot displays the DAPPS (Demographic Analysis and Population Projection System) interface. The main window has a title bar that reads "Demographic Analysis and Population Projection System (DAPPS) -- [C:\Users\Population Division\Documents\Test\Test.dapps.xml]". Below the title bar is a menu bar with "File", "Edit", "Projection", "View", and "Help". A toolbar with various icons is located below the menu bar. The main area is divided into two panes. The left pane is titled "Population" and is currently empty. The right pane is also empty. A dialog box titled "Create New Demographic Information" is open in the center of the screen. The dialog box contains the following fields:

Data Type:	Population	Data Format:	Population		
Age Group:	Five-year age groups	Min Age:		Max Age:	
Start Year:	2012	End Year:	2012	Interval:	1
Source:	2012 Census				

At the bottom right of the dialog box are "OK" and "Cancel" buttons.

DAPPS Interface

Demographic Analysis and Population Projection System (DAPPS) -- [C:\Users\Population Division\Documents\Test\Test.dapps.xml]

File Edit Projection View Help

Population

Population.2012.80.5

Population 2012 Ages 0 to 80 (5-Year)			
Age	Male	Female	Total
0 - 4	0	0	0
5 - 9	0	0	0
10 - 14	0	0	0
15 - 19	0	0	0
20 - 24	0	0	0
25 - 29	0	0	0
30 - 34	0	0	0
35 - 39	0	0	0
40 - 44	0	0	0
45 - 49	0	0	0
50 - 54	0	0	0
55 - 59	0	0	0
60 - 64	0	0	0
65 - 69	0	0	0
70 - 74	0	0	0
75 - 79	0	0	0
80 - 84	0	0	0
Total	0	0	0

MalePopulationUnderOne 0

MaleTotalPopulation 0

FemalePopulationUnderOne 0

FemaleTotalPopulation 0

Population Mortality Fertility Migration Output Data Information Extra Fields

Mortpak PROJCT

- Simple cohort component projection tool
- Useful for small applications such as checking census consistency
- Limited utility for comprehensive projection outputs

Mortpak PROJCT

MORTPAK FOR WINDOWS - [Selected application is PROJCT (Untitled1)]

File Edit View Application Run Chart Window Help

Input File Name: C:\Program Files (x86)\MORTPAK4\Untitled.MPL
When last updated: 06 March 2016

Data Entry Help
Show Document Output

Single-year population projection based on cohort-component technique.

TITLE:

Year of Base Population (4 digits):
Month of Base Population:
Day of Base Population:
End Year of Projection:
Display/Print Projection Results Every Year(s)
Open Age Group of Base Population:
Sex Ratio at Birth (e.g. 1.05):
Model Life Table Pattern:
Title for User Defined Model:

Enter data below only if "User-Defined Model" was selected as the model life table pattern.

User Defined Model $q(x,n)$ Values

Age Group	Males	Females
0 - 1		
1 - 5		
5 - 10		
10 - 15		
15 - 20		
20 - 25		
25 - 30		
30 - 35		
35 - 40		
40 - 45		
45 - 50		
50 - 55		
55 - 60		
60 - 65		
65 - 70		

Base Year Population by Age and Sex		
Age Group	Males	Females
0 - 5		
5 - 10		
10 - 15		
15 - 20		
20 - 25		
25 - 30		
30 - 35		
35 - 40		
40 - 45		
45 - 50		
50 - 55		
55 - 60		
60 - 65		
65 - 70		
70 - 75		
75 - 80		
80 - 85		
85+		

Assumed Fertility, Mortality and Migration Levels					
Projection Period	TFR	e(0) Males	e(0) Females	Migration Males	Migration Females
Initial period					
Final period					

Current and Projected Fertility Patterns		
Age Group	Base Year	End Year
15 - 20		
20 - 25		
25 - 30		
30 - 35		
35 - 40		


Spectrum

Spectrum

v5.4

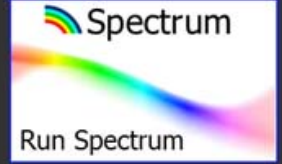
Recent

Eastlands.PJNZ


 Open projection

About
View revision log
Check for updates
☐ Do not show this screen again

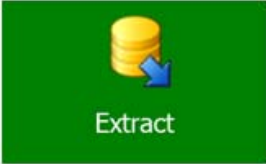
Applications and Tools




Run Spectrum



Run OneHealth




Extract




Aggregate


LiST




Missed Opportunities




LiST subnational projection




Join the online LiST conversation




AIM



AIM subnational projection




Join the online AIM/Goals conversation




Download National HIV Estimates Files


Support



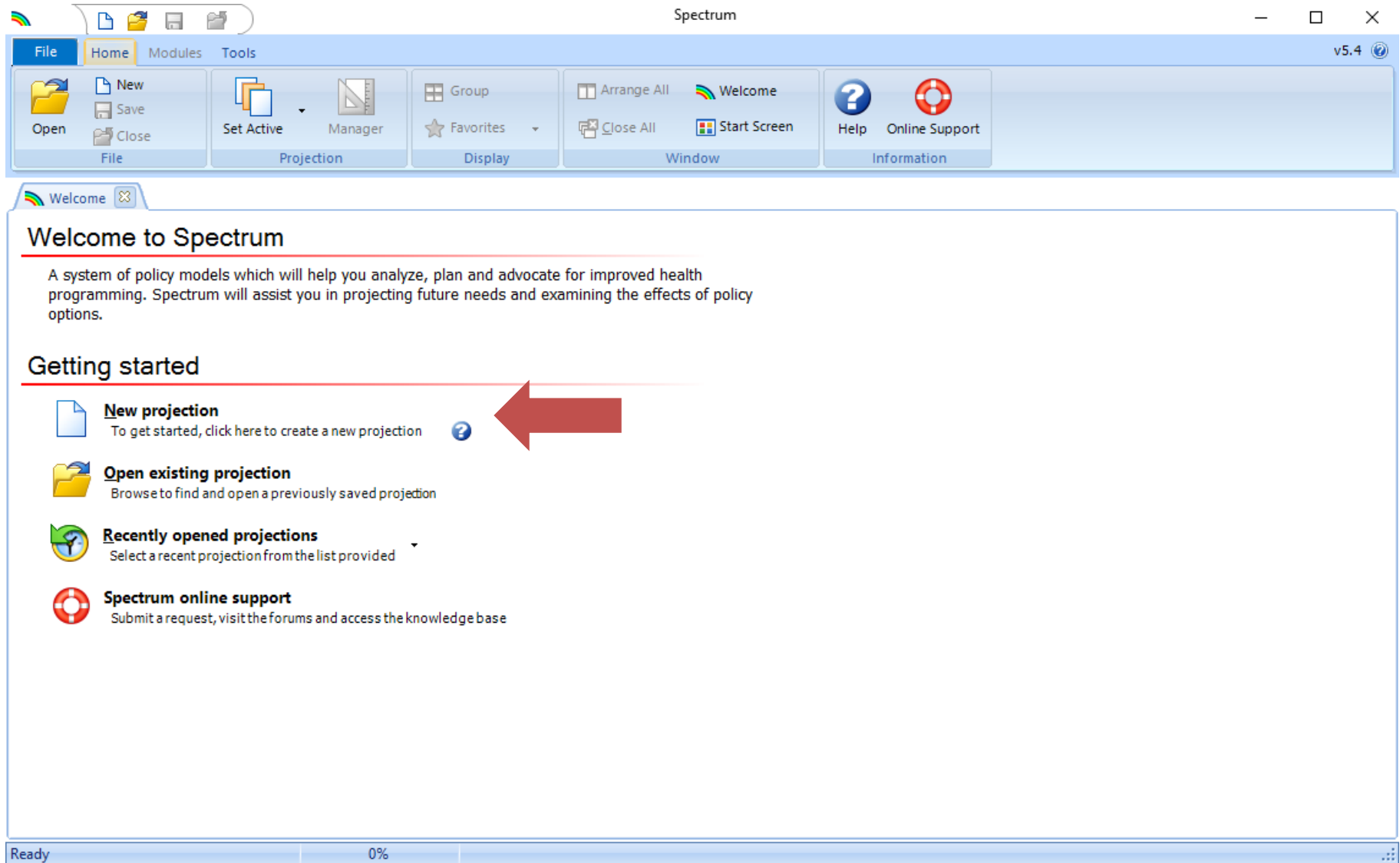
Support Site



Help



Create a new projection



Projection manager

Projection manager

Please set all parameters below in order to create your projection.

Set a name and folder location for your projection data

Projection file name

Set year boundaries for your projection

First year: 2010 Final year: 2030

Activate modules for use in your projection

Sectors

<input checked="" type="checkbox"/> Demographic Projection (DemProj)	<input type="checkbox"/> HIV Incidence (Goals)
<input type="checkbox"/> AIDS (AIM)	<input type="checkbox"/> Resource Needs Model (RNM)
<input type="checkbox"/> Lives Saved Tool (LiST)	<input type="checkbox"/> RAPID
<input type="checkbox"/> LiST Costing	
<input type="checkbox"/> Family Planning (FamPlan)	
<input type="checkbox"/> TB Impact Model and Estimates (TIME)	<input type="checkbox"/> Non-communicable diseases

Select a country or global region from which to retrieve demographic and other default data

Default data: No country or global region selected

☐ Subnational projection

Ok Cancel ? Help

Projection manager



Projection manager

Country and regional default data

Select

☒ Country

☐ Global region

☐ Sample country

☐ No country or global region

Select modules for which default data should be loaded:

☒ DemProj WPP 2015

☐ AIM

☐ FamPlan

☐ LIST

☐ TB

☐ RNM

☐ Goals

☐ NCD

☐ Malaria

Afghanistan

Albania

Algeria

Angola

Antigua and Barbuda

Argentina

Armenia

Aruba

Australia

Austria

Azerbaijan

Bahamas

Bahrain

Bangladesh

Barbados

Belarus

Belgium

Belize

Benin

Bhutan

Bolivia

Bosnia and Herzegovina

Botswana

Additional default country and regional data can be downloaded from our website. Click the button below to access the download manager.

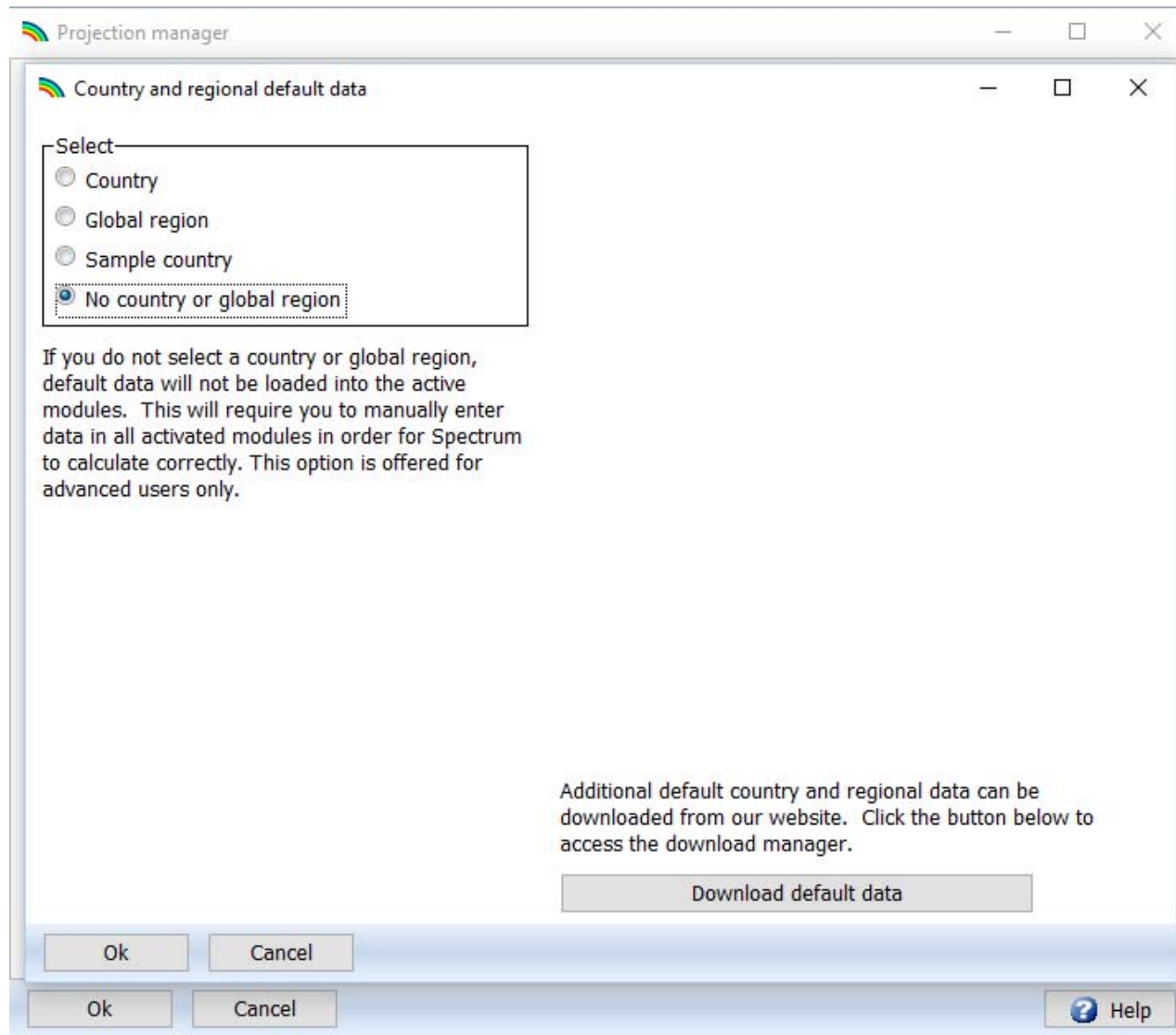
Download default data

Ok Cancel

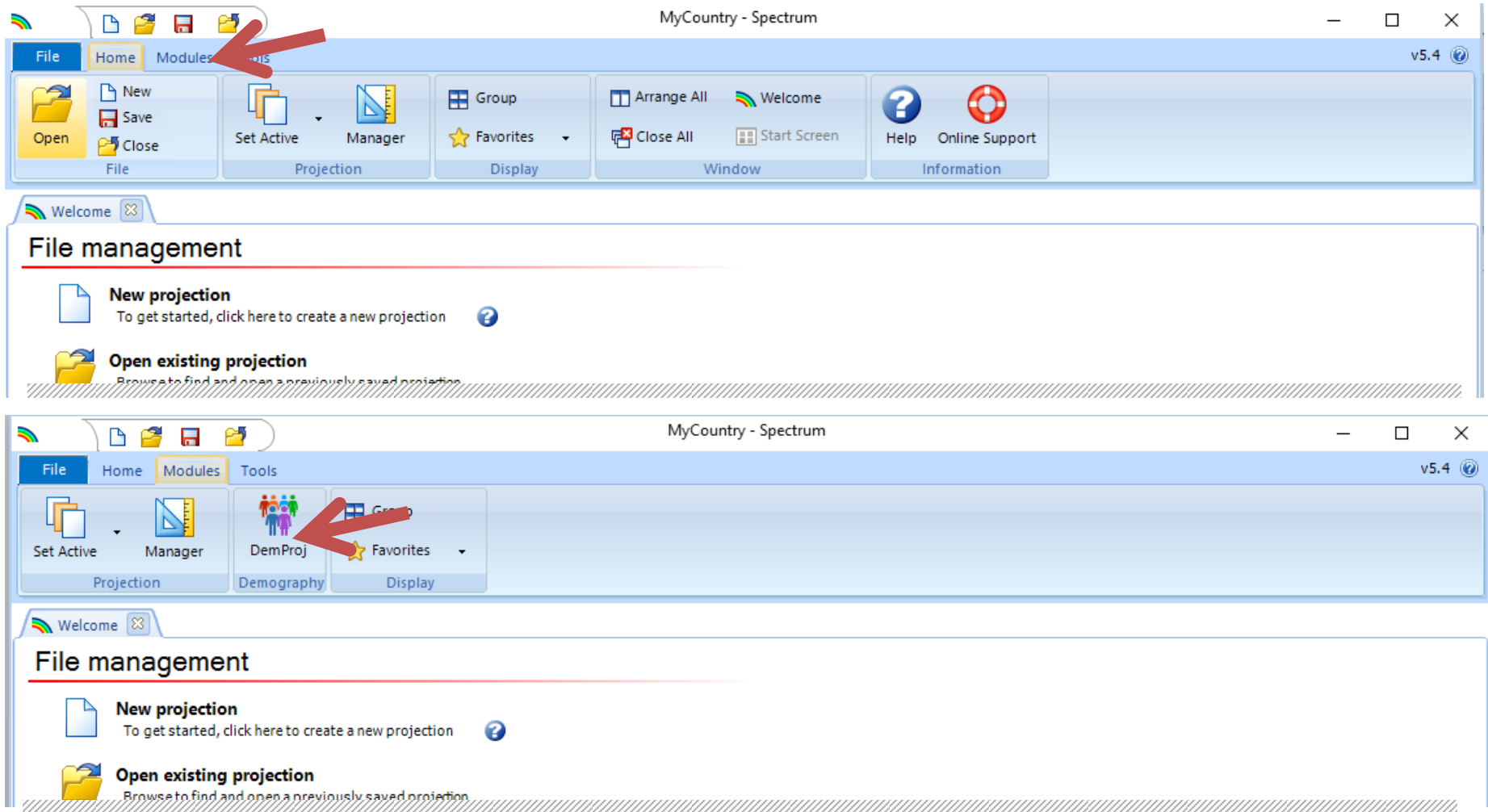
Ok Cancel

Help

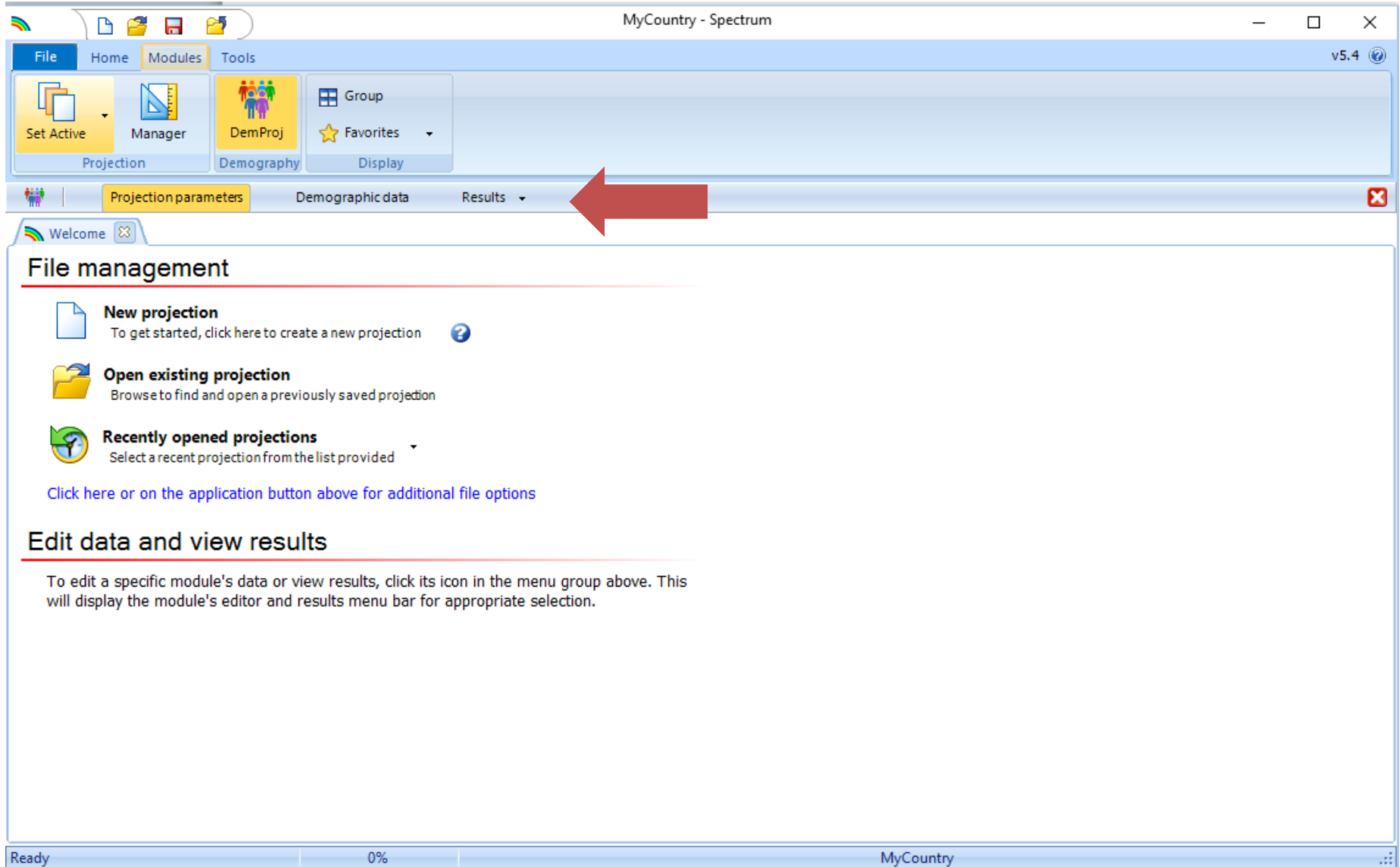
Projection manager



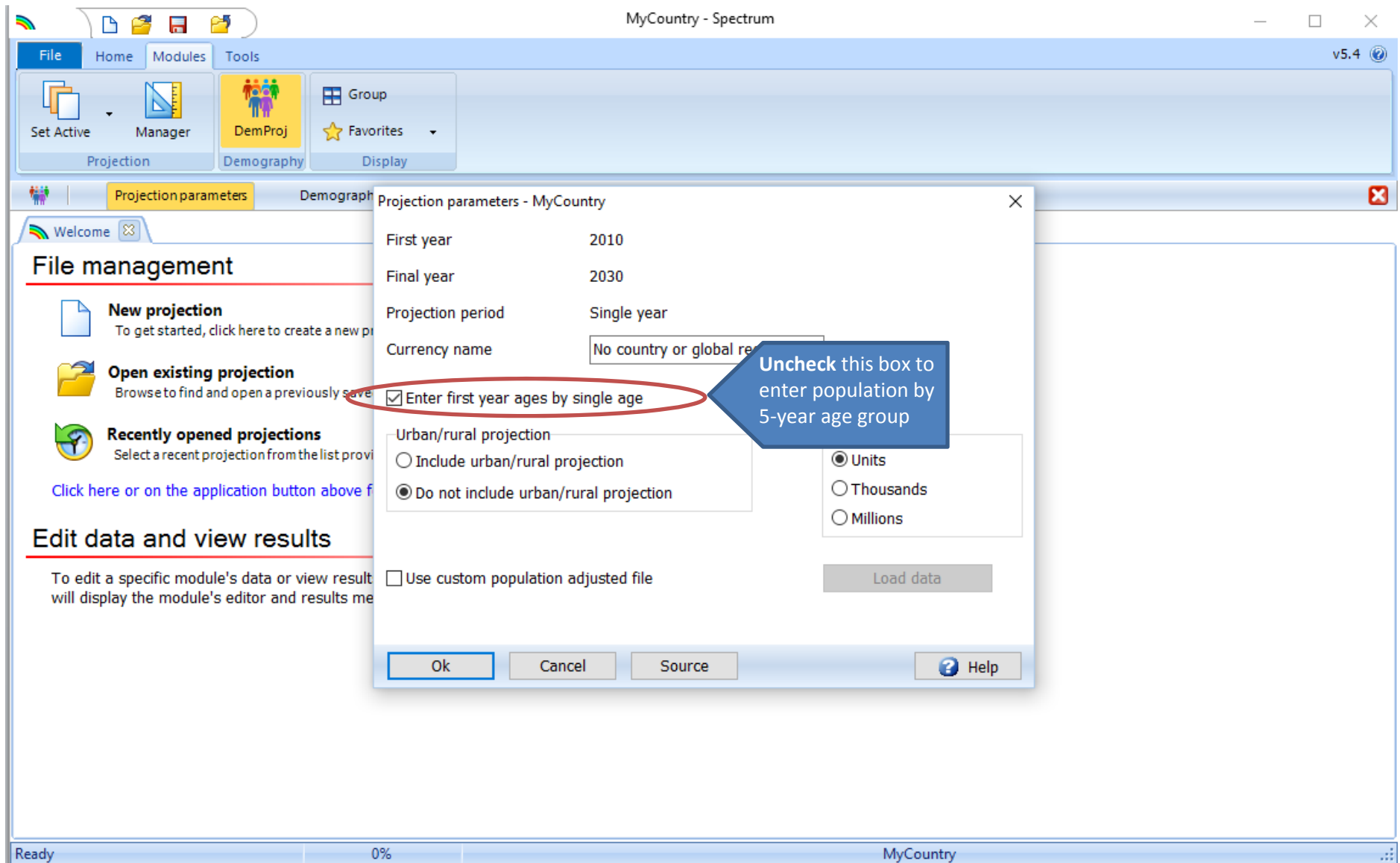
Spectrum menus



DemProj menu



Projection parameters



First-year population

The screenshot shows the 'MyCountry - Spectrum' application window. A 'Demographic data - MyCountry' dialog box is open, displaying the 'First year population' tab. The dialog box contains a table for population data by age and sex, and a text box explaining the data entry process. The table has columns for Age, Male, and Female. The text box states: 'All population projections must start somewhere. The starting point is the number of people in the population by age and sex in the base year. For both males and females, the population is divided into five-year age groups from 0-4 to 75-79. There is also a final age group for those people aged 80 and older.'

First year population (2010)

Age	Male	Female
0-4	0	0
5-9	0	0
10-14	0	0
15-19	0	0
20-24	0	0
25-29	0	0
30-34	0	0
35-39	0	0
40-44	0	0
45-49	0	0
50-54	0	0
55-59	0	0
60-64	0	0
65-69	0	0
70-74	0	0
75-79	0	0
80+	0	0
Total	0	0

Ok Cancel Duplicate Interpolate Multiply Source ? Help

Total fertility rate

The screenshot displays the 'MyCountry - Spectrum' software interface. A 'Demographic data - MyCountry' window is open, showing the 'Total fertility rate' tab. The window contains a table with years from 2010 to 2030 and a row for 'TFR' values. Below the table, a text box explains the definition of TFR. At the bottom of the window are buttons for 'Ok', 'Cancel', 'Duplicate', 'Interpolate', 'Source', and 'Help'.

MyCountry - Spectrum v5.4

File Home Modules Tools

Set Active Pro

Welcome

File management

Edit data

To edit : will disp

Demographic data - MyCountry

First year population Total fertility rate ASFR Sex ratio at birth Life expectancy Model life table International migration

Total fertility rate

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
TFR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Total fertility rate (TFR) is the average number of children that would be born alive to a woman (or a group of women) during her lifetime if she were to pass through all her childbearing years conforming to the age-specific fertility rates of a given year. TFR values are for the period from July 1st of the previous year to June 30th of the indicated year.

Ok Cancel Duplicate Interpolate Source ? Help

Ready 0% MyCountry

Age-specific fertility options

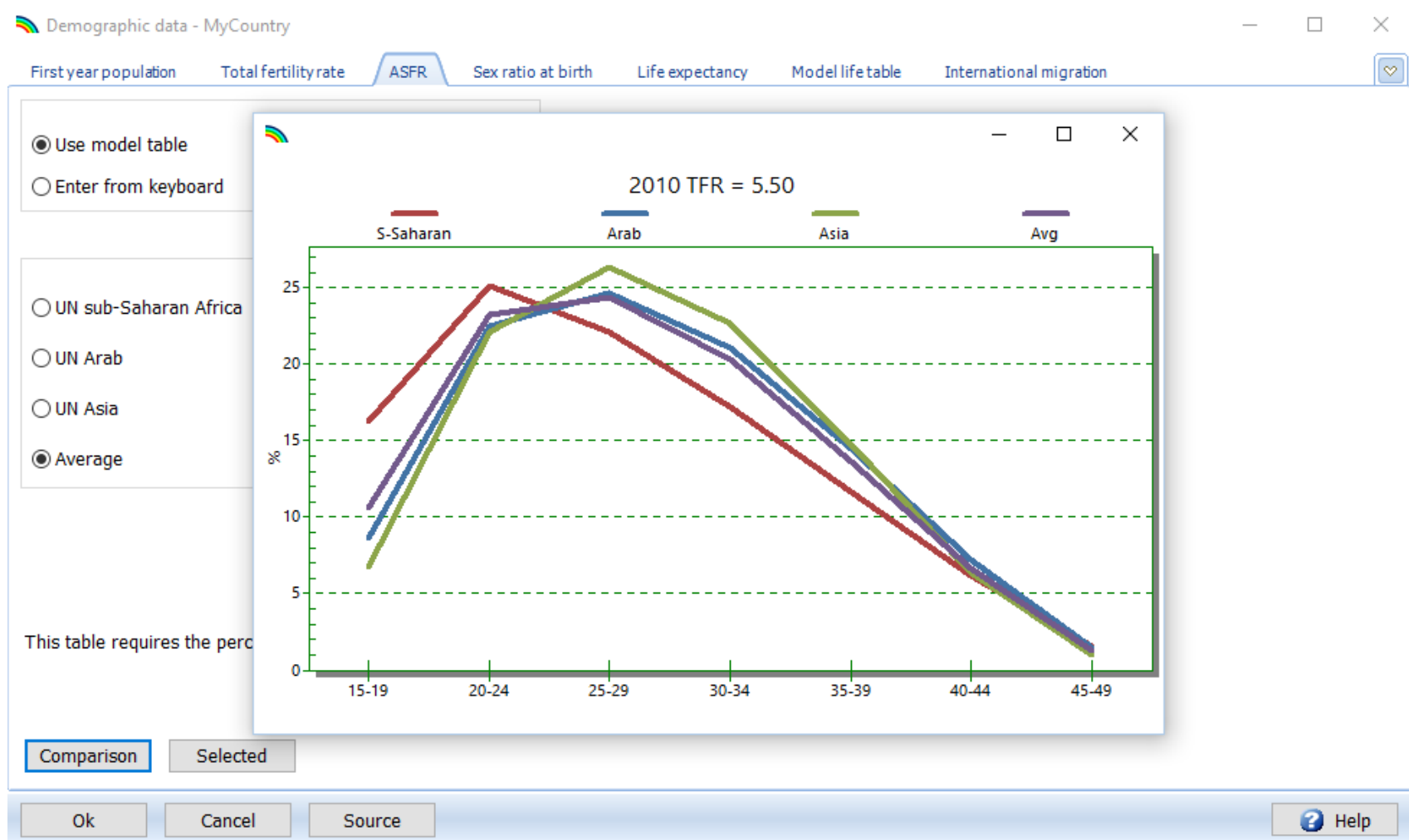
The screenshot shows a software window titled "Demographic data - MyCountry". It features a tabbed interface with the following tabs: "First year population", "Total fertility rate", "ASFR" (which is the active tab), "Sex ratio at birth", "Life expectancy", "Model life table", and "International migration".

Inside the "ASFR" tab, there are two main sections. The first section contains two radio buttons: "Use model table" (which is selected) and "Enter from keyboard". The second section contains four radio buttons for selecting a model: "UN sub-Saharan Africa", "UN Arab", "UN Asia", and "Average" (which is selected).


Below these sections, a text box contains the following instruction: "This table requires the percentage of lifetime births that occur at each age group. The values should sum to 100% in each year." The phrase "percentage of lifetime births" is circled in red.

At the bottom of the window, there are several buttons: "Comparison", "Selected", "Ok", "Cancel", "Source", and a "Help" button with a question mark icon.

Age-specific fertility model



Age-specific fertility distribution

 Demographic data - MyCountry

First year population

Total fertility rate

ASFR

Sex ratio at birth

Life expectancy

Model life table

International migration

☐ Use model table

☒ Enter from keyboard

Age Distribution of Fertility (%)

Age	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
15-19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20-24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25-29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30-34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35-39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40-44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
45-49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

This table requires the percentage of lifetime births that occur at each age group. The values should sum to 100% in each year.


Comparison

Normalize

Ok

Cancel

Source

 Help

Sex ratio at birth

Demographic data - MyCountry

First year populationTotal fertility rateASFR**Sex ratio at birth**Life expectancyModel life tableInternational migration


Birth ratio (male births per 100 female births):

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Birth Ratio	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00

The sex ratio at birth is the number of male births per 100 female births. It is set by default to 105. For most countries it will be about 103 to 105.


OkCancelDuplicateInterpolateSourceHelp

Life expectancy

 Demographic data - MyCountry

— □ ×

First year population Total fertility rate ASFR Sex ratio at birth **Life expectancy** Model life table International migration



Life expectancy

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Life expectancy is the average number of years a newborn can expect to live based on the mortality conditions at the time.


Ok

Cancel

Duplicate

Interpolate

Source

 Help

Model life table selection

Demographic data - MyCountry

First year population Total fertility rate ASFR Sex ratio at birth Life expectancy **Model life table** International migration

☐ UN Pop country-specific model life table (uncheck to select a regional model life table)

Regional model life tables

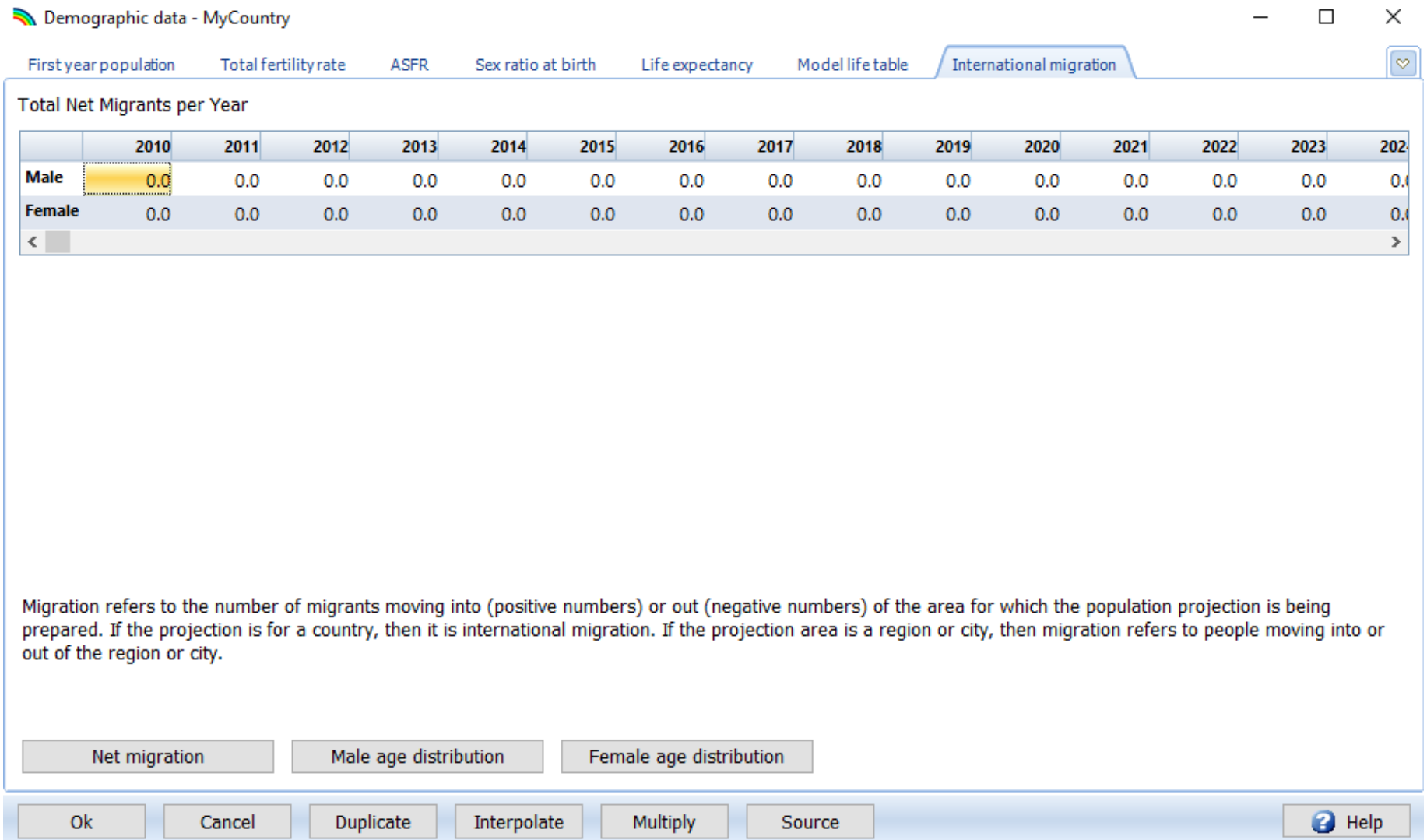
- ☐ Coale-Demeny West
- ☐ Coale-Demeny North
- ☐ Coale-Demeny East
- ☐ Coale-Demeny South
- ☒ UN General
- ☐ UN Latin America
- ☐ UN Chile
- ☐ UN South Asia
- ☐ UN East Asia
- ☐ Custom

A Life table is a table of values based on a series of related functions having to do with survivorship over intervals of time.

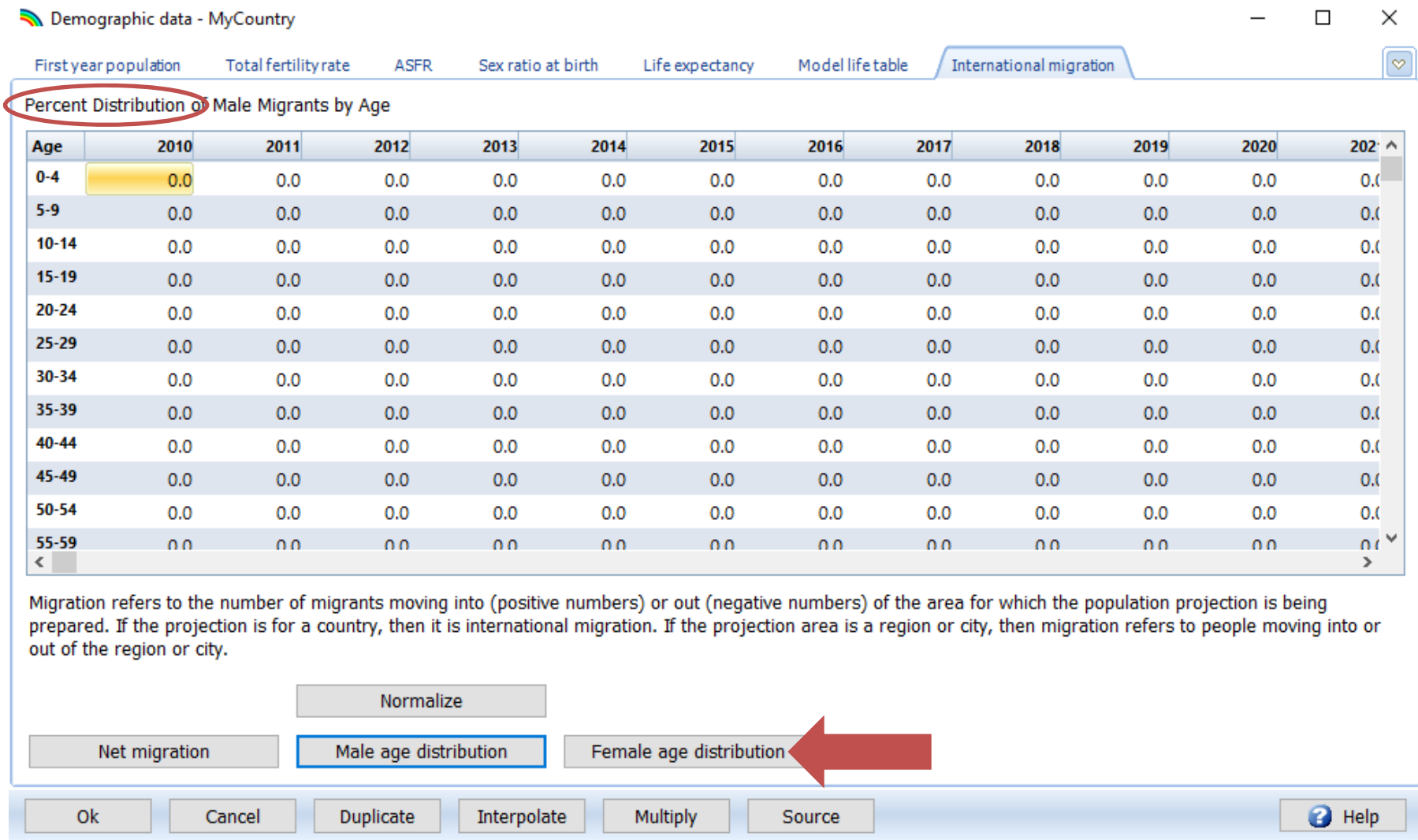
Custom

Ok Cancel Source ? Help

Total net migrants by sex



Per cent distribution of male migrants



Thank you

Questions?

>> until 11 March:



>> After 11 March: sawyerc@un.org
bassarsky@un.org