

# Using TOSMANA for fsQCA

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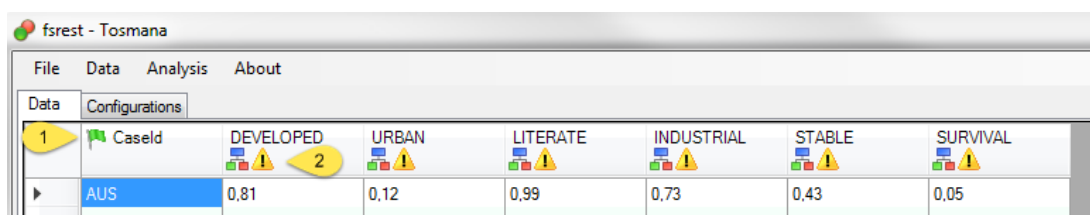
<http://www.tosmana.net>

This document illustrates a first simple use of *TOSMANA* for fsQCA. It aims to clarify the import of data as well as all steps necessary for a complete fsQCA analysis. Please refer to the manual or the *Getting Started with TOSMANA Guide* both found on the *TOSMANA* website for further information.

Created on September 27<sup>th</sup> 2016 based on: Cronqvist, Lasse. 2016. *Tosmana* [Version 1.52]. University of Trier. Internet: <http://www.tosmana.net> (Published: September 27<sup>th</sup> 2016). The data included is taken from: Ragin, Charles (2009): *Qualitative Comparative Analysis Using Fuzzy Sets (fsQCA)*. In: Benoît Rihoux und Charles C. Ragin (Eds.): *Configurational comparative methods. Qualitative comparative analysis (QCA) and related techniques*. Los Angeles: Sage, pp. 87-121, data from p. 95. The data can be found in the download section on the *TOSMANA* website.

The following steps do illustrate the import of data to *TOSMANA* as well as the procedure for a simple fsQCA analysis with the software:

1. The simple way to include data with *TOSMANA* is to copy data directly from a spreadsheet program. To do so, open the data set in a spreadsheet program. *Select* all cells with data in the data set and *copy*. Please remember to include variable names in the first row.
2. In *TOSMANA*, select *File>Import from Clipboard* in the menu. The data will be loaded to the software and will replace existing data. After the successful import, you should save your file in the format used within *TOSMANA* (*File > Save As*). The software saves the data as a XML-File, so you can edit the data outside of *TOSMANA* with a XML-Editor as well.
3. *TOSMANA* tries to identify the type of data imported. A variable containing characters will be marked as a possible case identifier with a green flag (1, this is the case for *Caseld* in this example). In addition, *TOSMANA* identifies metric data and marks the respective column with a subdivision symbol (2, here e.g. *DEVELOPED*). The yellow warning sign indicates that the condition has no thresholds attached to it (this can be ignored if the data is only subject to a fsQCA analysis and no cs- or mvQCA calculations are made).



The screenshot shows the TOSMANA software window with a menu bar (File, Data, Analysis, About) and two tabs (Data, Configurations). The Data tab is active, displaying a table with the following data:

	Caseld	DEVELOPED	URBAN	LITERATE	INDUSTRIAL	STABLE	SURVIVAL
AUS		0.81	0.12	0.99	0.73	0.43	0.05
RFI		0.99	0.99	0.99	1	0.99	0.95

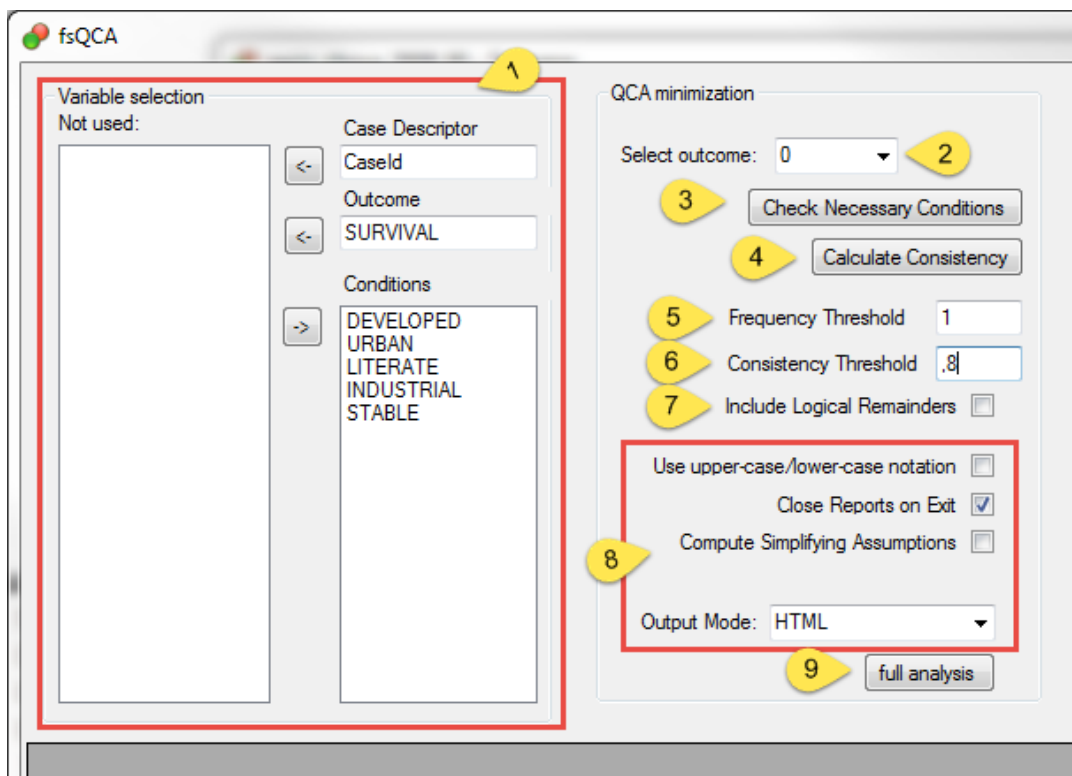
Annotations in the image: A yellow circle with the number '1' points to the 'Caseld' column header. A yellow circle with the number '2' points to the 'DEVELOPED' column header. Yellow warning icons are present in the cells for 'DEVELOPED', 'URBAN', 'LITERATE', 'INDUSTRIAL', 'STABLE', and 'SURVIVAL' in the first row.

4. Currently, no features for calibration are included in *TOSMANA*. Basic procedures for calibration will be added in a later version of the software.

5. After loading the data set, the fsQCA calculations can be started by calling *Analysis > Start fsQCA* from the menu bar or by pressing the *F10* key. In the fsQCA-window, first select the conditions, the outcome and the case descriptor (Area marked 1). Then, select the outcome value to be minimized (2). In a first step, you can check for necessary conditions (*check necessary conditions*, 3). In addition, you can calculate the consistency of the configurations in the truth table (*calculate consistency*, 4).

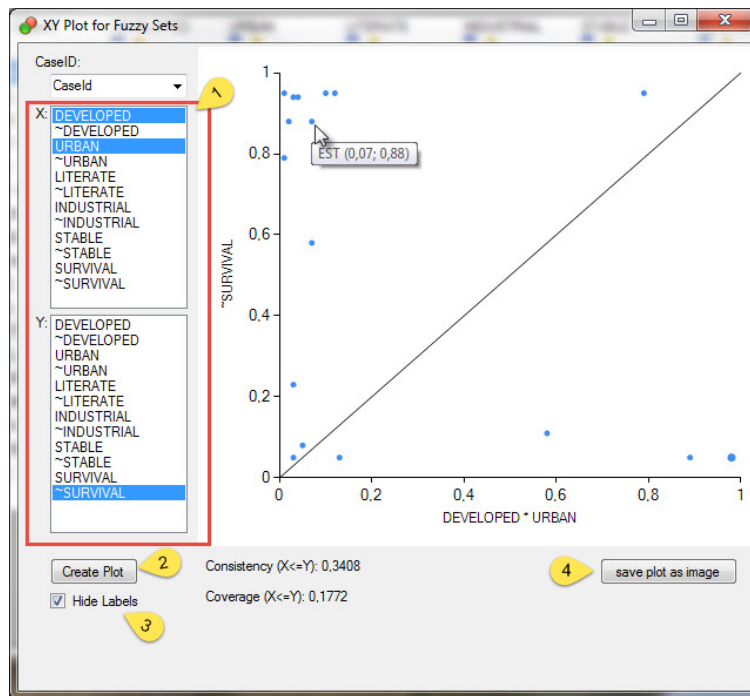
In *TOSMANA*, the outcome values of the truth table are automatically determined by the consistency threshold entered (6). The software assigns the outcome value 1 to configurations with a consistency value above the threshold; the outcome value 0 is assigned to cases below this threshold. Only configurations representing at least the number of cases set as frequency threshold (5) will be included. Select if logical remainders should be included in the minimization or not (7) and press the *full analysis* (9) button to create and minimize the truth table.

In addition, a number of options regarding the output of the calculations can be defined (Area marked 10).



## Further fsQCA features in TOSMANA

In addition to the analysis of consistency addressed above, TOSMANA also allows to study fuzzy set relations. To do so, please open the XY Plot from the main window (*Analysis – XY Plot*, or *F8*). One or multiple variables can be included on each axis (1) – select multiple variable by keeping *ctrl* pressed while selecting. Press the *create plot* button (2) to draw the XY Plot. In addition, the software calculates the consistency and the coverage values for the fuzzy set relation ( $X \leq Y$ ).



Single points in the plot show the individual cases. Cases sharing the same values are combined to a single, larger point. Hover the mouse over a point to see the case ID and the values of the case(s). To show all data, deselect the checkbox *hide labels* (3). Save the shown plot as an image by pressing *save plot as image* (4).

## References / Resources

Cronqvist, Lasse (2016a): TOSMANA Manual. Version 1.52. Trier. Available online: <http://www.tosmana.net>.

Cronqvist, Lasse (2016b): Getting started with TOSMANA. Univ. of Trier. <<http://www.tosmana.net>>