**Adding Variables to an Empty FDACS Template**

**Script:** FDACS\_add\_variables\_to\_template

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**Introduction**

To prepare an FDACS BMP workbook for data entry, researchers will normally start with the FDACS template and then add variables they expect to report in their final dataset. Variables need to be defined, including the required units, and if possible linked to equivalent variables from the ICASA Master Variable List, accessible at http://www.tinyurl.com/icasa-mvl.

To assist the initial workbook preparation, the R script ‘FDACS\_add\_variables\_to\_template‘ was created. The script reads a user-prepared list of variables, copies them to the designated sheets in a workbook, updates the workbook dictionary, and then saves the workbook.

The new variables are defined in the workbook ‘FDACS\_Observed\_Crop\_Variables\_V0.94.xlsx’. Individual worksheets currently are named by crops (e.g. ‘Carrots’, ‘Cotton’, or ‘Potato’). Users can create new sheets with names aligned with their projects. Each sheet contains nine variables:

* SheetName – The name of the sheet where the variable will be added.
* VariableName – The name of the variable to be added.
* Definition – The definition of the variable.
* Units – The units of measurement.
* Priority – Whether FDACS considers the variable to be required, preferred or optional.
* ICASA short name – The ICASA synonym using the short name.
* ICASA long name – The ICASA synonym using the long name.
* Equivalent – Whether the new variable is directly equivalent to an ICASA variable.

**Procedure for Adding Variables**

The full procedure for adding data is outlined in the steps below. We assume that the user is familiar with basic operation of the R language, use of RStudio, and understands how the FDACS BMP template is organized.

1. Download the script ‘FDACS\_add\_variables\_to\_template’ to a folder of your choice.
2. Create two new folders within the chosen folder, ‘/Data’ and ‘/Updated’.
3. Copy the FDACS BMP template file to the ‘/Data’ folder.
4. Copy the file ‘FDACS\_Observed\_Crop\_Variables\_V0.94.xlsx’ to the ‘/Data’ folder.
5. Prepare the list of variables to be added to the crop variables workbook.
   1. Open the workbook and either identify an appropriate crop worksheet or create a new sheet. If a new sheet is created, copy the eight column names from another sheet.
   2. For reach variable to be added, identify which worksheet in the FDACS template should contain the variable. Copy the sheet name to the column ‘SheetName’ and enter the variable name in the adjacent column, ‘VariableName.’
   3. Enter the definition, units and priority. If the project proposal states clearly that the variable will be measured, the priority should be ‘Req’ for “Required”.
   4. Attempt to identify the equivalent ICASA short name and long name for the variable. If the definition and units make it clear that the variables are equivalent, enter “Y’ under ‘Equivalent’.
   5. Repeat this process for all variables of interest.
   6. Save the file.
6. Open the R script ‘FDACS\_add\_variables\_to\_template’ in RStudio.
7. If not done previously, install the package openxlsx2 from Tools -> Install packages …
8. Edit the variable ‘crop\_name’ to contain the name of the worksheet in individual FDACS BMP datasets that will receive the new variables. This should be the only modification needed to the R script.
9. Run the script from RStudio by entering ‘alt-ctrl-r’ or navigating through the menu bar to Code -> Run Region -> Run All.
10. The script should run, outputting a few lines of information to assist possible de-bugging. The last lines of output are from “housekeeping” to free memory and remove objects.
11. Navigate to the folder ‘/Updated’ and open workbook. This file will contain the modifications specified in ‘Variables\_to\_add.xlsx’.
12. Inspect the sheets where variables were expected to be added.
13. Verify that the dictionary sheets were updated as well.

This completes the process for inserting variables into an FDACS BMP template.

**Troubleshooting**

One anticipated source of problems is in linking specific variables to equivalent ICASA names. At the moment, the ICASA Master Variable List is maintained as a Google Sheets file, so users will have to either browse the sheets or use the search function to locate variables. The standards include a small number of crop-specific variables but tends not to include commodity specific harvest quality or crop health variables. Users may suggest new variables via the FDACS BMP feedback link: ???

The most likely source of errors is mismatches among file names or the variable ‘SheetNames’.