

Capacity Building Workshop for
Modeling Energy and Land Use Change in Haiti
Santo Domingo 21-24 march – English version



User's Manual

Running MoFuSS locally in Haiti, scripts, and datasets for Windows

A banner for a workshop. At the top, it features the 'LEAP MoFuSS' logo. Below the logo, it says '21-24 mars Santo Domingo' and provides a URL: 'https://www.wegp.unam.mx/courses/haiti2023'. A dark blue horizontal bar contains logos for partner organizations: CLEAN COOKING ALLIANCE, SEI Stockholm Environment Institute, ciga, Centro de Ciencias de la Complejidad, and Laboratorio Nacional de Análisis de Sistemas (LANASE). Below this bar, the title 'Atelier de renforcement des capacités pour la modélisation de l'énergie et du changement d'affectation des terres en Haïti' is written in white and green text. At the bottom, it says 'Capacity Building Workshop for Modeling Energy and Land Use Change in Haiti' in a smaller white font. The background of the banner is a lush green forest.

LEAP MoFuSS
21-24 mars Santo Domingo
<https://www.wegp.unam.mx/courses/haiti2023>

**Atelier de renforcement des capacités pour la
modélisation de l'énergie et du changement
d'affectation des terres en Haïti**

Capacity Building Workshop for Modeling Energy and Land Use Change in Haiti

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1 Preface

This brief starter was developed mainly for the participants of the Capacity Building Workshop for Modeling Energy and Land Use Change in Haiti, held in Santo Domingo between March 21 and 24.

The main goal of this document is to guide participants to completely run the model for any test area within the country of Haiti. All scripts (extensions .egoml and .R) can be opened, edited and saved using Dinamica EGO and R respectively, or any other code editor such as [Notepad++](#) or [Sublime](#).

As mentioned during the presentation, MoFuSS is now intended to be fully web-based, using Haiti as our first study.

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2 Computer specifications

Dinamica EGO is only available for Windows operating system (OS). The model has been tested successfully in various configurations of Windows 7, 8 and 10 versions, and in Intel-based Macs using [Boot Camp](#). No sound tests have been conducted so far in Linux using [Wine](#).

Some geoprocessing operations in MoFuSS use parallel computing, detecting how many cores are available, and using all of them at maximum capacity. Eventually, you might experience that your computer becomes very slow if you try, for example, to open some other program or perform any other task requiring of CPU's processing power. This is however barely noticeable for small areas of analysis. Please note that if you cancel any geoprocessing operation using multiple cores, be sure that all Rscript.exe instances are stopped before proceeding with any other tasks: Press Ctrl+Alt+Del to check all processes running in your computer and wait until all Rscript.exe instances are turned off.

3 Download MoFuSS files

Copy the following folders from the UBS that was provided into any location of your hard drive. It is recommended to keep paths as short as possible and with no spaces, accents or characters.

MoFuSS_Haiti_StoDomingo2023 (located here in the USB drive: ...\\MoFuSS 2023 CCA Haiti\\data\\mofuss_haiti\\)

mofuss_gitlab (located here in the USB drive: ...\\MoFuSS 2023 CCA Haiti\\software\\)

Unzip the file **DinamicaEGO241.zip** (located in ...\\mofuss_gitlab\\linwin\\interpretersWindows\\)

Inside the unzipped folder you'll find two executables from a freeware called Dinamica EGO. First install "SetupDinamicaEGO-241.exe" and then "SetupDinamicaEGO-241-MinGW.exe", in that order. When asked, accept all default setting during installation. MoFuSS uses an old but super stable version of Dinamica EGO (version 2.4.1). The latest version of Dinamica EGO will produce some errors and warnings that are not easy to jump unless you are familiarized with this software. If you

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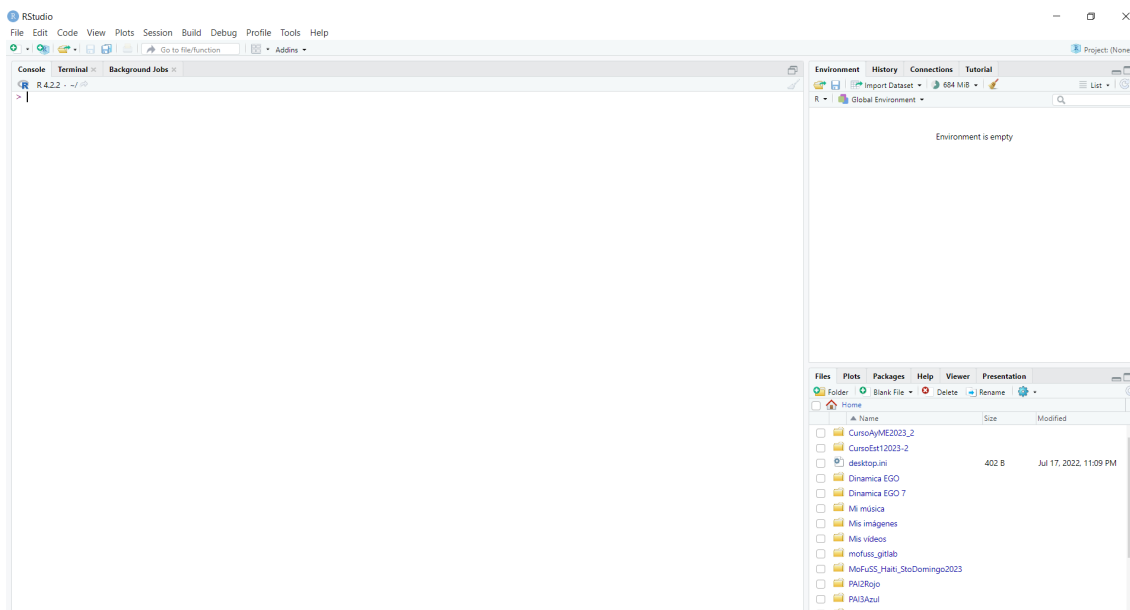


have any previous versions of Dinamica EGO installed, you can leave them as there is no conflict.

4 Install all other required freeware

Install [R and RStudio](#) for Windows. If you are not familiar with this software, follow the links “Download R for Windows” and then “install R for the first time”. During installation you can keep all default options (e.g. install both 64-bit and 32-bit files if you don’t know your OS type). MoFuSS can read your machine configuration and pick the correct version.

Once R and R Studio are installed, we need to install all required libraries. Open RStudio and you should see a similar layout (with a white background perhaps):



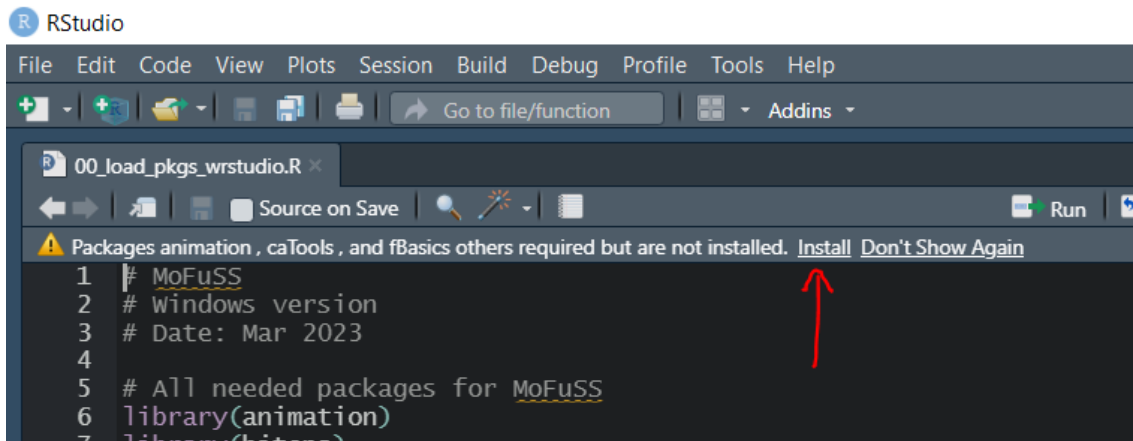
You can change the layout to “dark” in Tools -> Global Options -> Appearance -> Editor Theme -> (select Tomorrow Night 80 if you want to be exactly as Adrian’s)

Go to File -> Open File and load ...\\MoFuSS 2023 CCA

Haiti\\software\\mofuss_gitlab\\linwin\\scripts\\00_load_pkgs_wrstudio.R

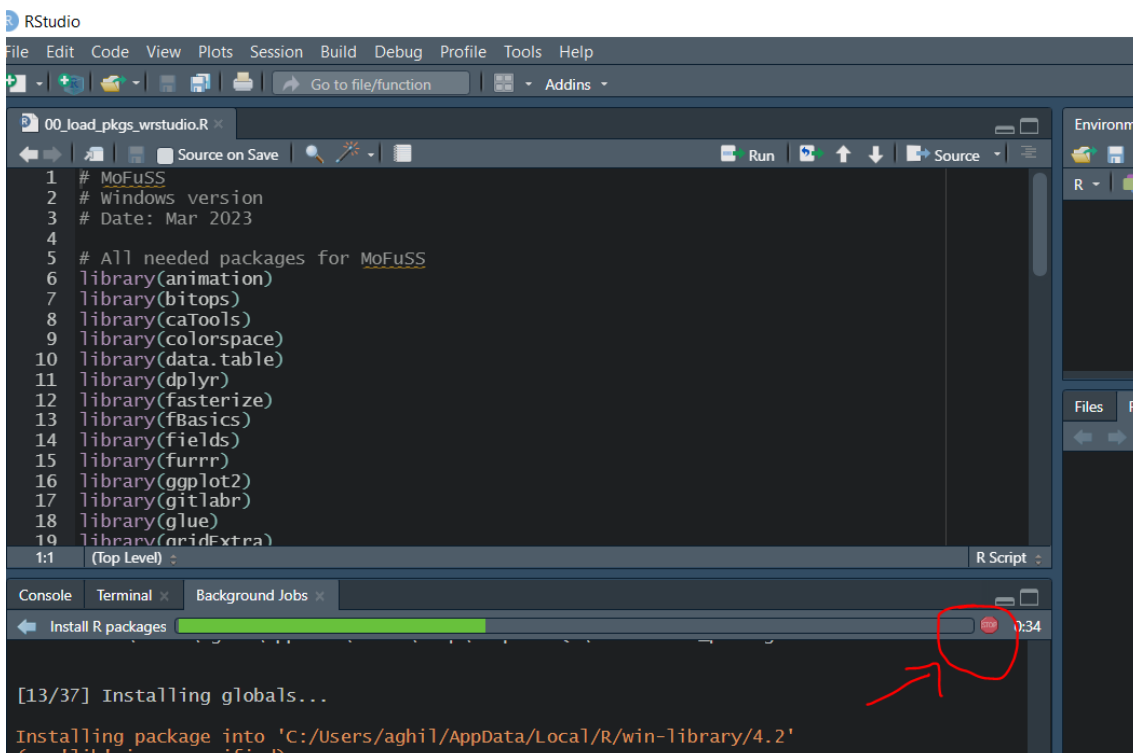
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Wait a few seconds and then click the “Install” tab as shown in the figure below. Please be careful not to click in the Don’t Show Again tab as it will make installation more complicated:



Installation of R packages can take a while. Be patient and the instructor will debug any issues at this point.

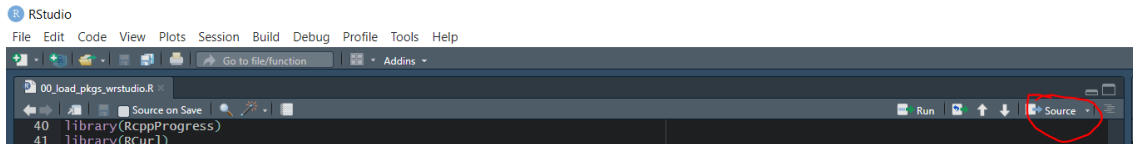
IMPORTANT: Please try not to touch anything in your laptop until the red circle disappears:



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Finally, click on the “source” button to double check all packages were successfully installed:



Install [Google Earth](#), it’s the easiest and more practical way to select your area of interest. If you already have it, then skip this step.

For MoFuSS to produce a summary report in .pdf, a LaTeX to PDF compiler is needed. Download and install the [Basic MiKTeX](#) for 32-bit or 64-bit depending on your system (install both if not sure). Note that not all compilers work properly for R running in Windows, so, even if you already have another version of TeX/LaTeX on your computer you still might need to install MiKTeX. But it is suggested that you wait for error and warning messages during pdf compilation before moving forward with any new installation.

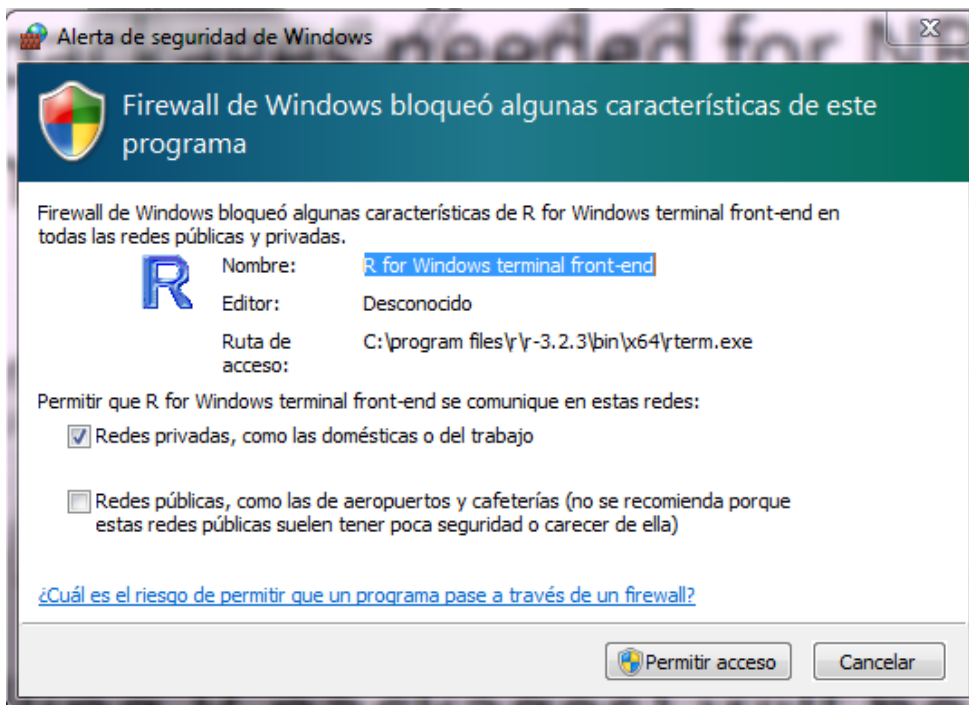
You need any GIS software to explore the spatial data that is being generated by MoFuSS. The best option is [QGIS](#), as its free, powerful, and scalable.

You need a [pdf reader](#) to open the summary report and see some warnings and other messages triggered by Mofuss. You can test whether your current PDF reader is compatible with multimedia files (e.g. Acrobat Reader >9.x), as two animations are inserted in the pdf summary report. If you already have this software, then skip this step. Note – if you do not have a pdf reader installed, MoFuSS will stop running because it is unable to deliver messages and instructions at the beginning of the process.

Finally, MoFuSS will produce animations in .avi, .mp4 and .wmv format. You can install [VideoLAN \(VLC\)](#) to open these files or use any other compatible software already installed in your computer.

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Windows, or your antivirus, or your firewall may ask for different kind of permissions. If this happens, please allow executables to communicate through networks and for the system to open/read/save files:

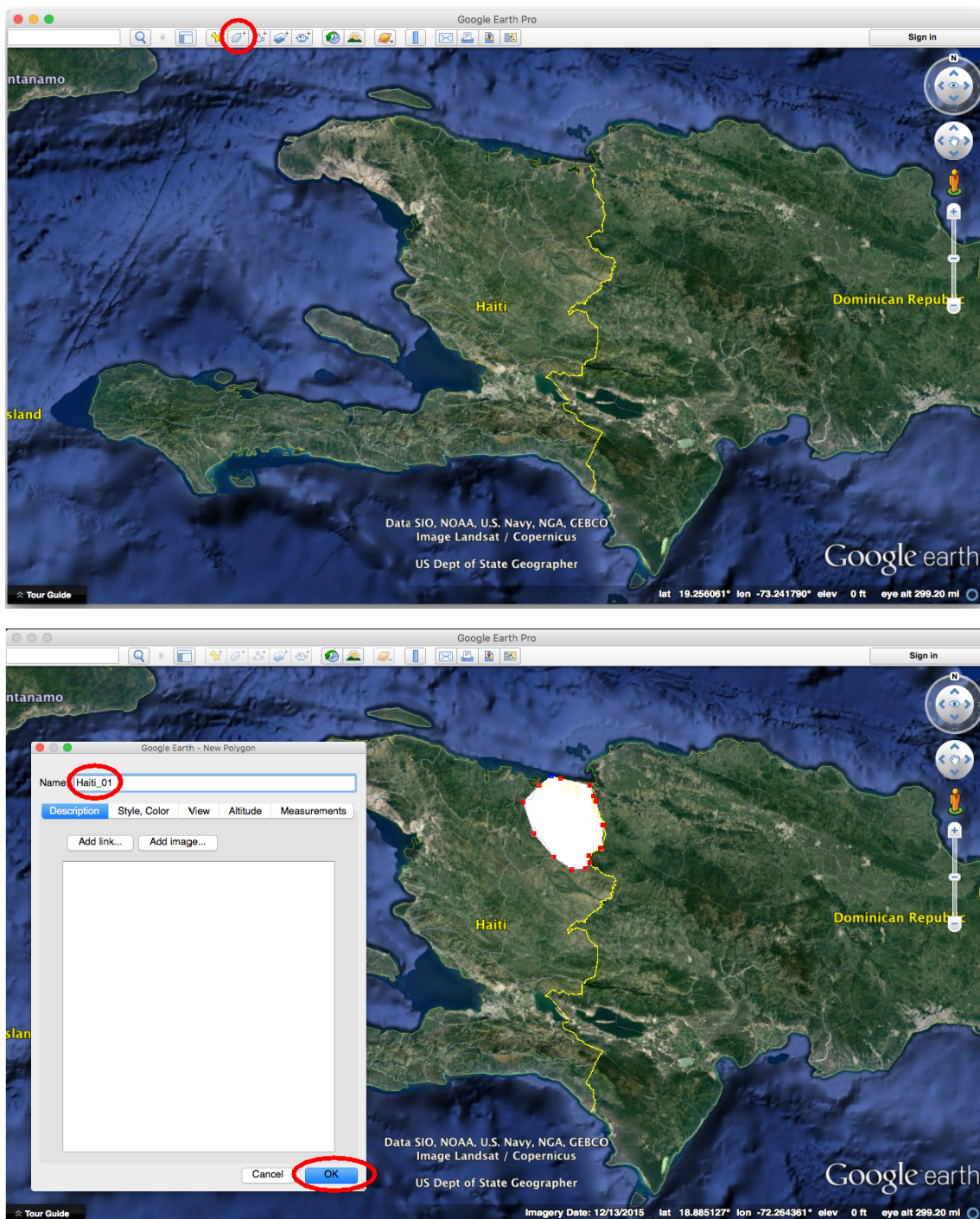


5 Selecting an Area of Interest (AOI) in Haiti

Open Google Earth and zoom-in over Haiti. Draw a **small**¹ polygon by clicking the polygon icon in the top menu bar, name it, and save it into Google Earth by clicking “OK”. If you are not experienced drawing polygons in Google Earth, use as few vertices as possible to avoid errors: i.e. one click per vertex (each vertex is shown as a small red square):

¹ It is important that you first select a small area (similar to Figure A2 or smaller) to save time and check that everything is working. You can try with large areas later and let the model run overnight.

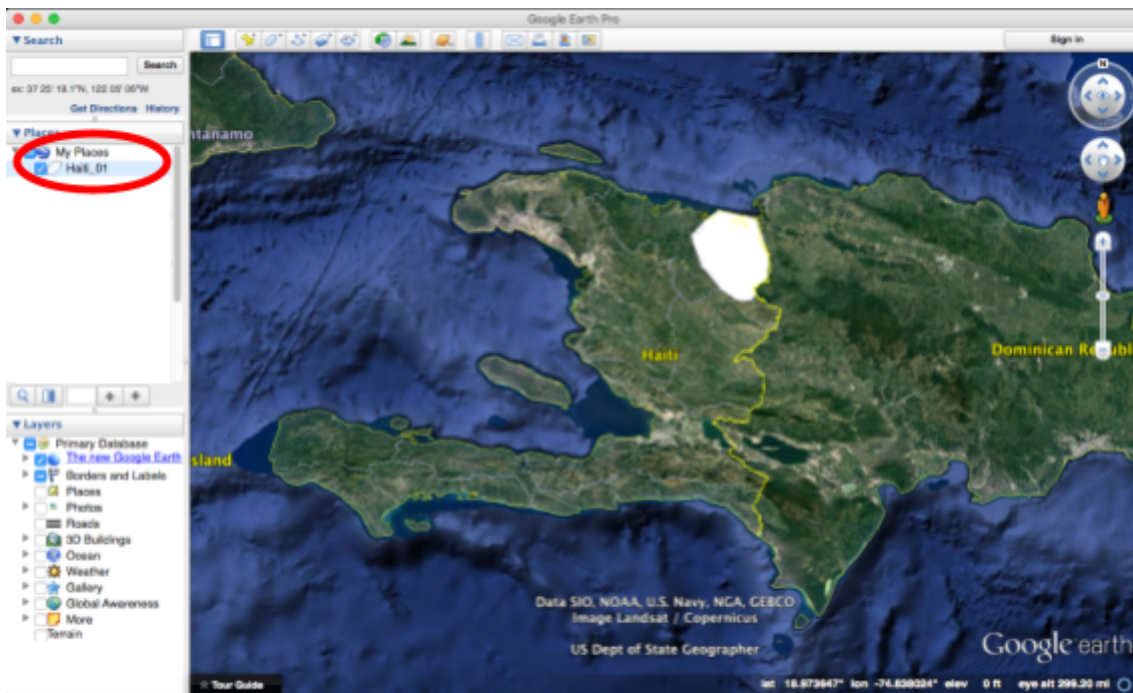
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To save the polygon into MoFuSS right click over the newly created polygon (likely under *My Places* or *Temporary Places* at the left side of your screen) and save it (*Save Place As...*) as a **KML file** (not KMZ) into
C:\Users\aghil\Documents\MoFuSS_Haiti_StoDomingo2023\LULCC\DownloadedDatas

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ets\SourceDataHaiti\InVector_GCS\your_polygon.kml (Figure A3)². You can save more than one Google Earth polygon in this folder but later you will be asked to choose only one through a file dialog box:



You can now close Google Earth, discarding any changes.

² If a new area is to be selected after running MoFuSS for the first time, you must save the new .kml file directly in ...\\MoFuSS_v6\\LULCC\\SourceData\\InVector_GCS\\your_polygon.kml, and start from script #2.

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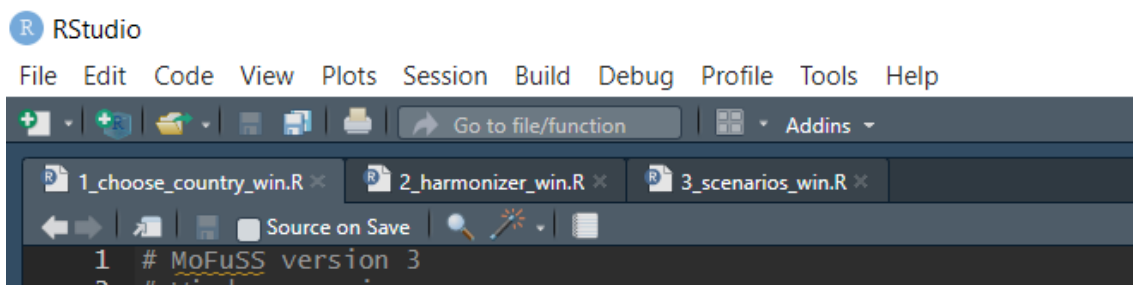
6 Run MoFuSS by means of a user-friendly interface - Part I

As already mentioned, this is the last MoFuSS course to be run locally, we expect next courses be fully web-based. As we are in the middle of this migration (because this course was delayed by a few years due to Covid19) we will need to run some R scripts with no user-friendly interface. The following instructions are intended to be as detailed as possible.

6.1 Hands-on Exercise #1: Using MoFuSS for one small Area of Interest (AOI)

Open (or go to) RStudio and open the following four scripts:

```
...\mofuss_gitlab\linwin\scripts\1_choose_country_win.R  
...\mofuss_gitlab\linwin\scripts\2_harmonizer_win.R  
...\mofuss_gitlab\linwin\scripts\3_scenarios_win.R
```

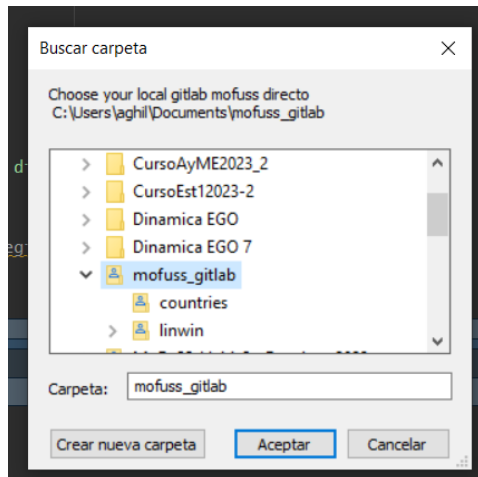


With the first script highlighted as in the previous figure, click the button “source” to run it.

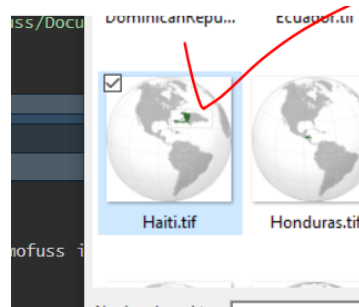
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This first scripts needs to know where your data is. You'll be asked three questions:

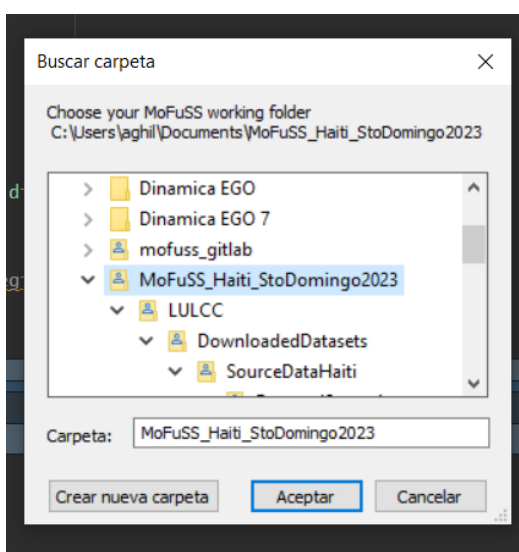
- 1) Where is your **mofuss_gitlab** folder?



- 2) Choose a country



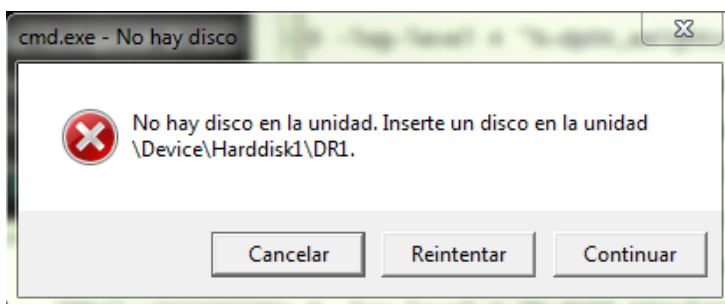
- 3) Select your **MoFuSS_Haiti_StoDomingo2023** folder



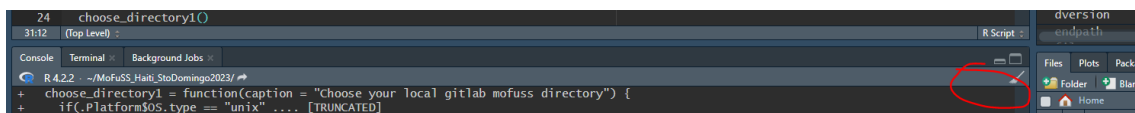
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Please wait until the scripts runs, it can take up to 5 minutes. After this, we will debug the results in each laptop.

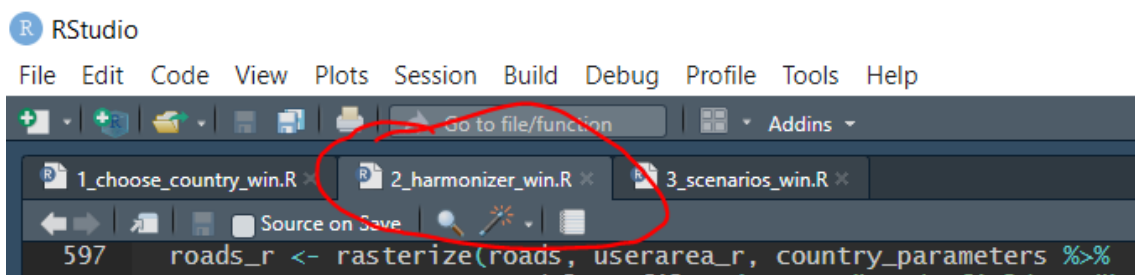
Note: Just click “Cancel” if a similar dialog boxes appear, it is just looking for files in your laptop



We know the script has stopped running when the red circle disappears



Once everything worked ok, we'll repeat the same operations for script 2 (...\\mofuss_gitlab\\linwin\\scripts\\2_harmonizer_win.R) . First you need to highlight it



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The following questions need to be answered this time:

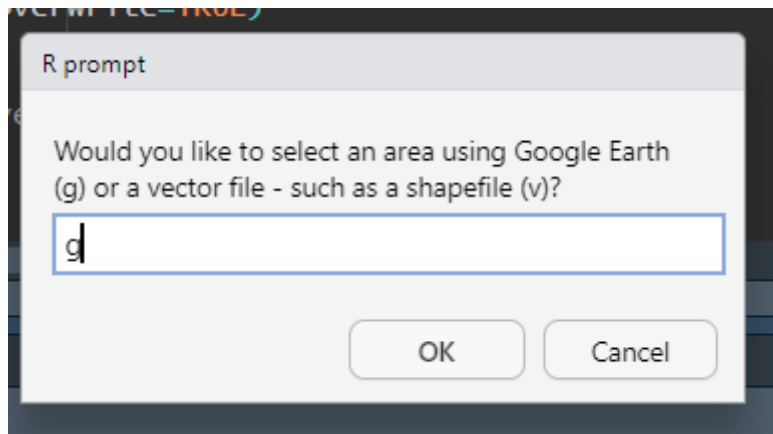
- 1) Resolution

A screenshot of a software dialog box titled 'R prompt'. The dialog box has a light gray background and a thin border. Inside, the text 'Enter a map resolution in meters' is displayed above a text input field. The input field contains the number '100'. At the bottom of the dialog box, there are two buttons: 'OK' and 'Cancel', both with rounded corners and a light gray background.

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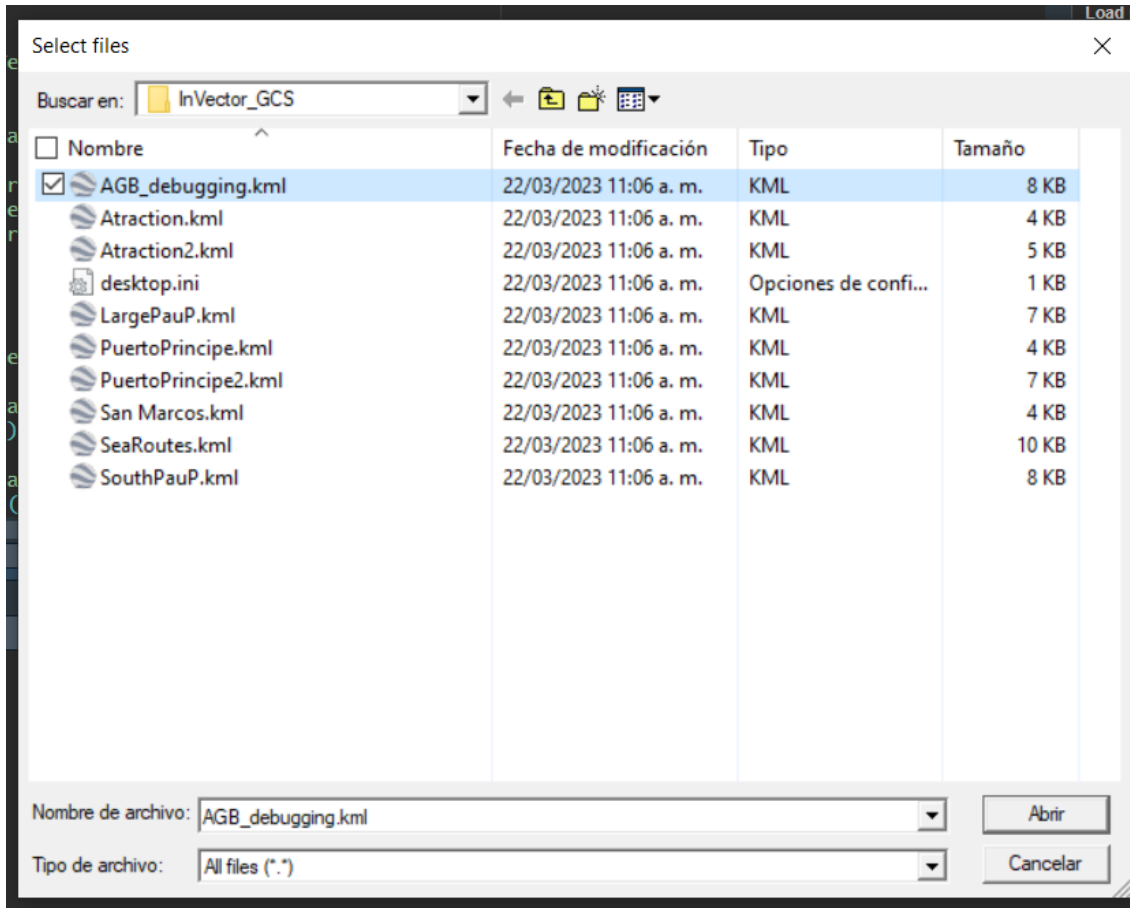


- 2) Area of interest format: Google Earth vs shapefiles. Please change the default from “v” to “g” si we can work with Google Earth



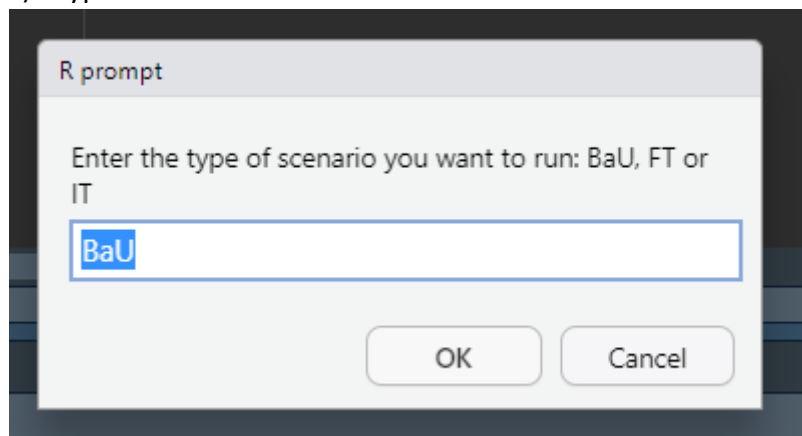
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3) Area of Interest: please select **AGB_debugging.kml**



Finally we need to run ...\\mofuss_gitlab\\linwin\\scripts\\3_scenarios_win.R

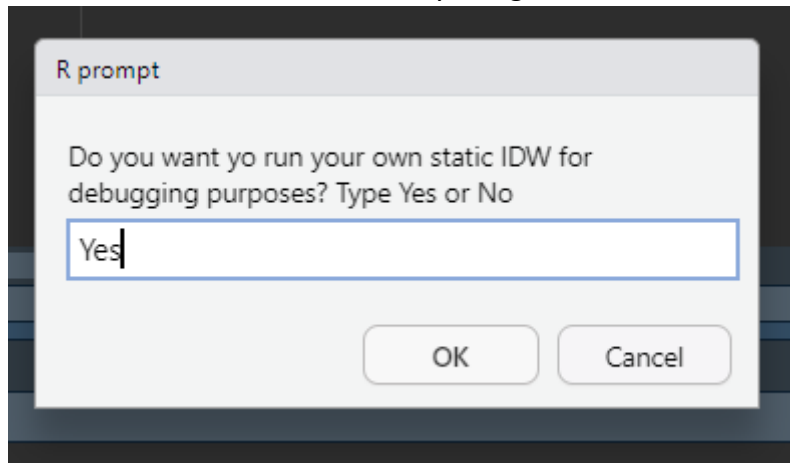
1) Type of Scenario



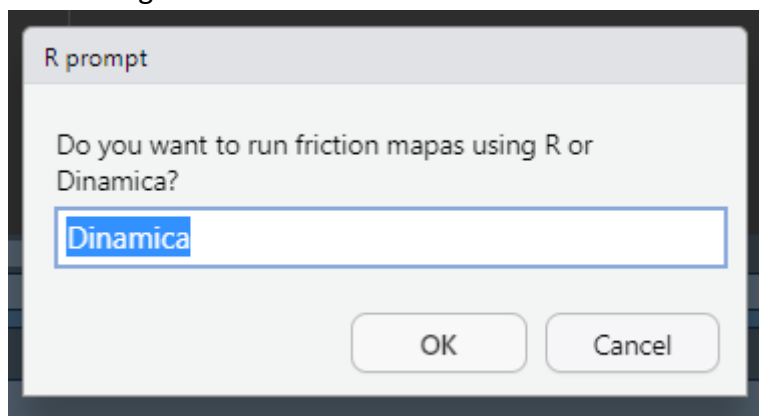
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- 2) Produces the pressure maps using your own laptop (YES) vs a super computing cluster (No). Leave yes as you don't have access to the cluster yet. But we'll d a demonstration the second day using webmofuss.

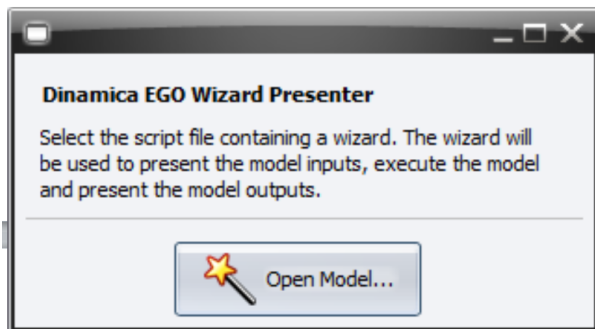


- 3) Friction maps running in Dinamica or R, you can choose whatever for locally running MoFuSS



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At this step we need to open Dinamica EGO Wizard Presenter.³



Use this software to open and run subsequently the following scripts carefully following ALL instructions from the Wizard (user-friendly interface). When in doubt about any parameter just leave the default value.

`...\mofuss_gitlab\linwin\scripts\4_FW_dyn_lulcc_Sc9.egoml`

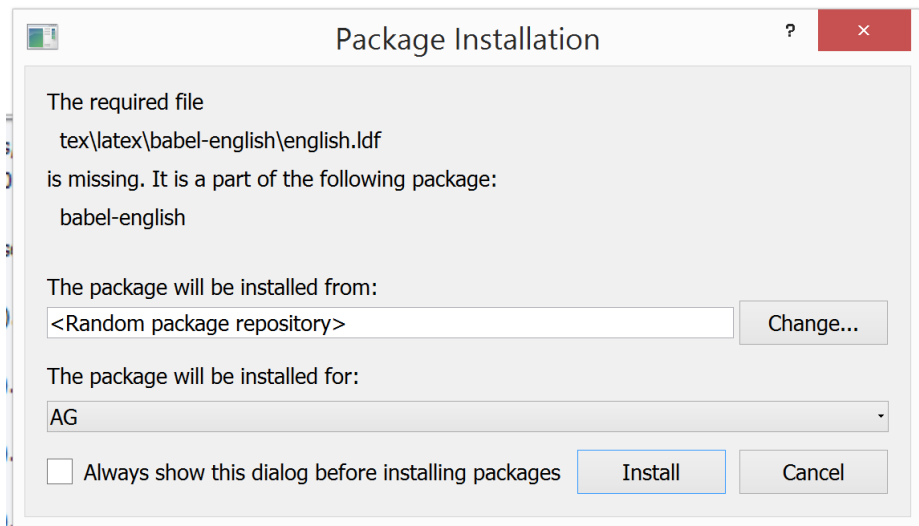
Like the first script, some TeX/LaTeX packages will be installed **during the first time** you run this script (Figure A9). Always click “Install”. You can click out the option “Always show this dialog before installing packages” to avoid receiving anymore warnings until all TeX/LaTeX packages are installed. Eventually you might receive a warning about Dinamica EGO having trouble to compile this particular script. It’s a bug in the log console and does not affect performance.

³ Dinamica has other executables that **won’t work here** (e.g. Dinamica Console Launcher, Dinamica Ego, Dinamica Map Viewer).

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Note: Allow TeX/LaTeX packages to be installed. Click out the option “Always show this dialog before installing packages” if do not want to be asked each time a package need to be installed.



7 Explore outputs

Summary outputs, including a .pdf summary report⁴ are saved into the following folders:

Summary outputs, including a .pdf summary report are saved into the following folders:

.../Summary_Report/

.../OutBaU/

.../HTML_animation_OutBaU/

You can also check all other meaningful results in .../Temp, much better if you use QGIS or any other GIS software

8 Selecting a new analysis area and re-running MoFuSS

⁴ The .pdf file should open automatically once the model finishes completely.

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If a new area is to be selected after running MoFuSS for the first time, then you must select a NEW test area in Haiti as done previously but, in this case, the KML file should be saved directly in ...\\LULCC\\SourceData\\InVector_GCS\\your_polygon.kml, and start again from script #2: ...\\mofuss_gitlab\\linwin\\scripts\\2_harmonizer_win.R

9 Erasing all temporal data and results

The script ...\\mofuss_gitlab\\linwin\\scripts\\0_erase_all_win.R serves to wipe out all temporal data and results. After running this script, only input data, scripts and the folder structure will be maintained.

10 Run MoFuSS by means of a user-friendly interface - Part II

10.1 Hands-on Exercise #2: Using MoFuSS for different small Area of Interest (AOI) within Haiti, modifying input parameters in a BaU scenario

At this stage, instructions are rather general as you already know how to tweak parameters and rerun from this:

...\\mofuss_gitlab\\linwin\\scripts\\2_harmonizer_win.R

to

...\\mofuss_gitlab\\linwin\\scripts\\4_FW_dyn_lulcc_Sc9.egoml

Let's now "play" with different Aoi and check results among all of us. Remember to keep it small.

Second, lets "play" with supply parameters.

Third, lets "play" with demand parameters.

10.2 Hands-on Exercise #3: Using MoFuSS for any small Area of Interest (AOI) within Haiti, to compare the BaU to an intervention scenario

Choose FT instead of BaU and let it run for 30 years: 2010->2040.