How to use the SIMOGRAV App

Step 1

Access RStudio Connect under https://rstudio.unhcr.org/. If you need a licence to access the platform, please apply here.
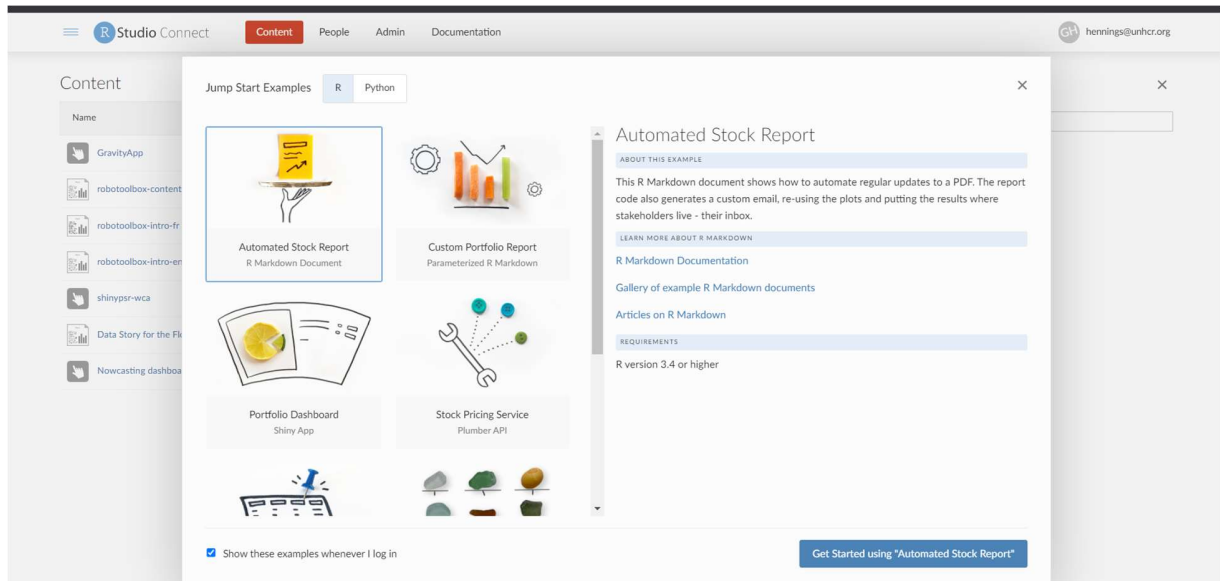
Open the SIMUGRAV app by clicking on the link GravityApp:
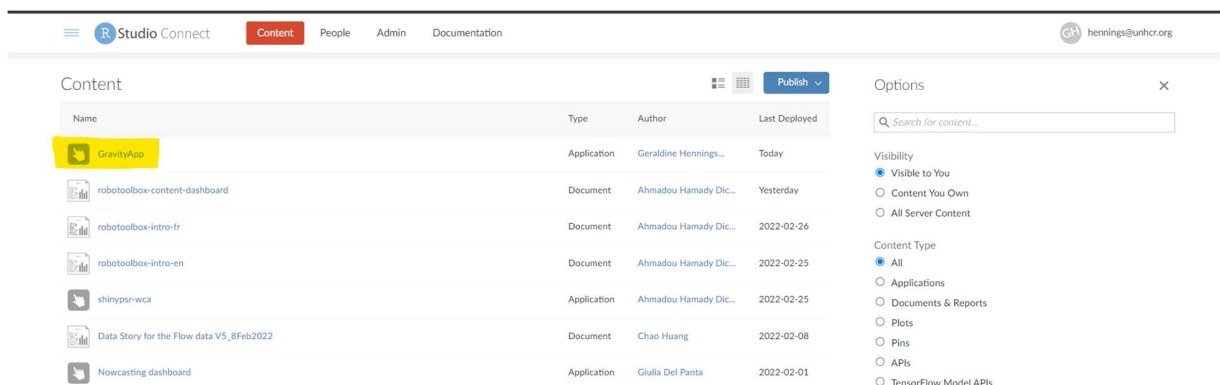
The app takes a little while to load.

Step 2

Once the app is loaded you should see this window:

You can navigate the app by choosing the tabs in the black taskbar at the top. The first tab shows the simulation interface. The second tab is the download interface for the stock data:

The third tab gives you an overview of the variables that are used to run the simulation.

And the fourth and final tab gives a brief overview on how to use the app.

Step 3

In the following we will walk you through how to run the simulation in the first tab 'Simulation Flow Data'. First choose the country of origin and the country of asylum you're interested in through the drop-down menus. The countries are arranged by regions.

Alternatively, you can start typing in the country name in the field above the drop-down menu and pick among the suggestions that pop up.

Once you have made your country choices, the other buttons will be updated to reflect the status quo situation of the country. These are the values that will be used to predict the flow data. Any change in these values made by you through the interface will subsequently change these values and the predicted flow and stock data.

After you have chosen the country pair, you can now make modifications to some variables through the interface. As the prediction is covering three years, you have first to decide which years you want to change. Let's say, we want to make modifications for 2022 and 2023. To do so we choose the years in the drop-down menu 'Select Year' in the lower left corner of the interface and click on 2022 and 2023.

All modifications you make will now be implemented for the years 2022 and 2023.

Once you've made these choices, you can begin to modify the variables through the sliders, drop-down menus, and tick boxes. We begin with the number of conflict fatalities in a year. The slider scale will display the status quo value. As the status quo for future years isn't known, this value reflects the last known value of fatalities for the chosen country. In this example we have chosen Afghanistan and the slider shows the last known value of total conflict fatalities in Afghanistan, 30,434 fatalities:

We can now modify this value according to our expectations or interests. Remember that these modifications will only apply for the chosen years, in our example 2022 and 2023. Let's assume we expect an increase in yearly conflict fatalities to around 60,000 for these two years. All we need to do is move the slider to this value.
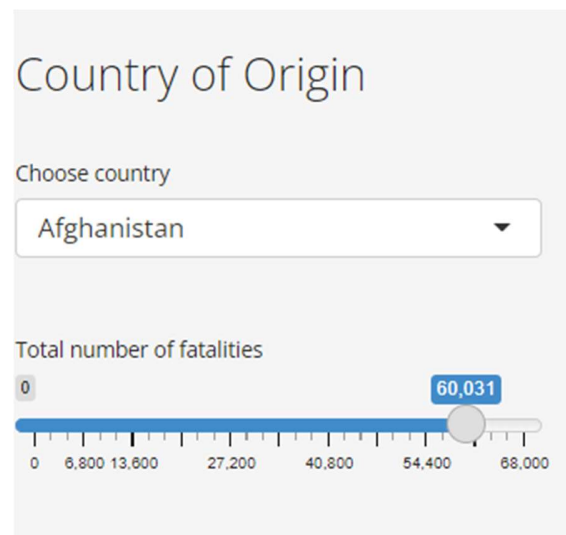
Subsequently, we want to look at changes in GDP per capita. The slider allows us to modify percentage changes in GDP per capita. It will show the original GDP per capita in the text above, which is based on forecasts from the IMF. In our example Afghanistan, expected GDP per capita is $1975 in 2022[1].

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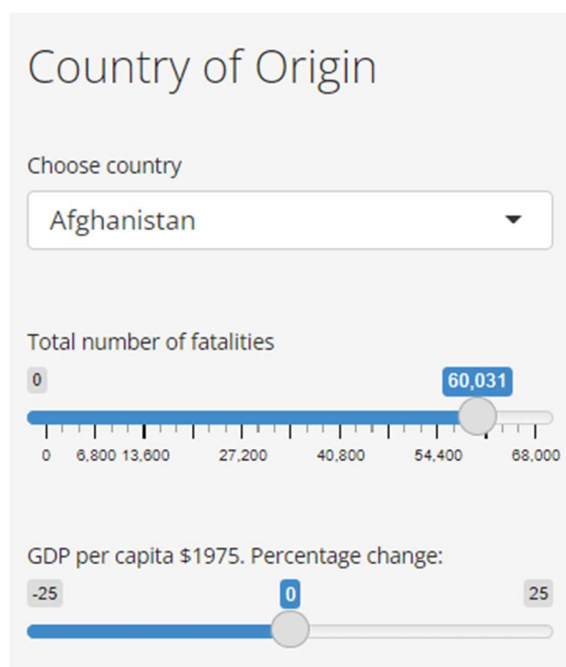
[1] If multiple years are chosen, the default values only display the values of the first chosen year.

To proceed with our example, we reduce the Afghan GDP per capita by 10%. Again, we simply need to move the slider accordingly.

Finally, we need to look at the indices for 'Civil Liberty' and 'Political Rights'. These indices are measured on a 7-point Lickert scale, where 1 indicates absolute liberty and 7 indicates no liberty at all. The default values for Afghanistan are again taken from the last known year, in our example they are '6 Unfree' for civil liberty and '5 Partly free' for political rights.
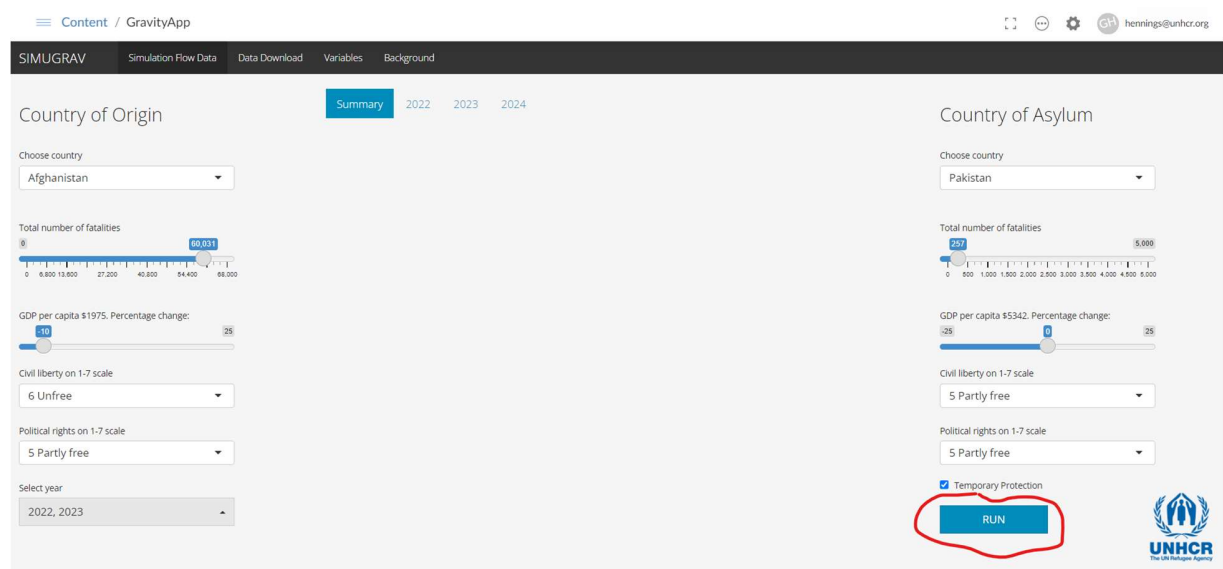

As these indices change only slowly over time, we leave them as is.

As a country of asylum, we have chosen Pakistan. But we decide to leave all values for Pakistan at their default values. However, feel free to make any modification you like on both country of origin and country of asylum. In case you are unsure about the variables and what exactly they measure, you can always consult the list under the tab 'Variables' for further information.

Finally, we need to decide whether there will be temporary protection for Afghan refugees in Pakistan in 2022 and 2023. We can activate or deactivate temporary protection by clicking or unclicking the little box 'Temporary Protection' on the lower right side.


We are now ready to run the simulation and get predicted flow and stock values. To start the simulation, click on the blue 'RUN' button at the bottom to the right. The simulation can take a few seconds to run, so do not close or reload the app.

The first figure shows the historical and predicted flows for the chosen country pair. In our example Afghanistan -> Pakistan. The red line indicates where the predicted values begin on the timeline. You can see the exact values by hovering the cursor over the curve. It is also possible to zoom into the figure if needed.
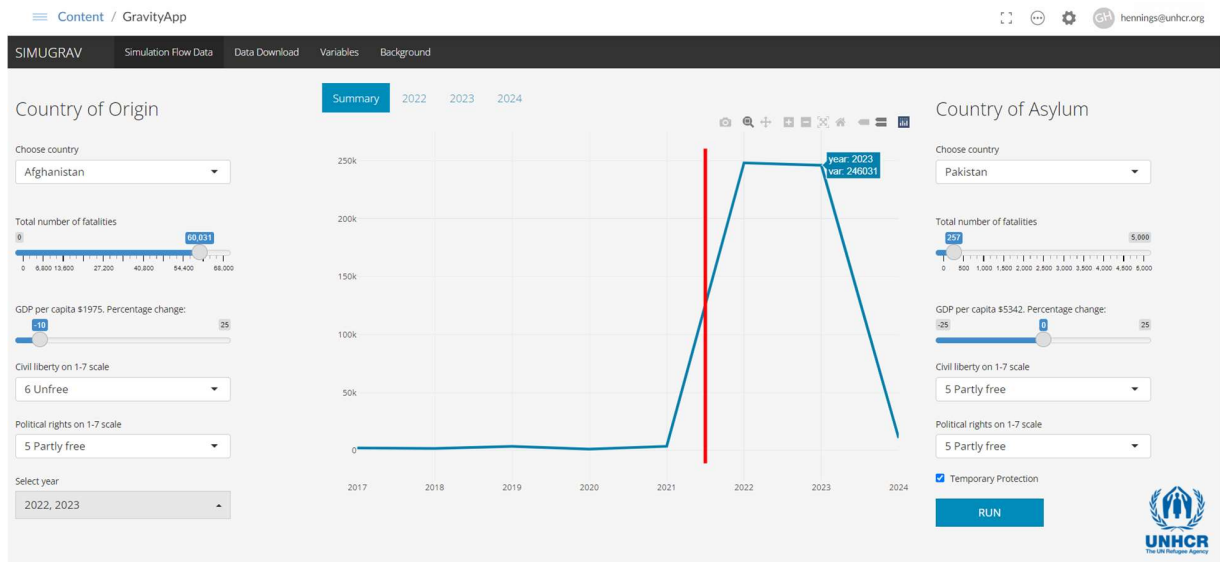
Under the tabs 2022, 2023, and 2024, the results are displayed as Sankey plots that show the flows from the chosen country of origin to the chosen country of asylum, the four largest flows to the chosen country of asylum and the rest. Exact values can again be displayed by hovering the curser over the figure.
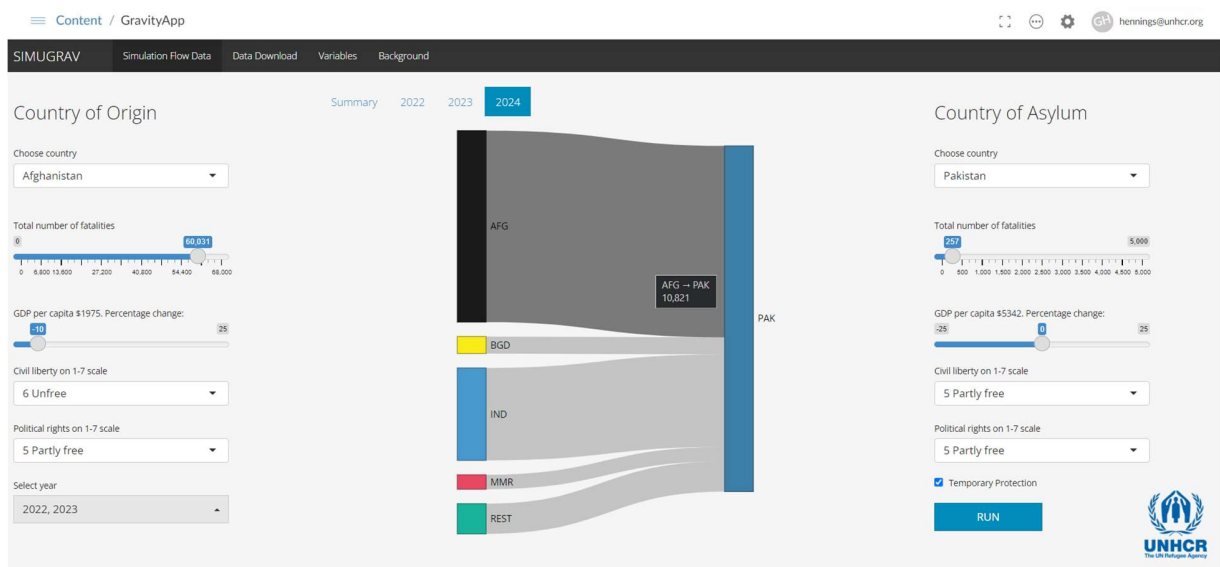
This completes the simulation tab.

Step 4

To access the predicted stock figures, go to the second tab 'Data Download'. The stock figures will **only** be calculated if you have hit the 'RUN' button in the first simulation tab. The reason for this is that any modification you might make will change the stock figures. If you are only interested in the stock figures from the status quo, simply hit 'RUN' without further modifications. The calculation can take some seconds, so do not close the app or reload it.

The stock figures from the three largest stocks are displayed for the chosen country of asylum, for the last known year, as well as the subsequent three predicted years.

You can modify the display by choosing either the three largest refugee stocks, or the three largest asylum seeker stocks through the drop- down menu at the top.

You can download either the stock figures for the chosen country of asylum, or the entire data set of stock figures, i.e., for all countries of asylum, as a csv file by clicking the respective download buttons below the table. Please wait until the table is displayed before clicking on the buttons, as otherwise the calculation of the stock figures won't be finished, and the app will throw an error.

This concludes the introduction. Please contact Andrea Pellandra (pellandr@unhcr.org) or Geraldine Henningsen (hennings@unhcr.org) in case you have questions or encounter problems.