GEN4GEO ver. 1.3 – USER MANUAL

Oct. 13, 2026

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1. Acronyms

Acronym	Meaning
AoI	Area of Interest
LLM or llm	Large Language Model
AI	Artificial Intelligence

2. Quick Start

GEN4GEO is a dashboard that allows the exploration of geospatial data in natural language.

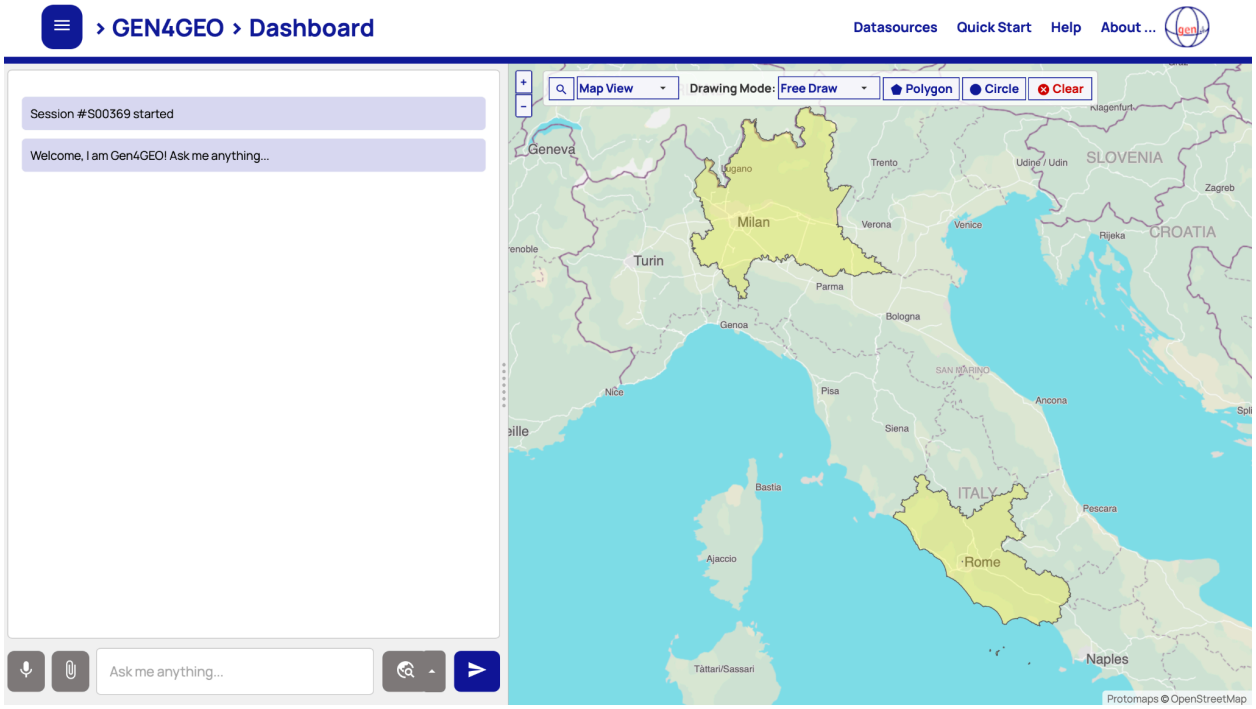

Figure 1 – GEN4GEO landing page.

2.1. Step 1 – Select an area of interest

Data exploration starts with the selection of an area of interest (AoI) on the map shown on the right side of the GEN4GEO landing page (Figure 1).

By default, the map highlights the areas for which the dashboard can provide data. If an area of interest is not selected, questions will be answered for all available administrative units at coarser spatial granularity (highlighted in yellow in Figure 1), providing data aggregated at that level. The map can be repositioned on a different geographical area in different ways:

- By clicking on the map and dragging it as needed.
- By using the geo-search functionality of GEN4GEO, clicking on the search icon shown in Figure 2 and typing the name of the location of interest (for example, “Italy” or “Viterbo Italy”). This will automatically identify the location of interest and reposition the map accordingly.

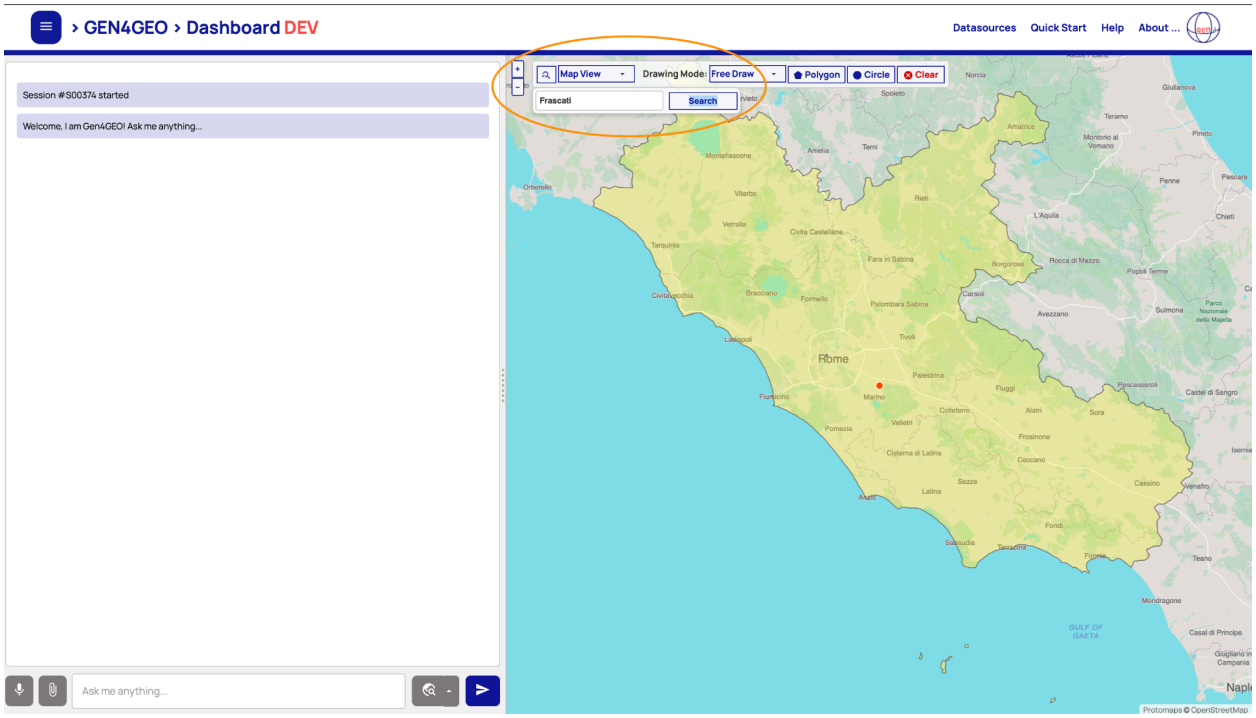

Figure 2 – How to reposition the map with geo-search.

The map can be zoomed in and out with the +/- buttons shown in Figure 3 or by using the scroll wheel of the mouse.

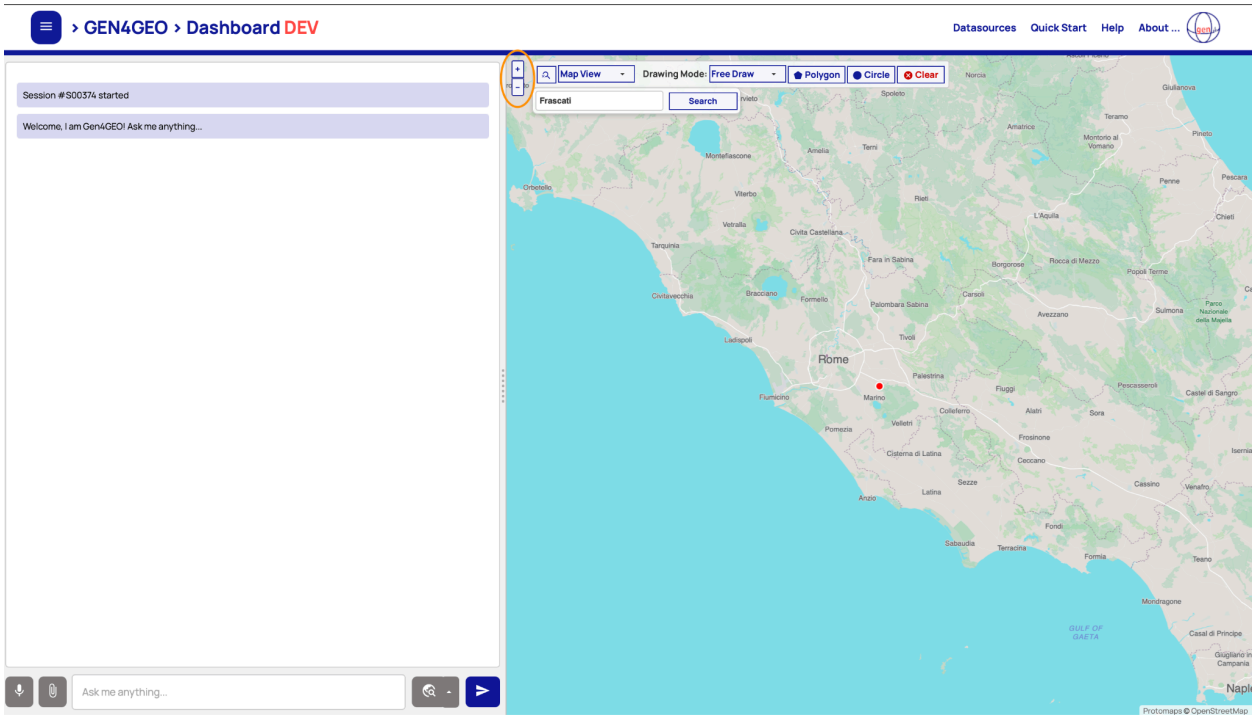

Figure 3 – How to adjust the map's zoom level.

Once the map is positioned where needed, the area of interest (AoI) can be selected by drawing a polygon or a circle on the map. This can be done by clicking either on the “Polygon” or on the “Circle” button on the top menu, as shown in Figure 4, and then drawing the target AoI on the map.

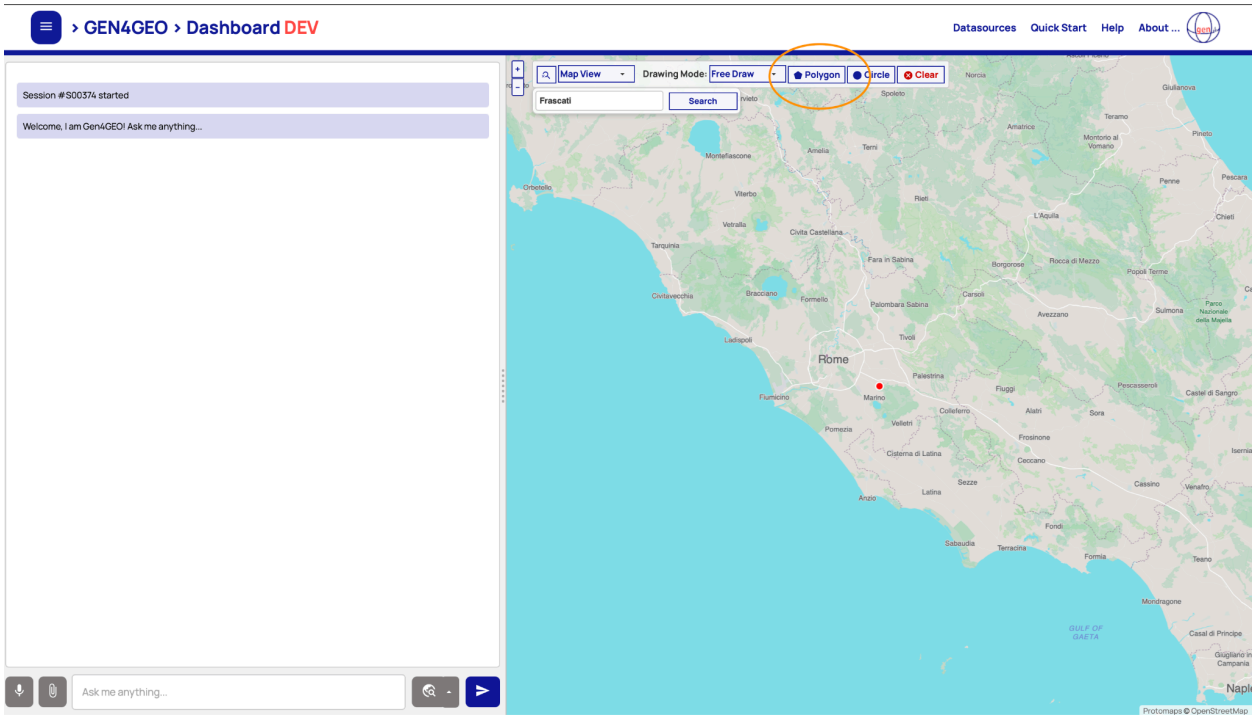

Figure 4 – How to select a drawing tool.

2.2. Step 2 – Ask a question in natural language

After selecting an area of interest, we can ask a question by typing it in the prompt box shown in Figure 5. For example, as a first question, we could ask “What data are available?”.

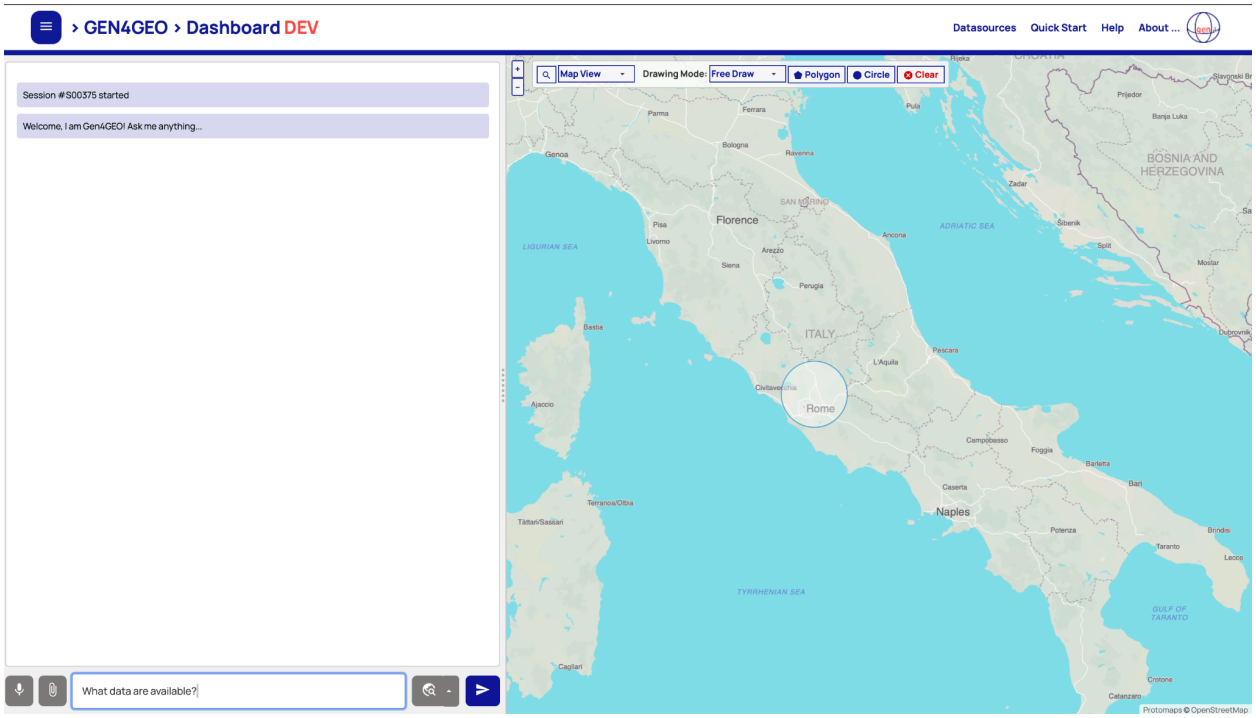

Figure 5 – How to ask a question in natural language by writing it in the prompt box.

GEN4GEO will answer with a list of the available urban indicators as shown in Figure 6.

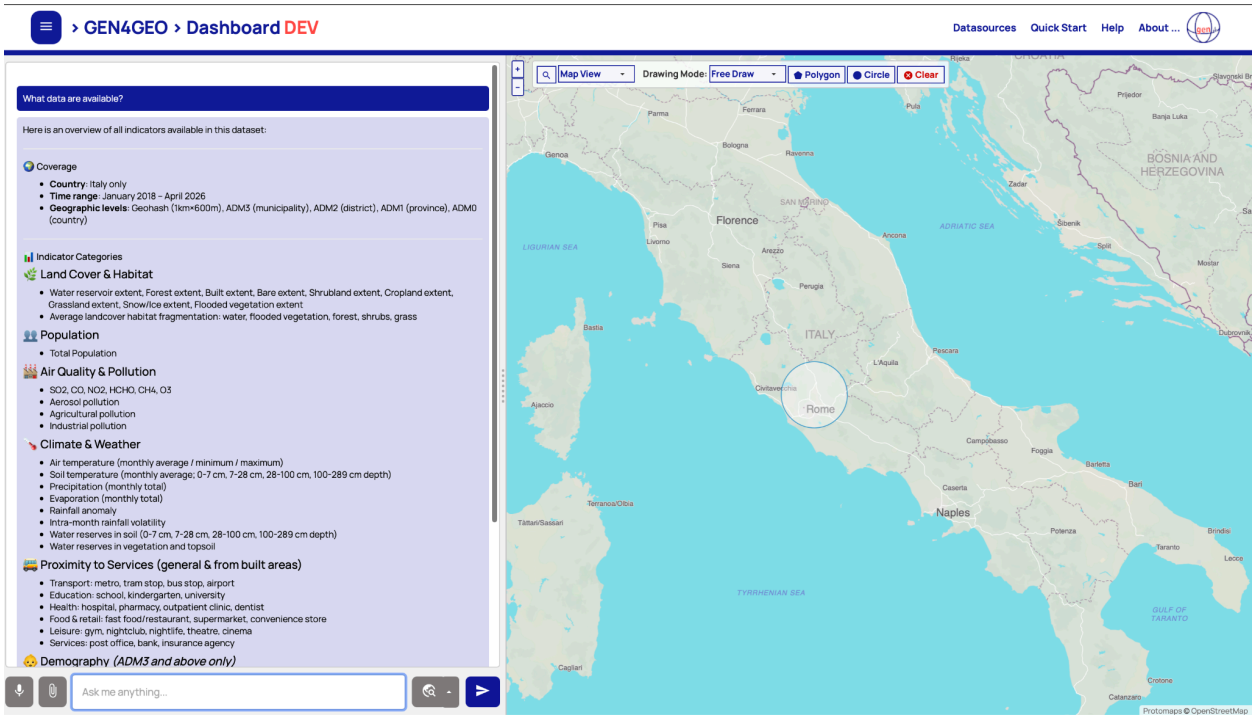

Figure 6 – GEN4GEO answer to the question “What data are available?”

The complete list of urban indicators, together with the data sources that have been used to produce them, associated urban dimensions and other additional information is also available by clicking on the “Indicators & Data Sources” button on the top menu, as shown in Figure 7.

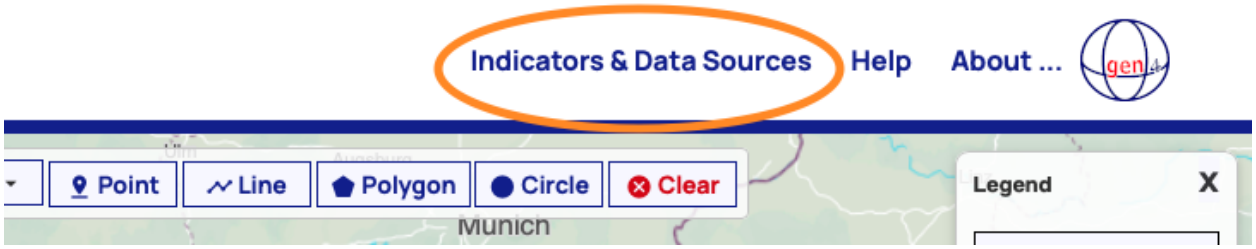

Figure 7 – How to obtain the complete list of urban indicators and their sources.

Figure 8. shows the list of indicators obtained by clicking on the “Indicators & Data Sources” button. The list can be scrolled with the mouse.
Use the selectors to filter the indicators by source, maximum spatial granularity, urban dimension, or directly type a keyword.

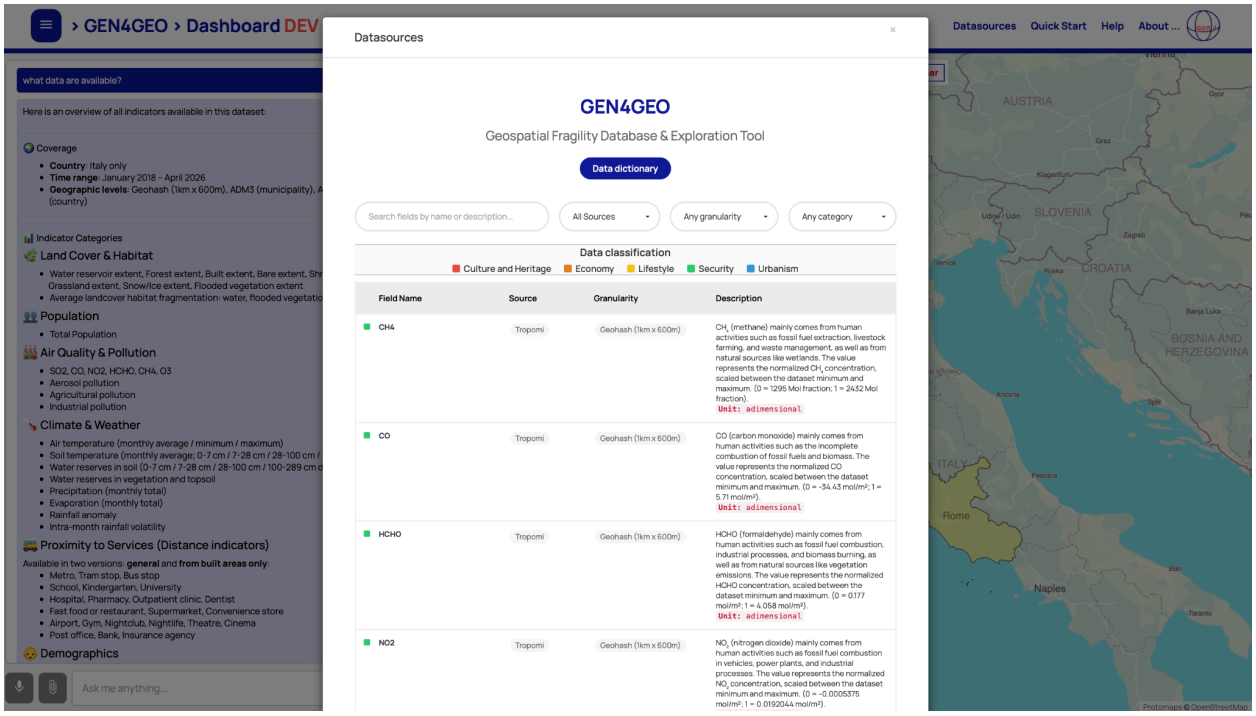

Figure 8 – Complete list of urban indicators.

You're now ready to use GEN4GEO and can ask your own questions. You don’t need to use the exact names of indicators – GEN4GEO will interpret your query and provide information on the indicators that can help answer it.
As an alternative, the indicators in the Indicators & Data Sources section are clickable, as shown in Figure 9. If you want to generate prompts in the chat automatically, you can directly click the name of an indicator: you will see a default question that can be customized (see section 6.1 for more details).

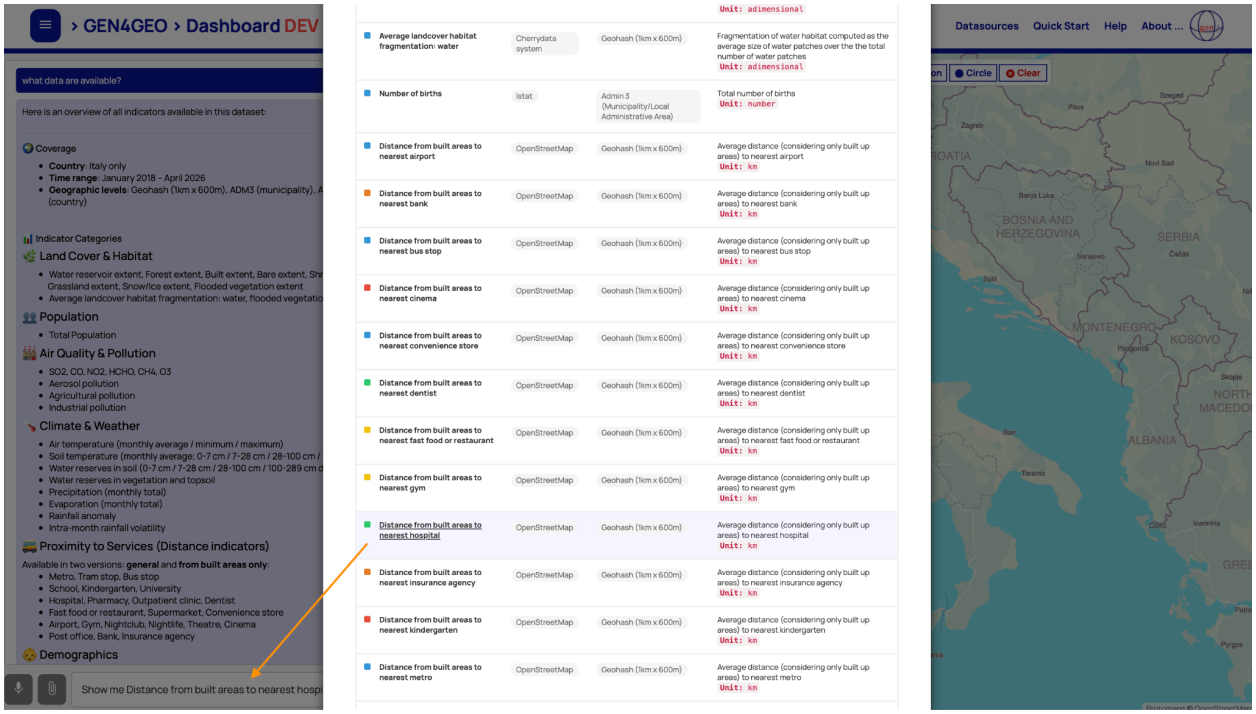

Figure 9 – Clickable indicators in the Indicators & Data Sources section.

3. Free vs. Admin navigation mode

The area of interest (AoI) can be selected by drawing a custom area on the map, as explained in Section 2.1, or by selecting predefined administrative areas, namely countries, regions within countries, provinces within regions or municipalities within provinces. These four levels of predefined administrative areas are called “Admin Level 0” (i.e. countries), “Admin Level 1” (i.e. regions), “Admin Level 2” (i.e. provinces) and “Admin Level 3” (i.e. municipalities). You can click on the “Drawing mode” drop-down menu to select your navigation mode, as shown in Figure 10. By default, the drawing mode is set to “Free Draw.”

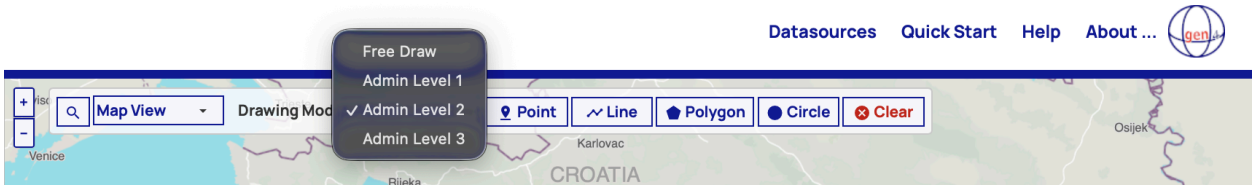

Figure 10 – How to select a navigation mode.

As an example, if you select “Admin Level 1” (i.e. regions) navigation mode, you will be able to draw a point, a line, a polygon, or a circle to select your regions of interest. If you click on the “Point” button, the administrative borders of regions will show automatically (see Figure 11) and you can click on one or more than one of them by keeping the “shift” key pressed on your keyboard until you have selected all regions of interest. If you make the wrong selection, you can click on the “Clear” button and choose again.

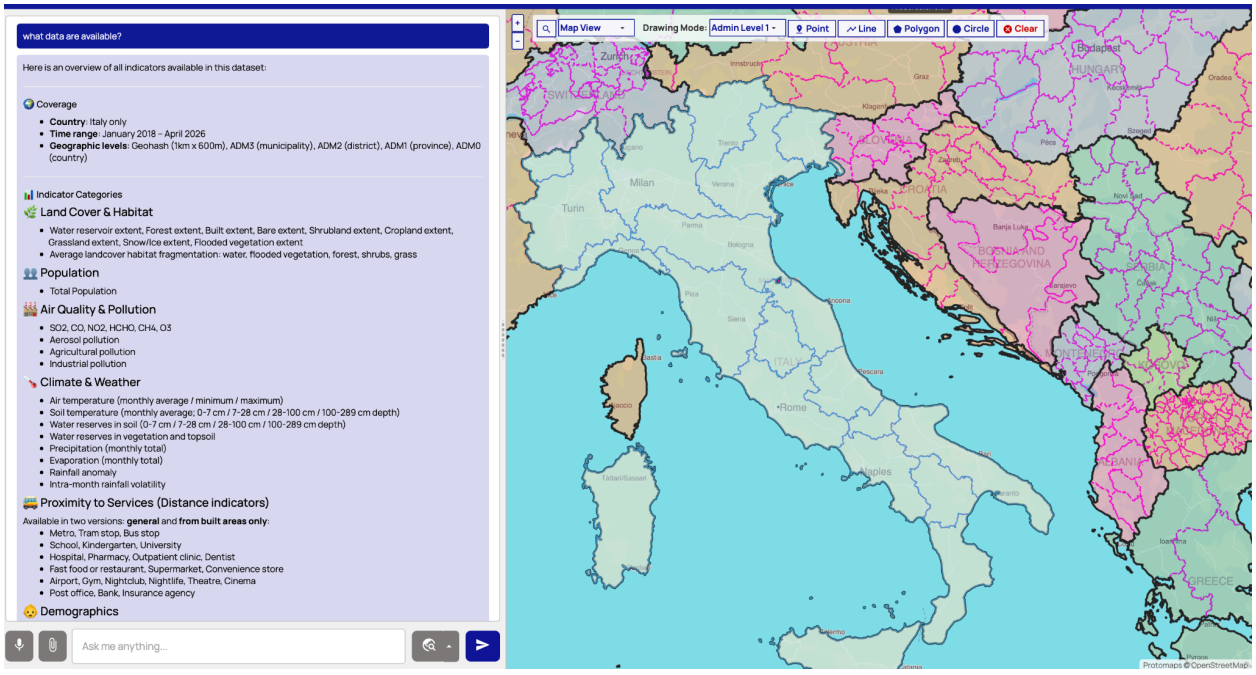

Figure 11 – Admin Level 1 navigation mode – example.

The “Admin Level 3” (i.e. municipalities), “Admin Level 2” (i.e. provinces) and “Admin Level 0” (i.e. countries) navigation modes work in the same way. The only difference is the administrative

boundaries that are shown on the map. Figure 12 shows the “Admin Level 2” boundaries for Italy. Black borders indicate countries, black dashed borders indicate regions, and pink borders indicate provinces. The names of the provinces appear on the map when you hover the mouse over a province.

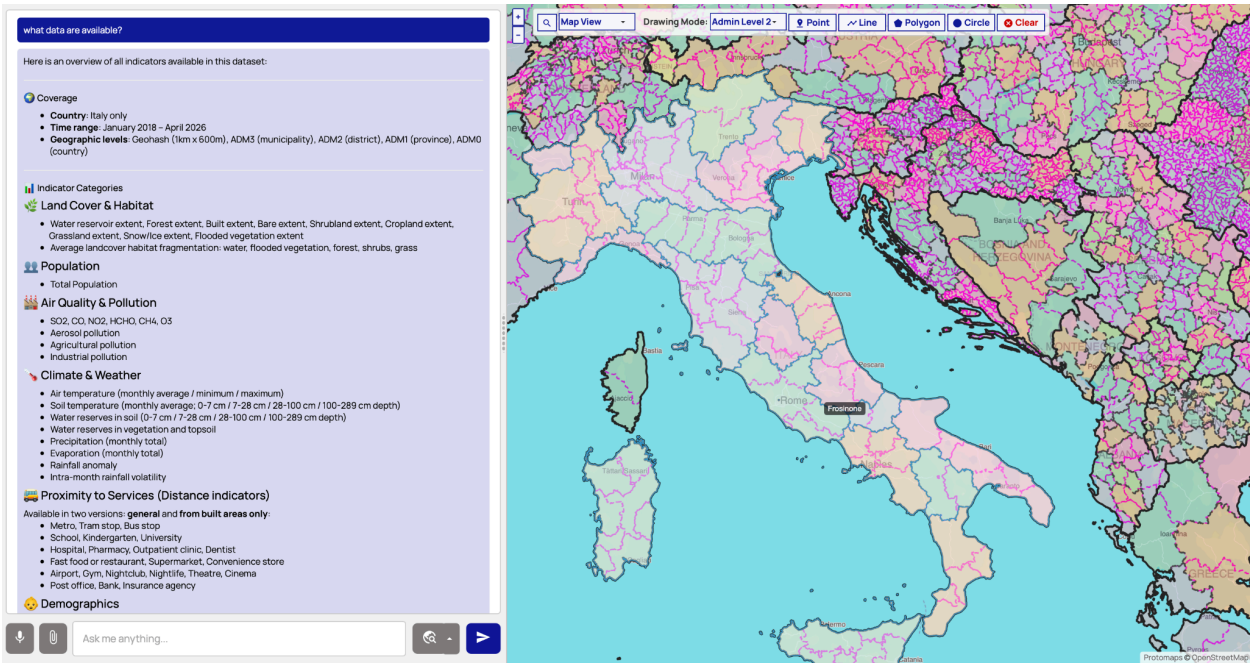

Figure 12 – Admin Level 2 navigation mode – example.

You can also use the key combination Ctrl+A (or cmd+A) to select:

- all regions within a country (Navigate at ADM0 level, select the country, Ctrl+A)
- all provinces within the selected region(s) of a country (Navigate at ADM1 level, select the region(s), Ctrl+A))
- all the municipalities within the selected province(s) of a country (Navigate at ADM2 level, select the province(s), Ctrl+A))

The Ctrl+A shortcut can be used multiple times consecutively and the selection will automatically change accordingly.

4. How GEN4GEO answers your questions

4.1. General structure of a GEN4GEO answer

When you ask a question through the prompt window, GEN4GEO can answer in two ways:

1. If the question is generic and cannot be answered based on the urban indicators stored in the database, GEN4GEO will answer based on the general knowledge of the underlying large language model (LLM). For example, Figure 13 shows the answer to the question “In which country is Viterbo located?”.

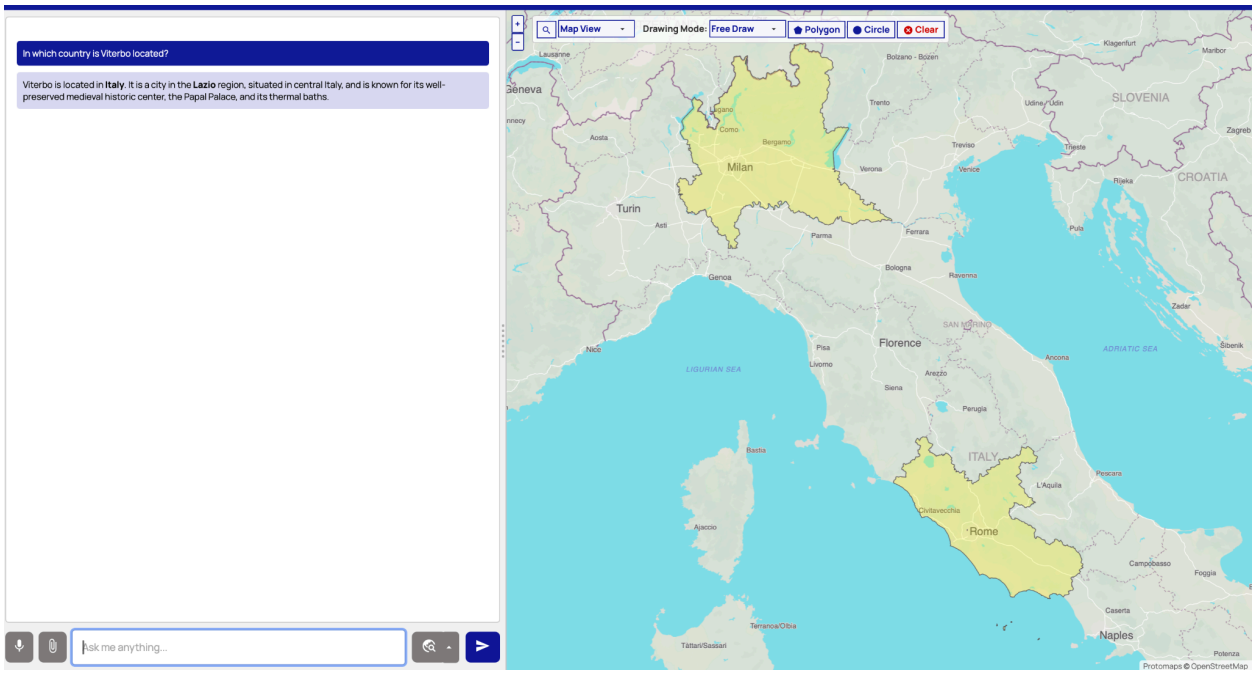

Figure 13 – Answer to a generic question with the landing page default area selection (i.e. a question that cannot be answered based on the urban indicators stored in the database).

To be noticed that if the question doesn’t need to interrogate the database because it involves general knowledge, the selected area of interest on the map becomes irrelevant for the question. The example in Figure 13 has been asked without changing the area selection in the landing page, while the one in Figure 14 has been asked by selecting a province in Italy. The answer given by the LLM is pretty much the same.

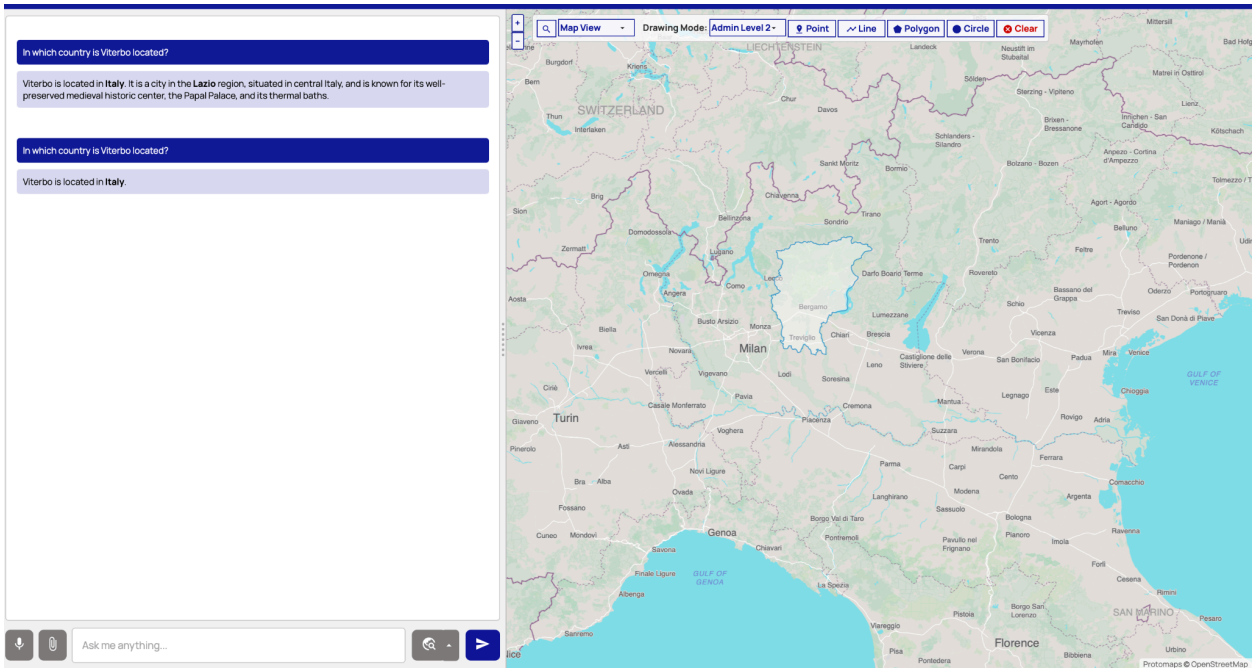

Figure 14 – Answer to a generic question by changing the default area selection (i.e. a question that cannot be answered based on the urban indicators stored in the database).

2. If the question can be answered based on the urban indicators stored in the database, GEN4GEO will retrieve the indicators that can help answer the question and will provide the answer in four different formats:
    a. An AI-generated text comment.
    b. A chart displaying the raw time series of the indicators across the entire period covered by the data in the database.
    c. A table showing the indicators aggregated as requested by your question.
    d. A map visually representing the selected indicators (raw or aggregated)

For example, let us consider the following question: “Can you give me the average population in 2025 per district?” The answer is shown in Figure 15. As you can see, the answer includes the four components listed above, that is a comment, a chart, a table, and a map.

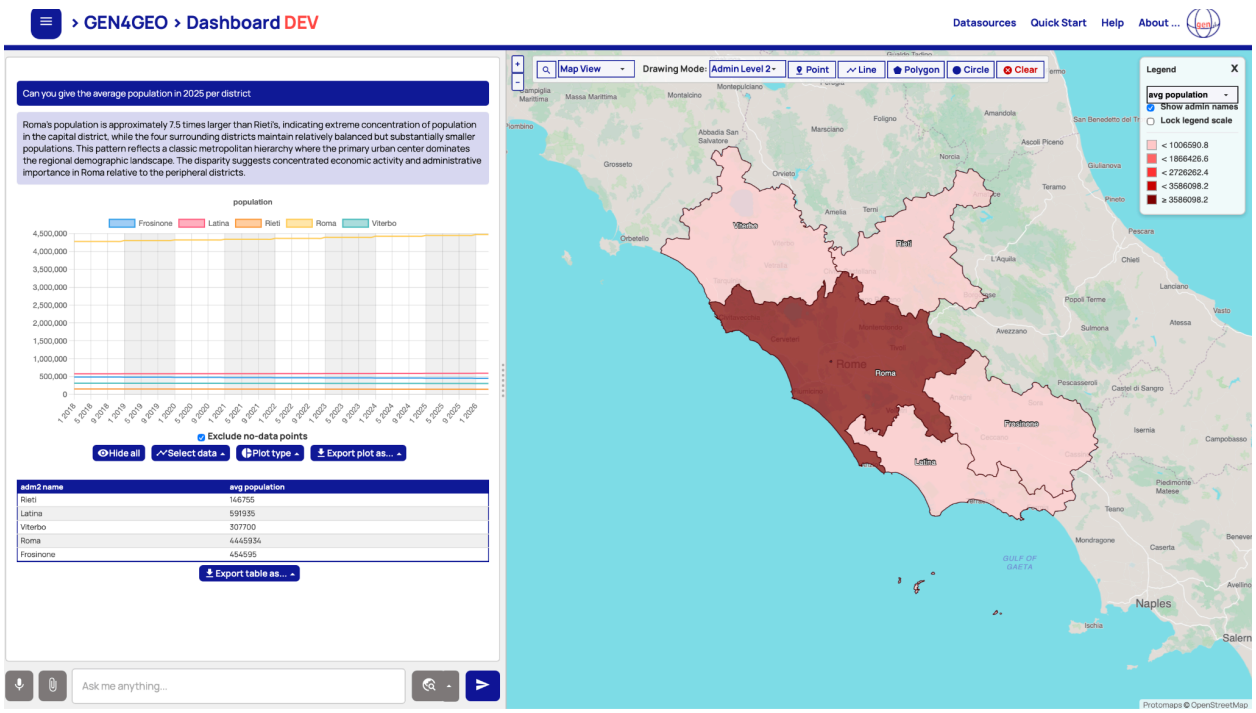

Figure 15 – Answer to the question: “Can you give the average population in 2025 per district?”

4.2. How to customize a GEN4GEO answer

How to customize maps

The maps include a “Period” button, which allows users to change the map's time reference. By default, the map displays the most recent available time period.

In Free Draw mode, the map always displays raw monthly data, as shown in Figure 16. Users can therefore select both the year and the month using the Period selector.

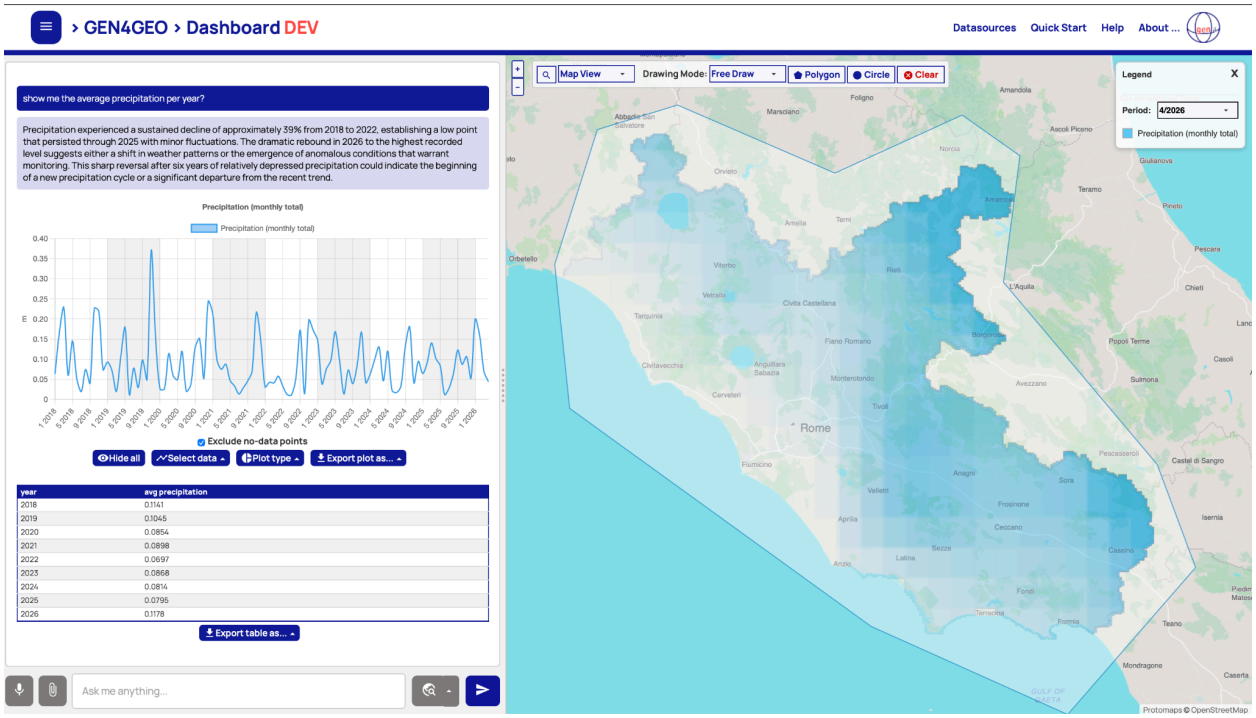

Figure 16 – How to change the time frame of a monthly map in Free Draw mode.

In Admin mode, the map reflects the content of the table (for example, data aggregated per year or data filtered for a specific month) as shown in Figure 17. The time reference is automatically determined from the table whenever possible. If it cannot be identified, the map defaults to displaying raw monthly data. The Period button can then be used to manually adjust the time reference as needed.

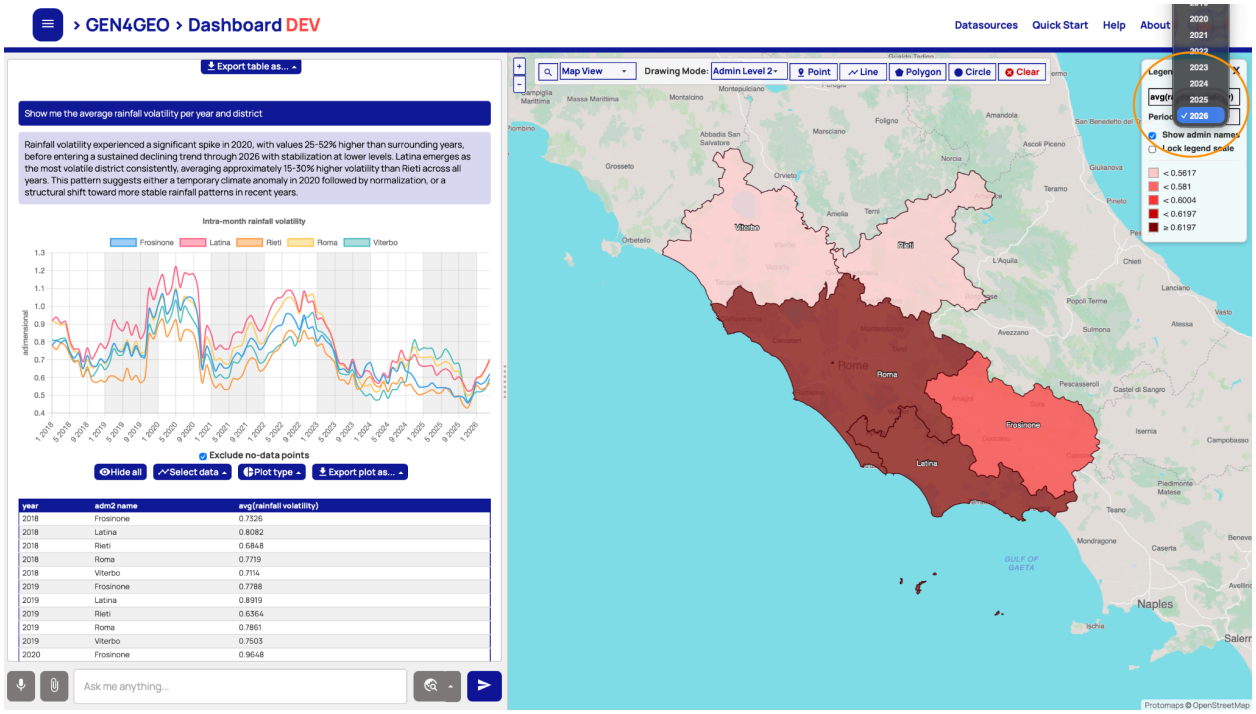

Figure 17 – How to change the time frame of a yearly map in Admin mode.

If the answer to your question includes multiple indicators, you can also select the indicator to be represented on the map, using the drop-down menu shown in Figure 18. The question answered in Figure 18 is “Can you give me the average distance from hospitals and schools for each admin 3?”. The answer includes the “distance from hospitals” and “distance from schools” indicators, accordingly.

Note that this is possible only if you choose your area of interest in admin mode (“Admin Level 0” or “Admin Level 1” or “Admin Level 2” or “Admin Level 3”, see Section 3).

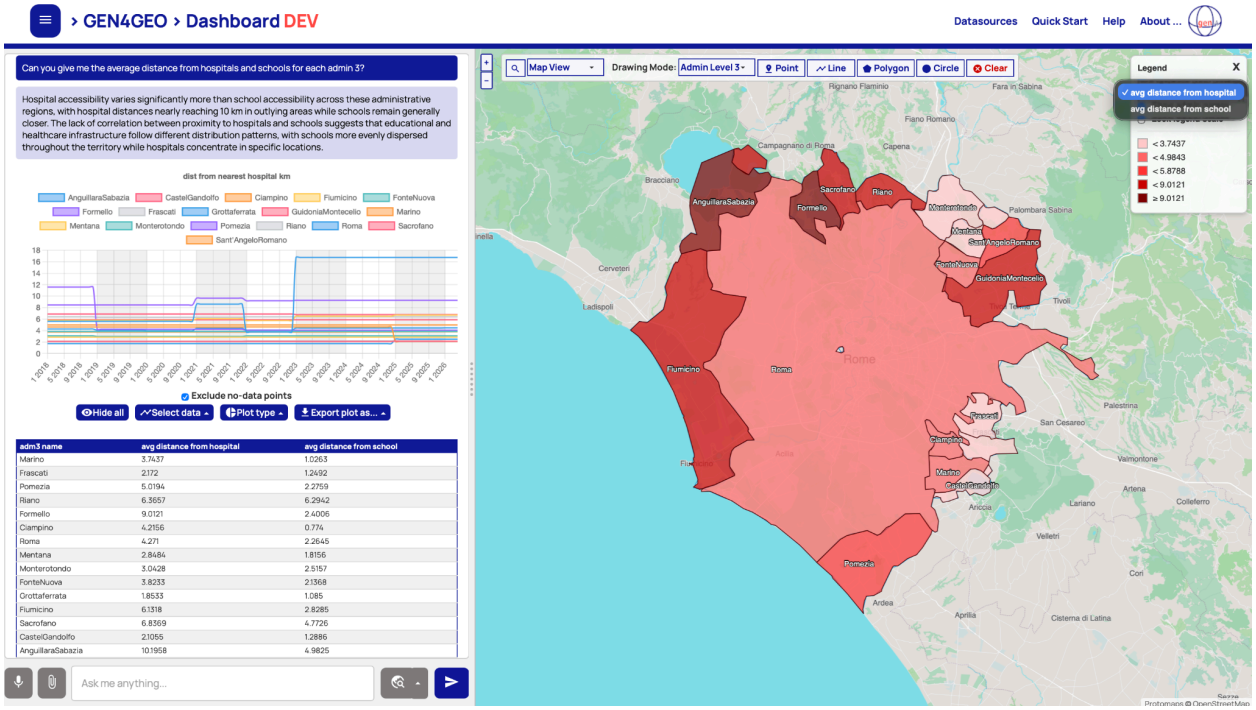

Figure 18 – How to change the indicator represented on the map.

You can also hide the names of the admins on the map by deflagging the option ‘Show admin names’ as shown in Figure 19.

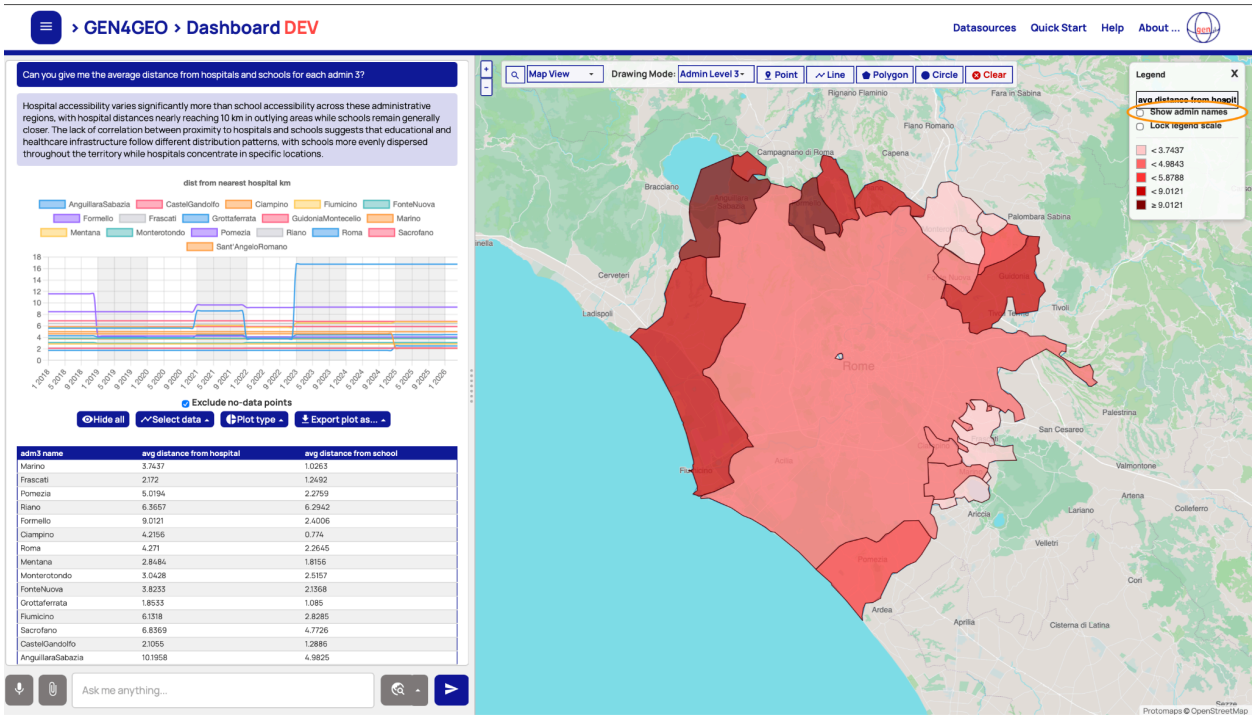

Figure 19 – How to hide the names of the admins in a map.

By flagging the option ‘Lock legend scale’ as shown in figure 20, you can also ‘freeze’ the thresholds of an indicator of the selected time frame. This option allows to produce comparable maps of the same indicator across time when customizing the time period of the maps.

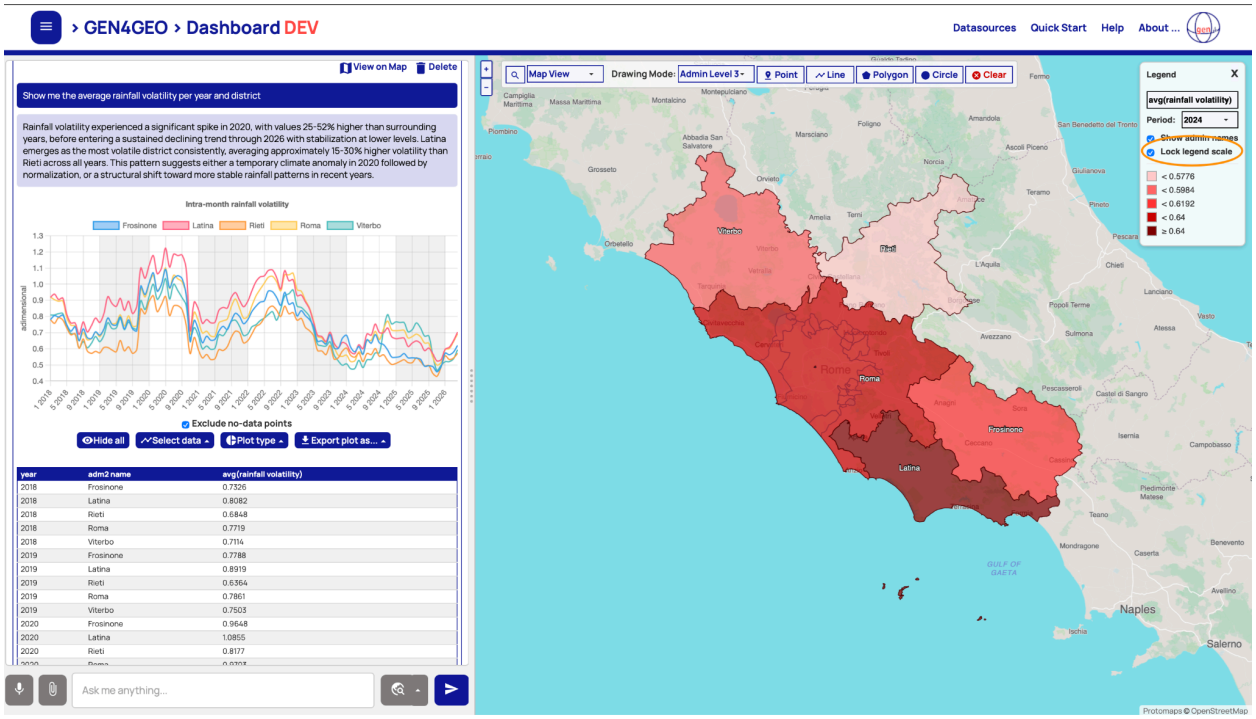

Figure 20 – How to lock the thresholds of an indicator in a map

If you are navigating in “Free Draw” mode, all indicators are represented on the same map.
In this case, you can hide one or multiple indicators by clicking on the name of the indicator in the legend.
Figure 21 shows how the distance from schools, universities and kindergarten indicators are both represented on the map, answering the question “Show me the average distance from schools, universities and kindergartens”.
Figure 22 shows the same map with distance from schools and kindergarten deselected.

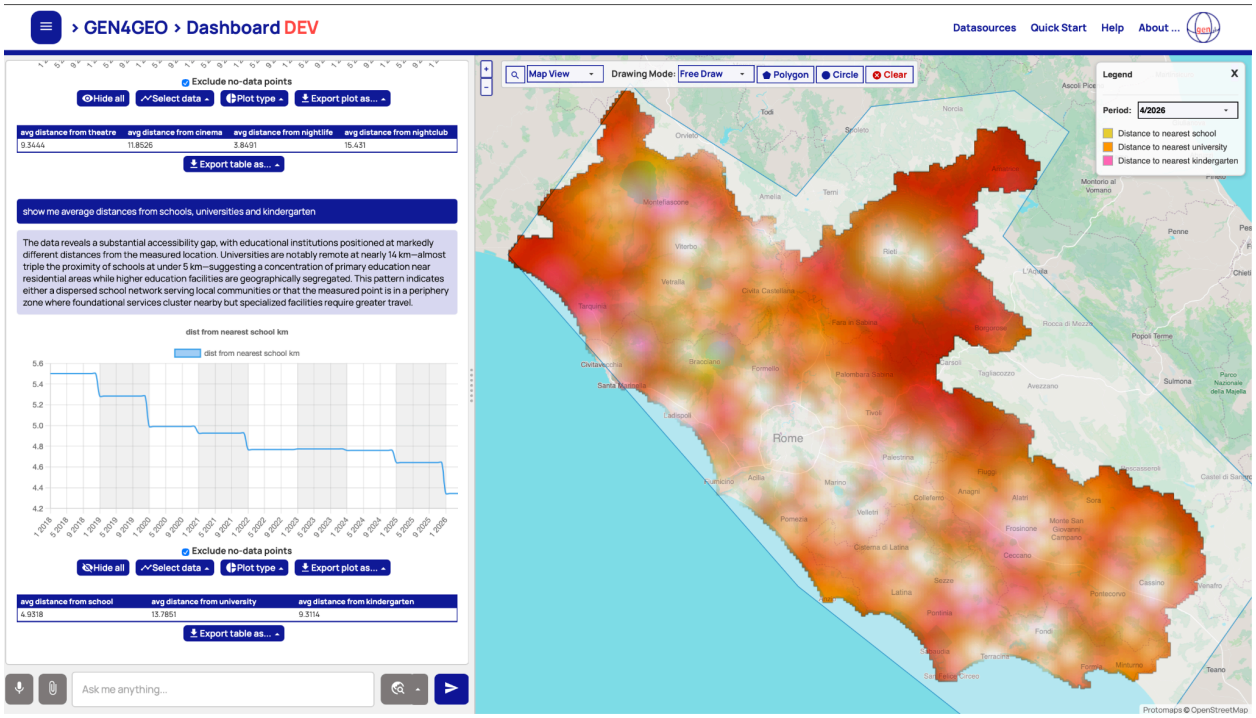

Figure 21 – Using “Free Draw” navigation mode to see multiple indicators on the same map.

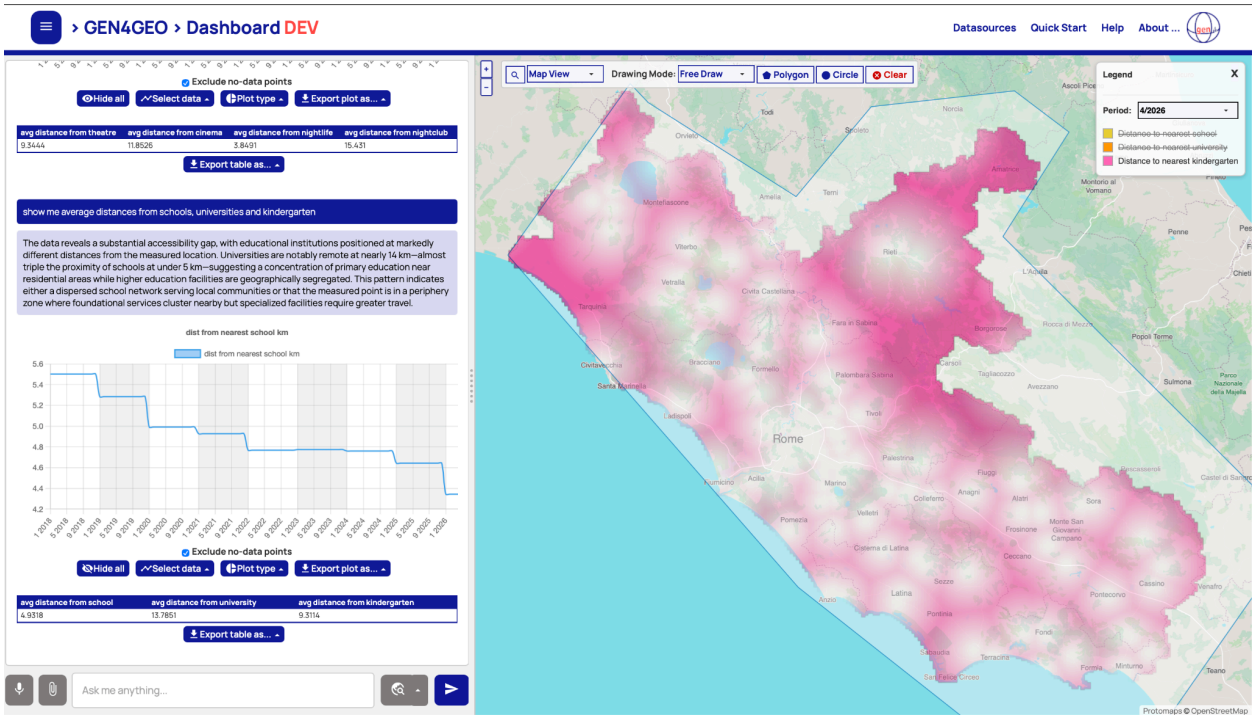

Figure 22 – How to deselect an indicator from the maps in “Free Draw”.

How to customize charts

Charts can be customized by:

1. Selecting the indicator that is shown in the chart using the “Select data” menu below the chart (Figure 23).

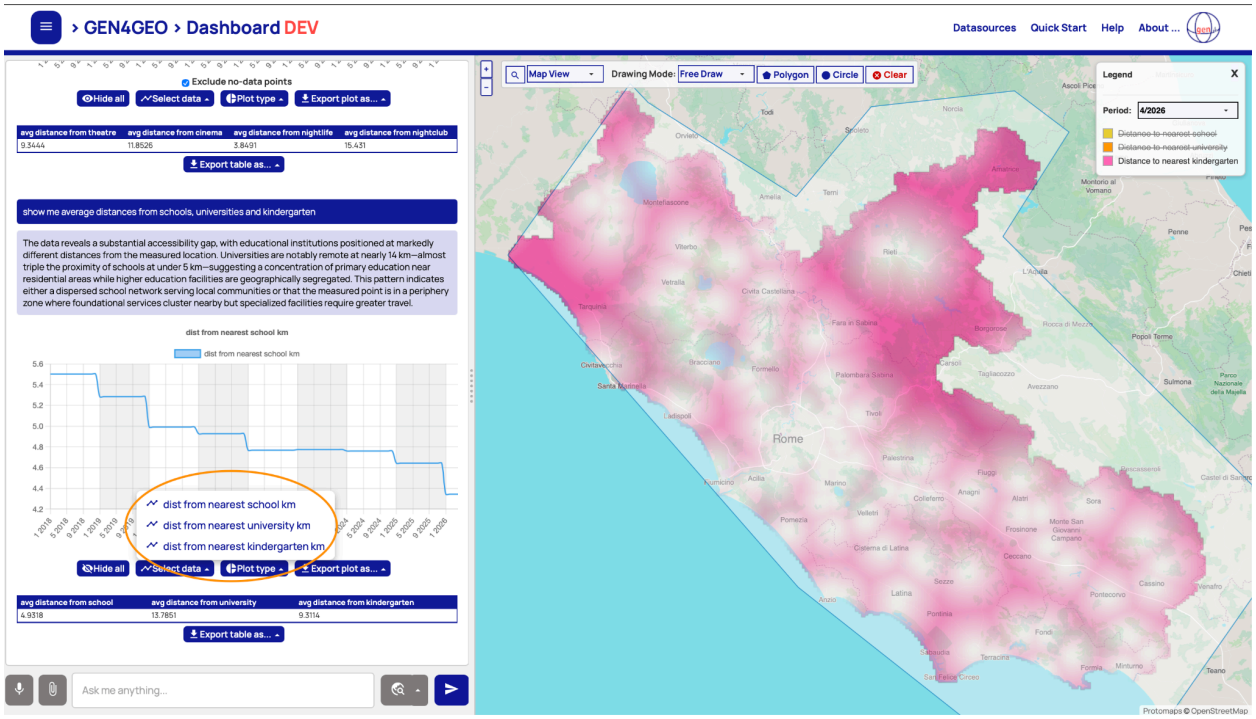

Figure 23 – How to change the indicator that is shown in the chart.

2. Changing the plot type using the “Plot type” selector below the chart (Figure 24).

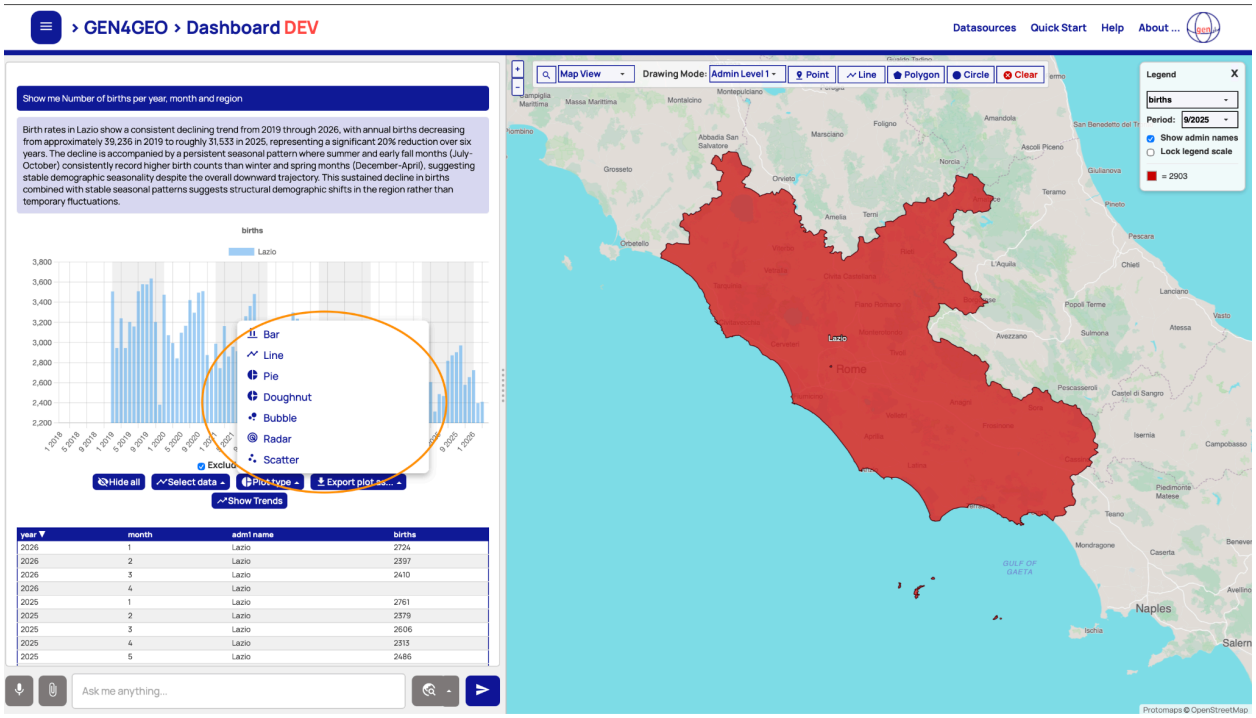

Figure 24 – How to change the plot type of the chart.

3. Selecting and deselecting countries, regions, provinces or municipalities by clicking on their names right above the chart (Figure 25). In this case, Figure 25 shows the answer to the question “Show me the number of births per year, month and municipality”.

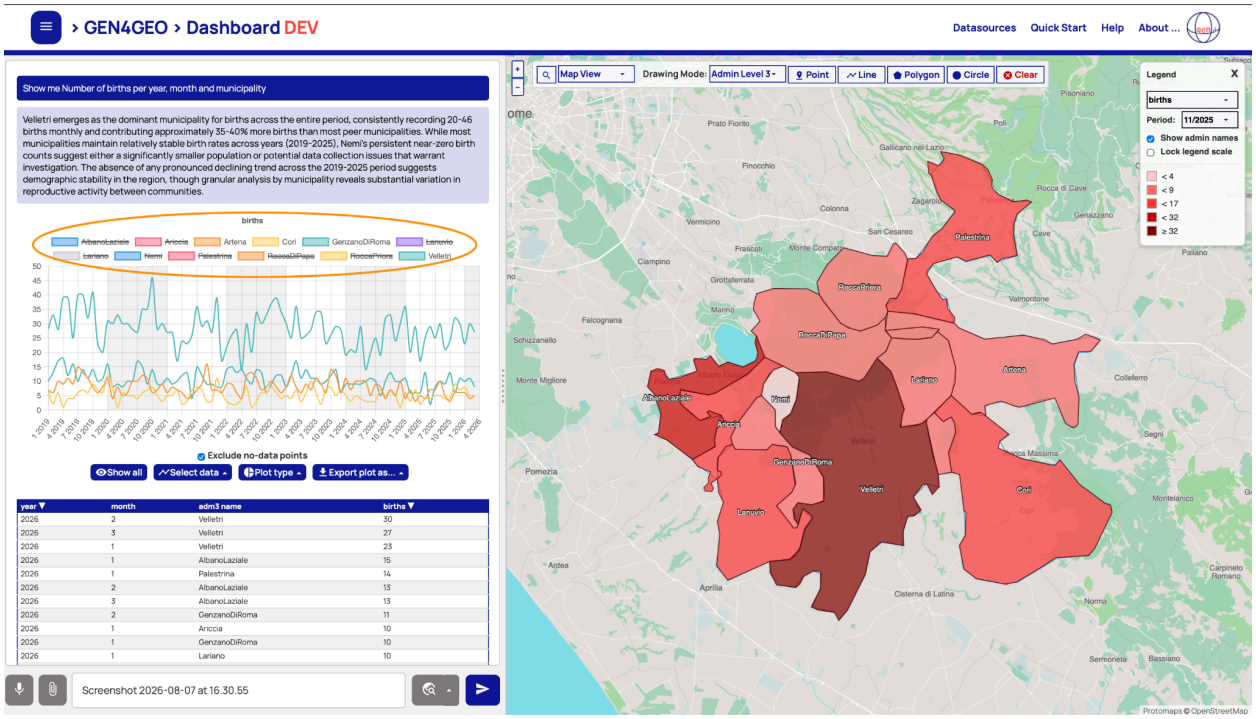

Figure 25 – How to select/deselect time series in the chart.

4. Selecting and deselecting all countries, regions, or provinces by clicking on the “Hide all”/“Show all” button right below the chart (Figure 26). In this case, Figure 26 shows again the answer to the question “Show me the number of births per year, month and municipality” for some municipalities in Lazio, Italy.

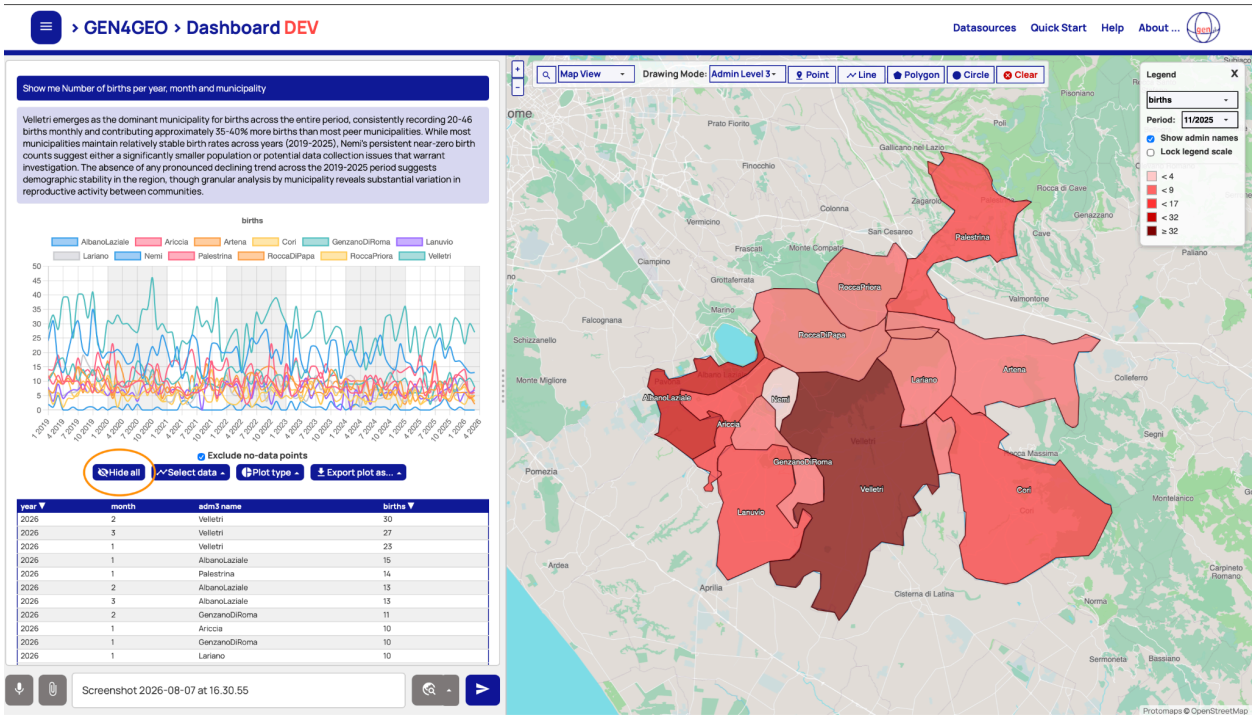

Figure 26 – How to select/deselect time series in the chart all at once.

5. Selecting a custom temporal range: The plot supports interactive navigation along the temporal axis to allow precise selection of time intervals.
    a. **Select a specific time interval**: Click-and-drag over the plot area to select a custom temporal interval. The selected range is highlighted with a darker grey background.
    b. **Pan in time**: Hold the ALT/Option key and Click and drag the plot to move backward or forward in time while maintaining the current zoom level.
    c. **Reset the view**: To return to the default temporal extent, click the ‘Reset’ button located in the top-right corner of the plot. The button appears automatically when the mouse hovers over and the default zoom has changed.

How to customize tables

Tables can be customized by sorting the data in ascending or descending order based on one or multiple selected columns, as shown in Figure 27. In this case, Figure 27 shows the births per year, month and municipality, where years and births are in descending order.

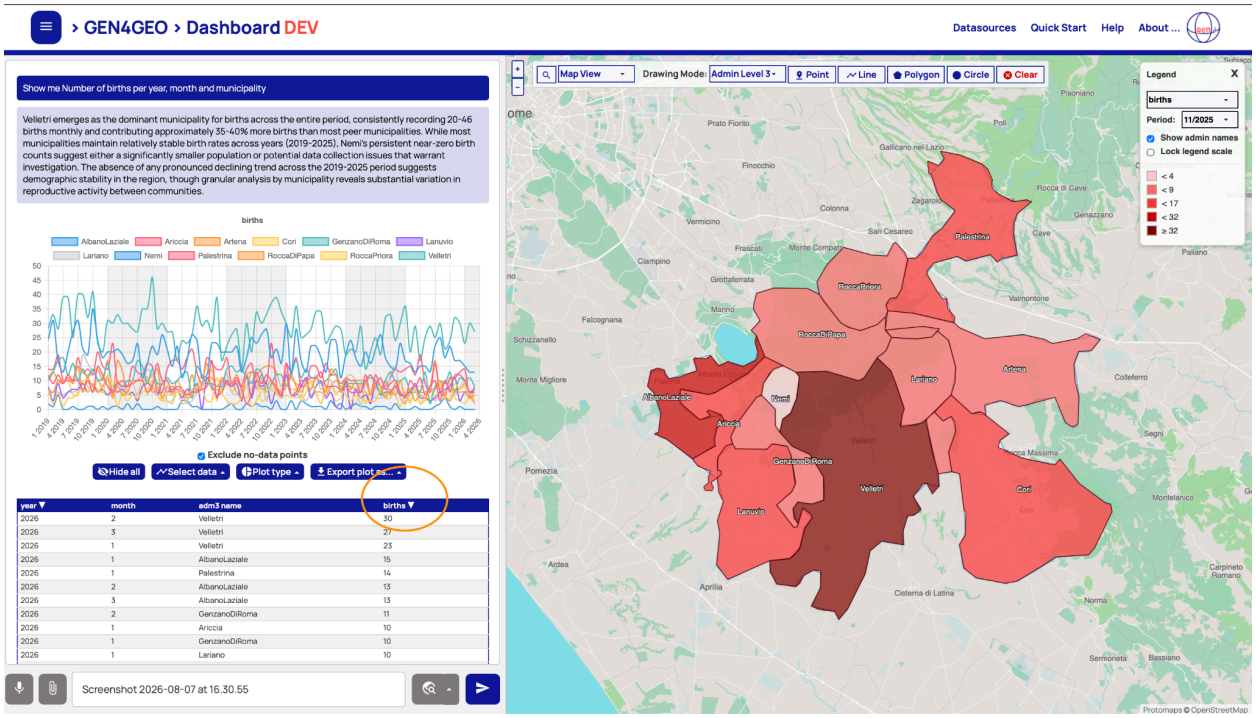

Figure 27 – Ordering data in the table.

How to customize AI-generated text comments

Text comments can be customized only by asking the same question again by specifying the changes that you would like to see in the comment. Figure 28 shows the answer to the question “Can you give me the births in 2024 for the selected regions? Specify the month and the region. Give me a super short comment.” for the Lazio and Lombardy regions in Italy.

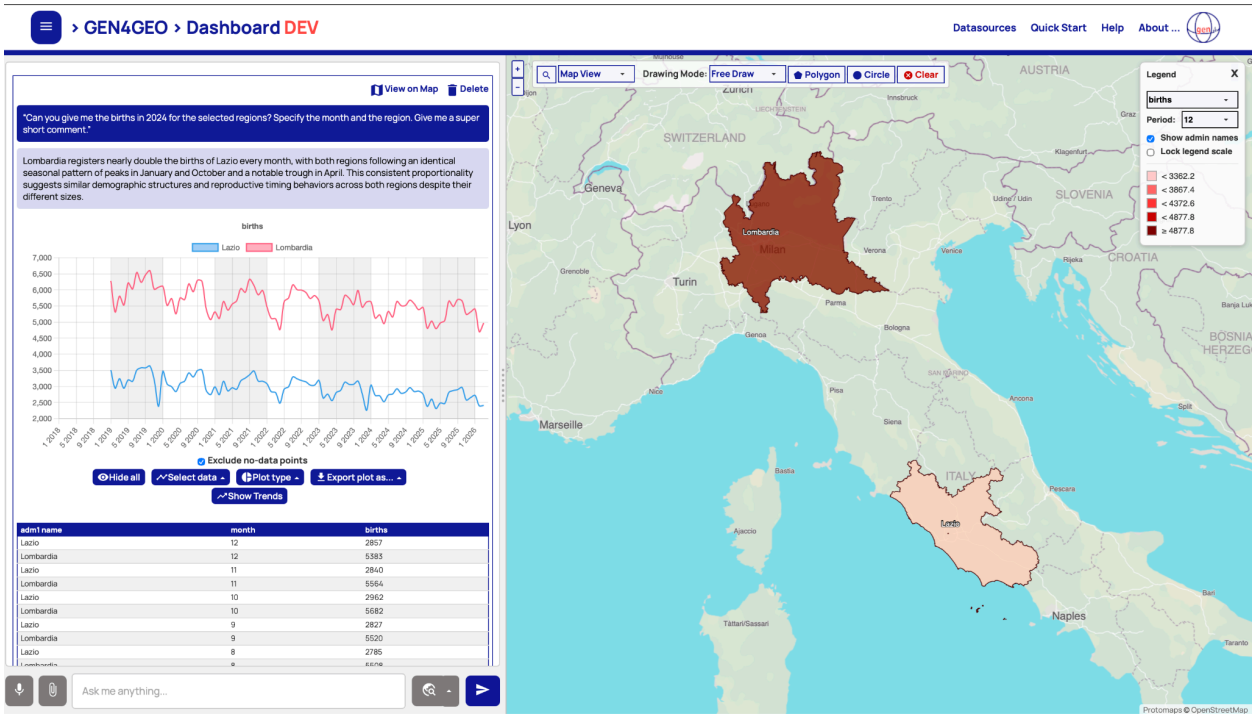

Figure 28 – How to customize AI-generated text comments.

5. How to create a report

5.1. How to remove content

Any content generated in the chat, including text and screenshots of the maps, can be deleted if needed. To remove an item, select it and then click the “Delete” button located in the top-right corner of the item, see Figure 29. The item will be permanently removed.

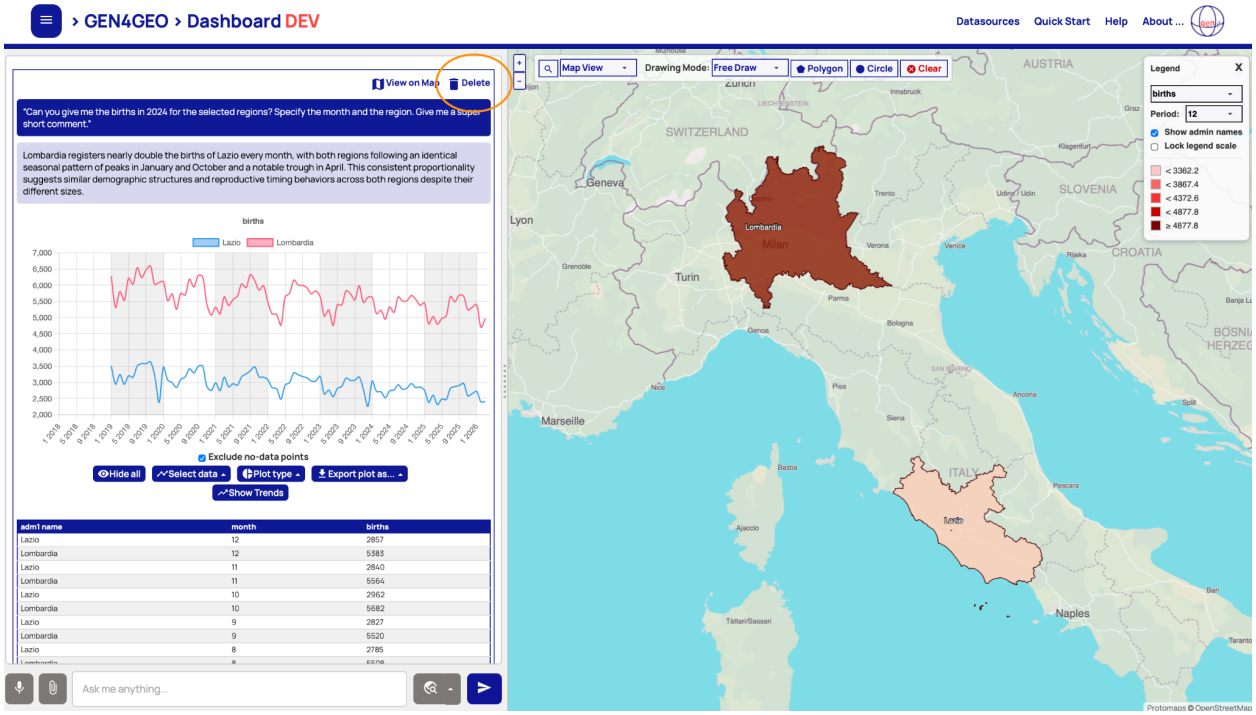

Figure 29 – How to delete an answer.

5.2. How to generate and save a report

Click the three horizontal lines (☰) in the top-left corner of the page to open the main menu, as shown in Figure 30.

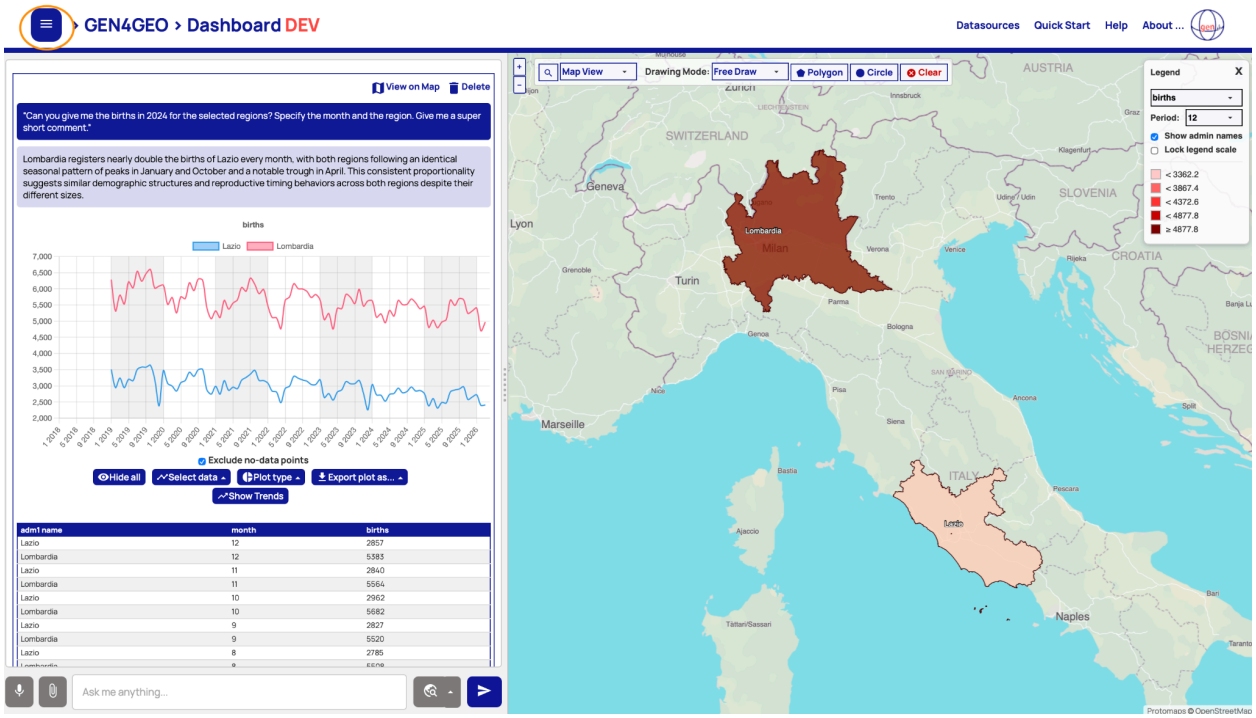

Figure 30 – How to open the main menu.

Before creating a report, you can include the map currently visualized. To do this, click the “Add a map screenshot” button, as shown in Figure 31. A screenshot of the latest chat answer will be created.

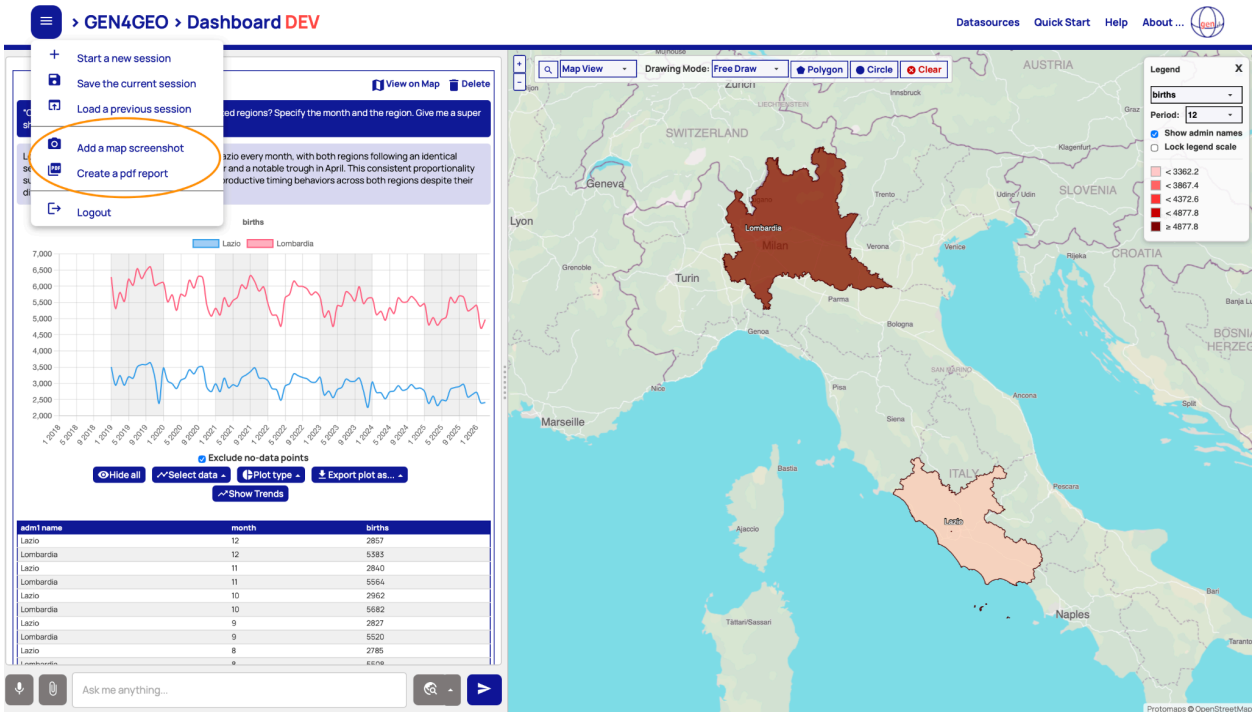

Figure 31 – How to create a report including a map.

If you want to take a screenshot of the map from a previous answer, click on the question and then on the ‘View on Map’ button that pops up (Figure 32), visualize the map and add the screenshot as explained before.

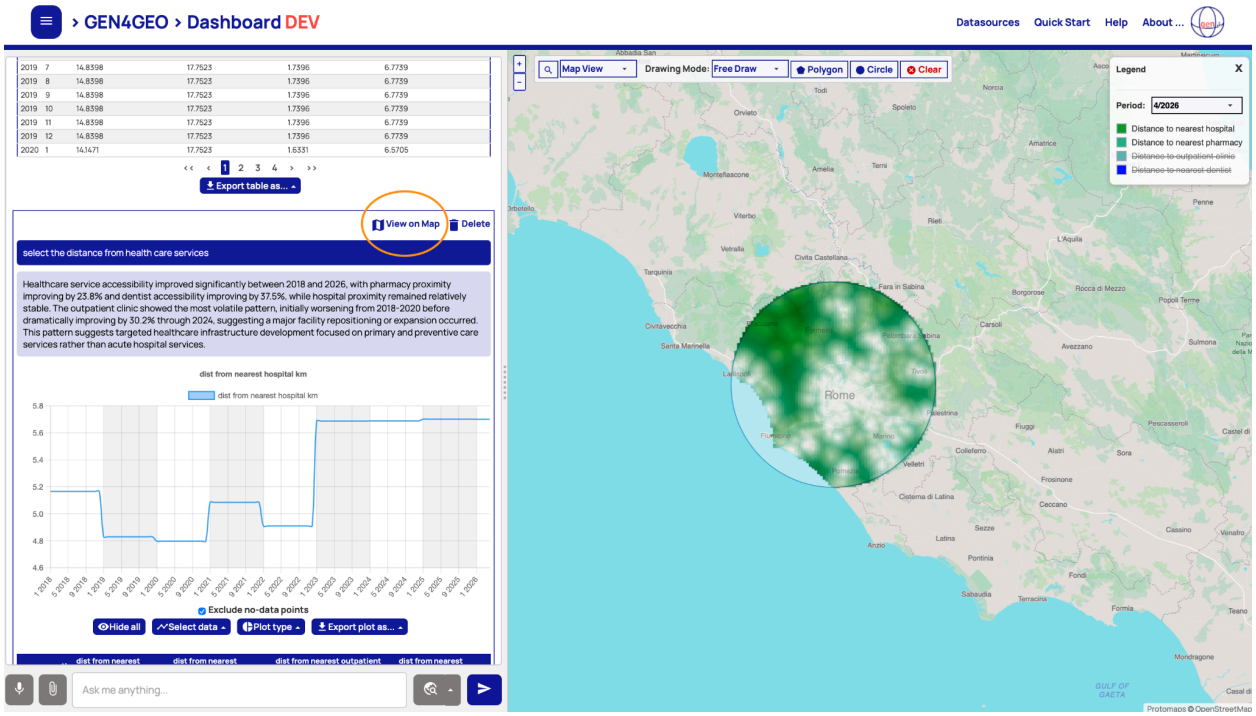

Figure 32 – How to visualize a map from a previous answer.

Click the **“**Create a pdf report**”** button to generate a report containing all the questions and answers from your GEN4GEO chat, along with any attached maps, as shown in Figure 31.

5.3. How to export data

Users can export all charts, tables, and maps produced by GEN4GEO.

To download charts, go to the answer section below the chart and click **“**Export plot as…**”**, as shown in Figure 33. You will be able to choose among different export formats, including .csv, .xlsx, .png.

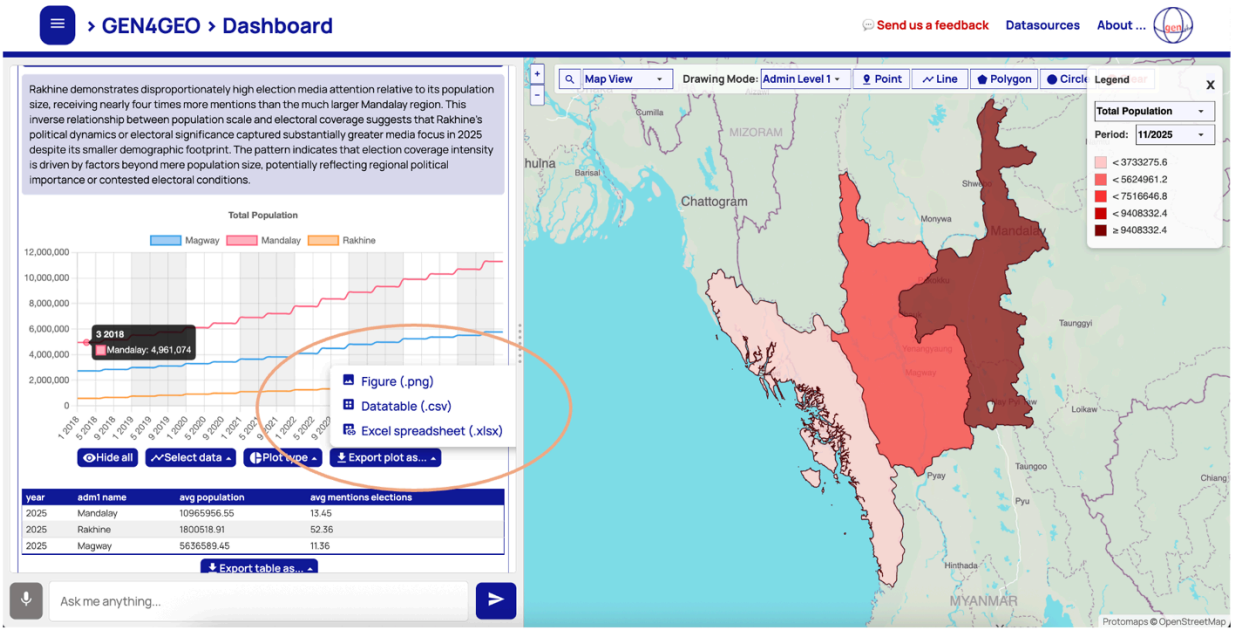

Figure 33 – How to export charts.

To download tables, go to the answer section below the table and click “Export table as…”, as shown in Figure 34. You will be able to choose among different export formats, including .csv, .xlsx, .pdf.

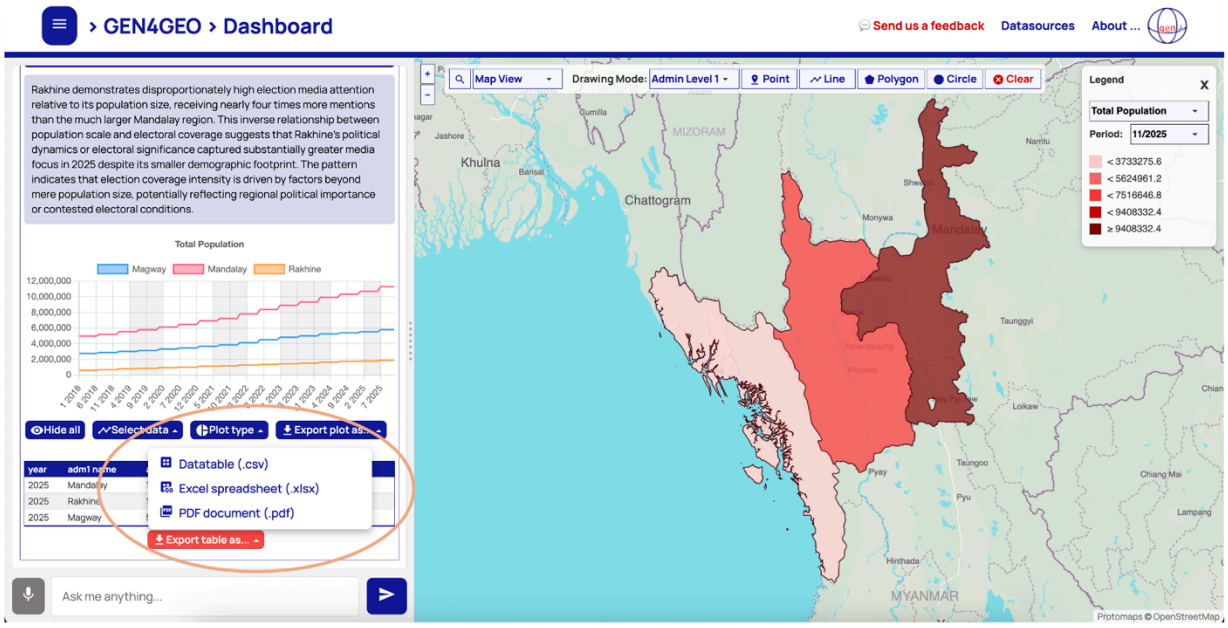

Figure 34 – How to export tables.

To download maps, click “Add a map screenshot”, as shown in Figure 31. Then, in the answer section below the newly generated image, click “Export as image”, as shown in Figure 35.

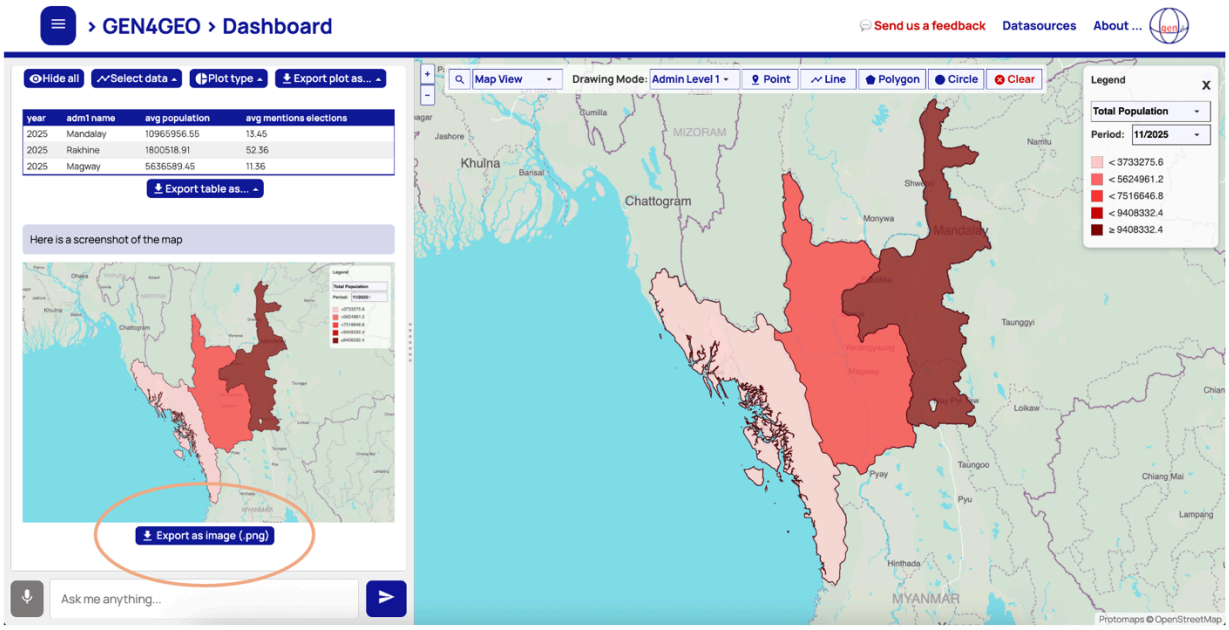

Figure 35 – How to export maps.

5.4. How to save and restore a session

To manage sessions in GEN4GEO, click on the main menu (the three horizontal lines (☰) in the top-left corner of the page) and then use the buttons shown in Figure 36.

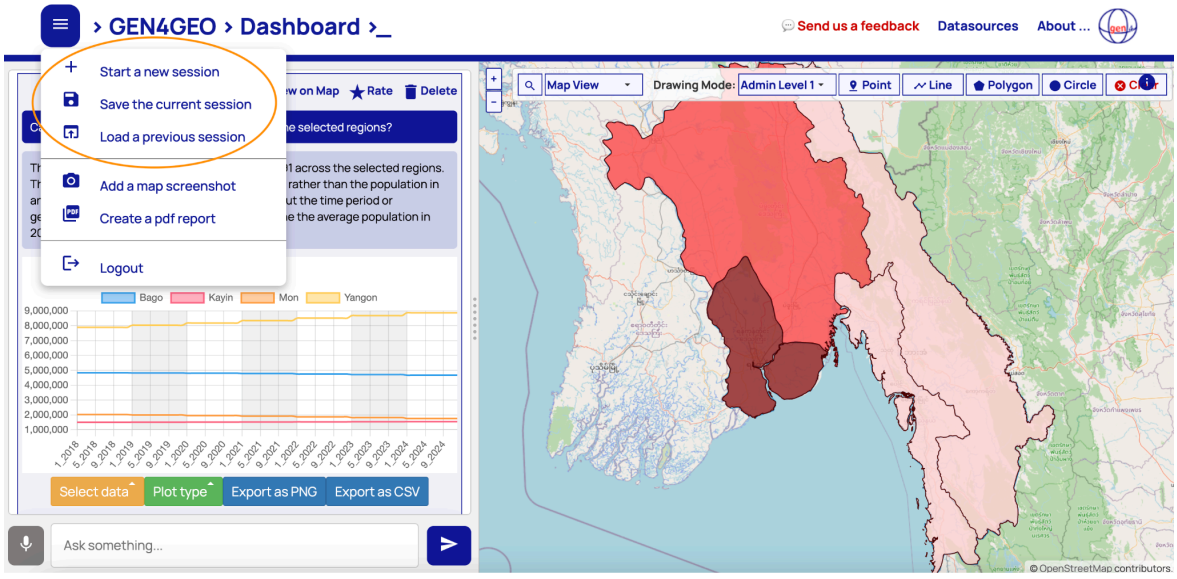

Figure 36 – How to start, save and load sessions.

The “Start a new session” button deletes the current session and starts a new session. All interactions with GEN4GEO from the current session will be permanently deleted, unless they are explicitly saved before starting a new session. The “Save current session” button allows you

to save the current session by storing the chat history as a `.json` file on your PC. The “Load previous session” button allows you to select a previously saved `.json` file to restore a past session.
After restoring a previous session, you can visualize the map corresponding to any of your past questions by clicking on the question and then on the “View on Map” button that appears in the menu right above the question, as shown in Figure 32.

6. How to write your prompt

6.1. How to ask questions

GEN4GEO uses a large language model (llm) to interpret your questions. You do not need to be precise in the way you ask your questions, as the llm can understand your questions and select the indicators that best answer them. For example, you do not need to use the exact name of urban indicators to extract information on those indicators. You can also make typing errors and the llm will correct them automatically. For example, you can ask “What is *forest* extent in the selected area?” or “What is *frest* extent in the selected area?” and obtain the same answer, as shown in Figure 37. In this case, you are not using the exact name of the indicator (which would be “forest_extent”) and you are misspelling the word forest at the same time, but the llm answers your question correctly.

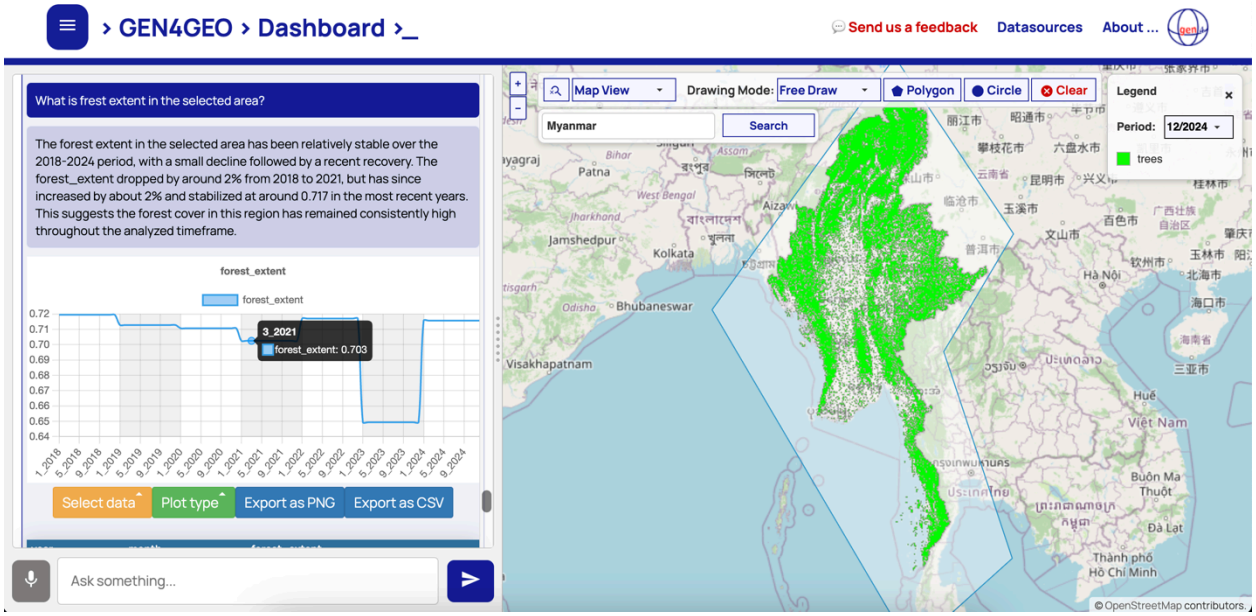

Figure 37 – GEN4GEO can understand questions with typos.

Similarly, you can use generic or collective names to extract multiple indicators at a time. For example, you can ask “Can you give me total mentions by topic?” and the dashboard will return multiple indicators of mentions, as shown in Figure 38.

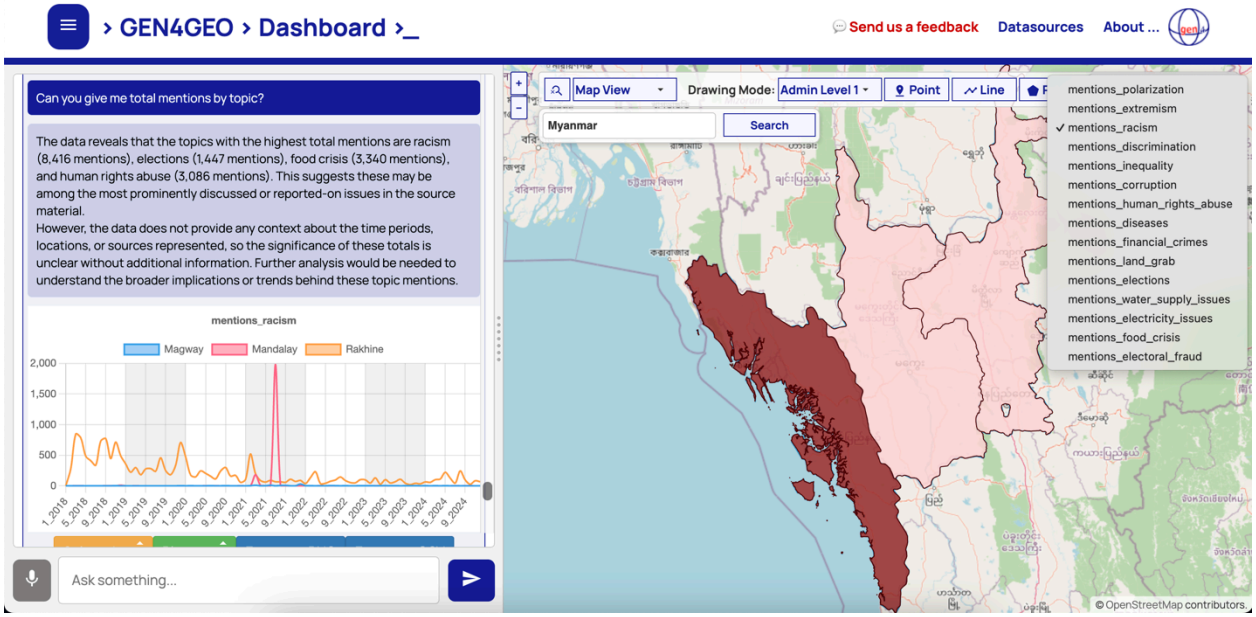

Figure 38 – Answer to the question “Can you give me total mentions by topic?”

However, even if the answer is correct, it may not be complete. In the previous example, you cannot be sure that the answer includes *all* indicators of mentions in the database. You can verify this by clicking on the “Datasources” button in the top menu providing the complete list of

indicators. If you want to make sure that the answer includes all the indicators that you need, you should list them one by one in your question, as shown in Figure 39. The question is “Sum by year for each of the following indicators: Protests and Riots, Non-State Actor Events, Criminal Org Events, Political Actor Events.” The question lists 4 indicators, by their name, and GEN4GEO shows the 4 requested indicators. The question also specifies “sum by year”. This results in a table providing totals for all available years (2018-2026).

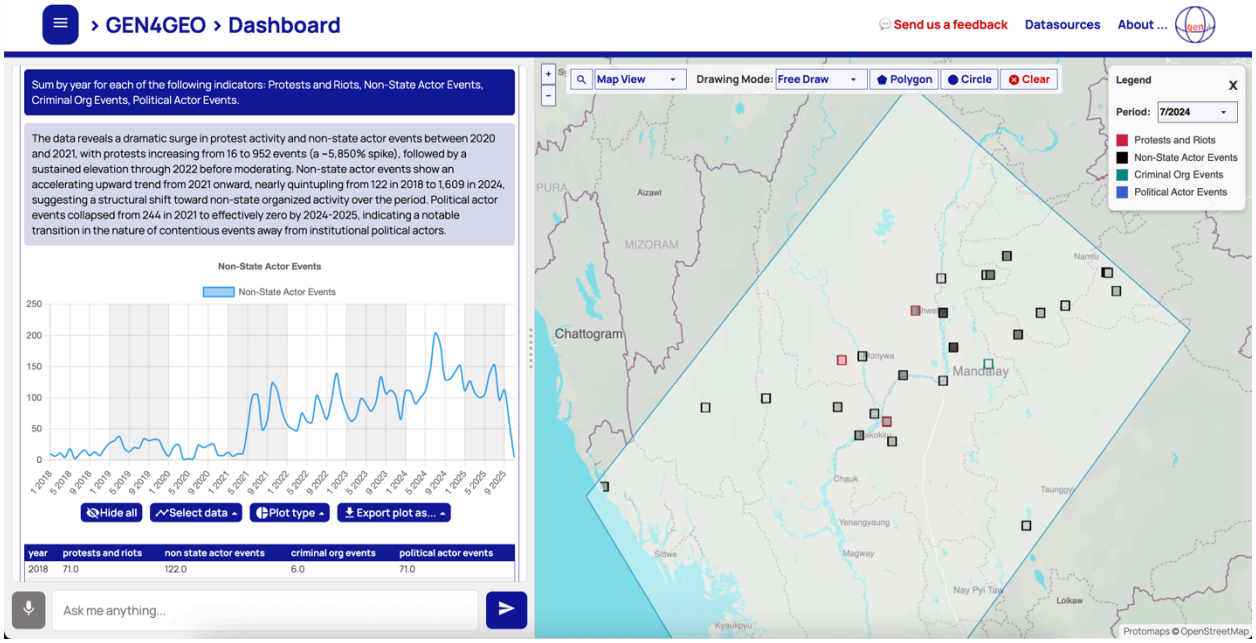

Figure 39 – How to ask a precise question.

6.2 How to ask for data aggregation

By asking specific questions, you can aggregate data in different ways, along the geographical and time dimensions. For example, you can ask “Can you give me the total number of Non-State Actor Events in the entire period?” and, in this way, obtain the total number across the entire 2018-2026 period, as shown in Figure 40.

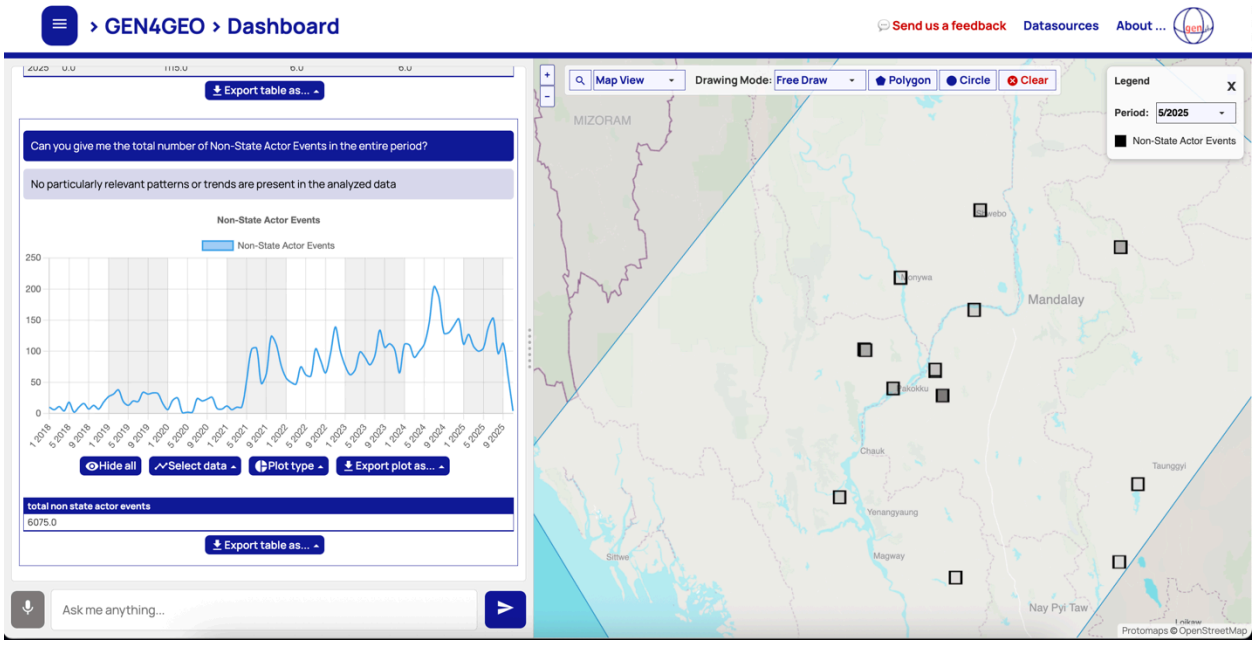

Figure 40 – How to aggregate data along the time dimension.

You can also ask GEN4GEO to compute correlations. For example, by asking “For each region compute the R parameter of correlation between crop extent and conflicts UCDP”, GEN4GEO tests the correlation between crop extent and conflicts on data aggregated at regional level. Results are shown in Figure 41.

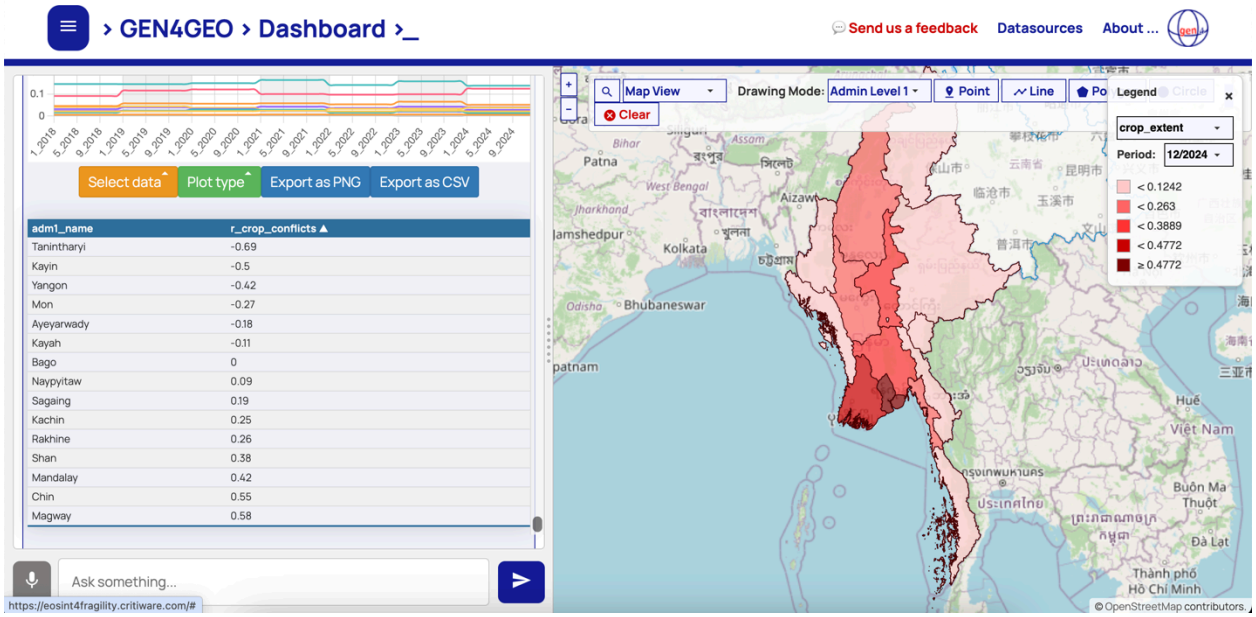

Figure 41 – How to test the correlation between variables.

6.3 How to generate a default prompt through the Datasources section

As anticipated at the end of section 2.2, the indicators shown in the Indicators & Data Sources section are clickable and can be used to generate a default prompt in an automatic way. By clicking an indicator, a default prompt appears in the chat, as shown in Figure 9. The question can be fully customized before you send it and uses the name of the indicator as it is displayed in the Indicators & Datasources section.
The preliminary step before clicking the indicator is always the selection of a Navigation Mode and an area of interest, as explained in section 2.1, otherwise the questions will be answered for available administrative units at the coarser spatial level.
The automatic prompt that appears in the chat is automatically adapted to the selected navigation mode. For instance, if you are navigating at admin 0 level, the question asks to show data 'per country'.

While generating an automatic prompt, you may encounter the warning shown in Figure 42: this happens if you select an indicator that is unavailable at the spatial granularity required by the current navigation mode; to understand the maximum resolution of an indicator, look at the 'Granularity' field in the Datasources section associated to that indicator (Figure 43):

- If the resolution is 'Geohash (1km x 600m)', the indicator is available also at coarser levels, namely district, province and country level (e.g. 'Wounded in Non-State Actor Events', Figure 43)
- If the resolution is 'Admin 2', the indicator is available at province and country level, but not at geohash level
- If the resolution is 'Admin 1', the indicator is available at province and country level, but not at district and geohash level ('Years of education', Figure 43)
- If the resolution is 'Admin 0', the indicator is available only at country level (e.g. 'Young Persons Literacy Rate', Figure 43)

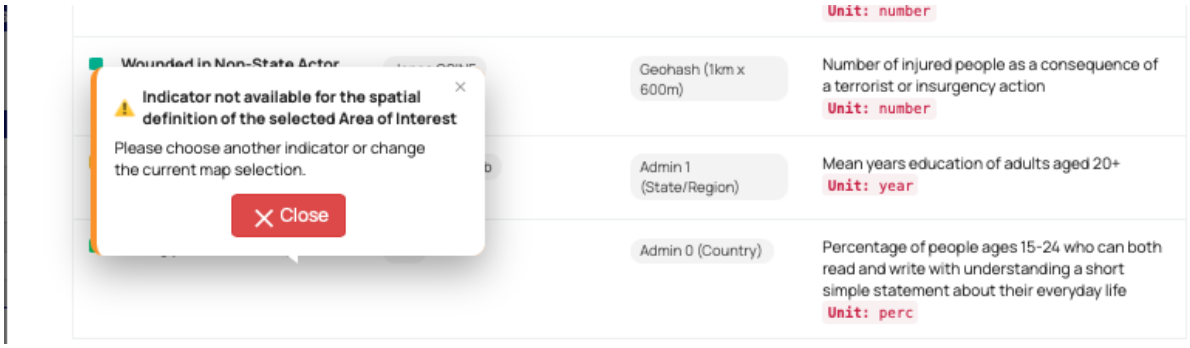

Figure 42 – Warning when clicking an indicator in the Indicators & Data Sources section that cannot be inspected at the selected spatial granularity.

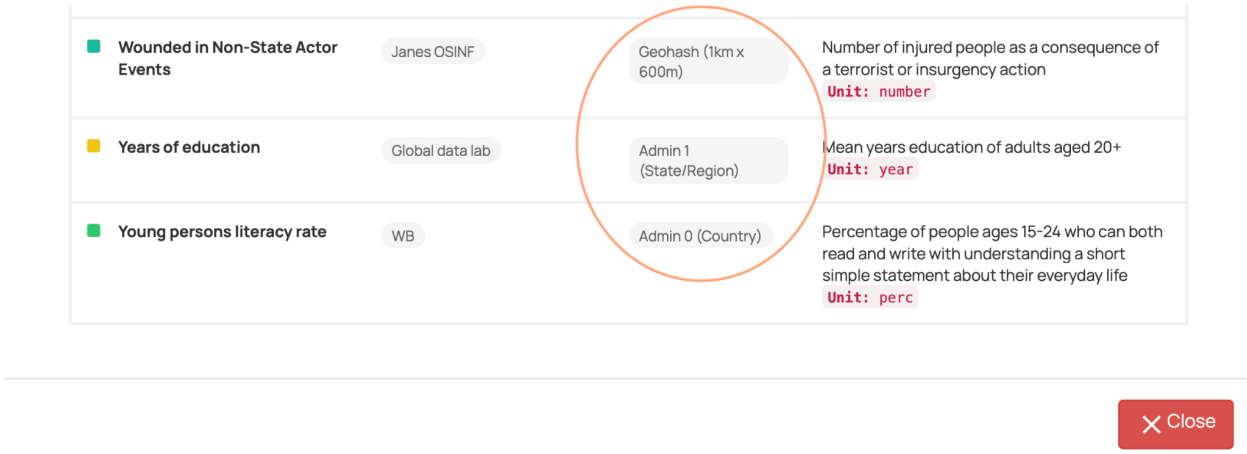

Figure 43 – Resolution of indicators in the Datasources section

7. Intelligent search

The buttons in Figure 44 activate the intelligent search functionalities.
The left button with the paper click icon enables you to search in a pdf loaded from your local machine, while the button with magnifying glass icon on the right enables you to search on the web.

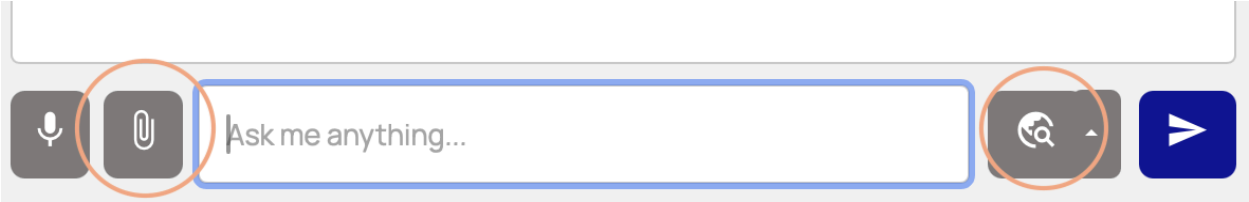

Figure 44 – Search in pdf and in web buttons

When activating the search in pdf functionality, the popup in Figure 45 appears. After you upload your pdf, ask a question in the chat.
Figure 46 shows an example of data extracted from a document about AMA S.p.a.'s planned activities for 2026.

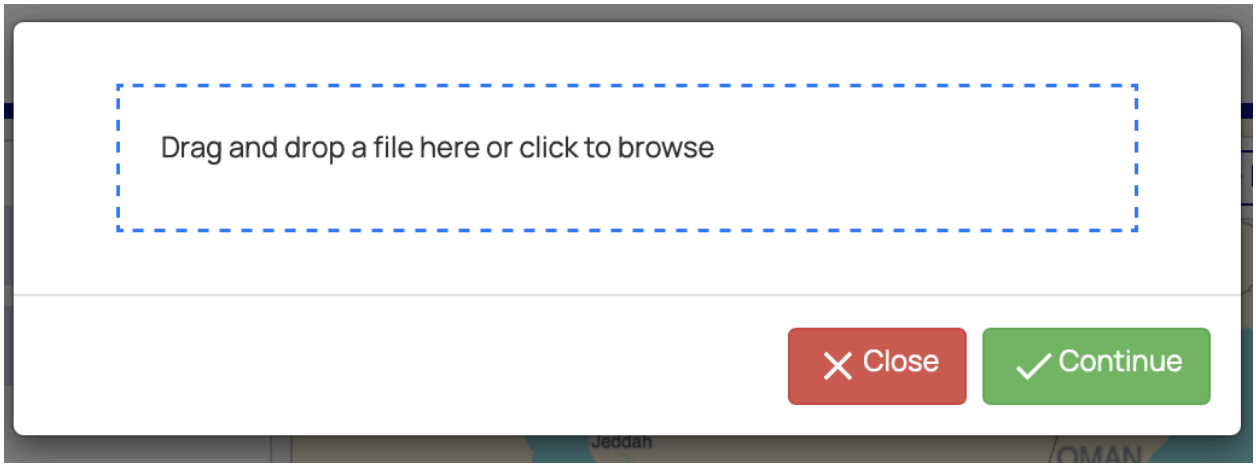

Figure 45 – Pop-up of the pdf search to upload a PDF document

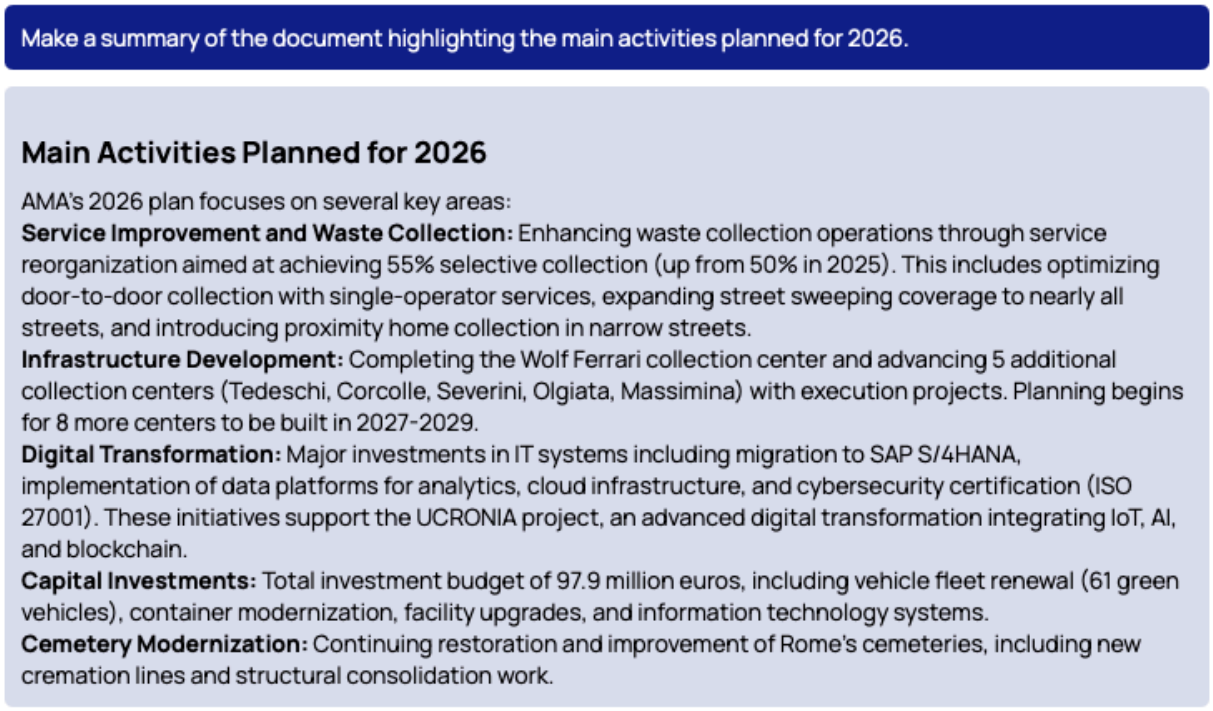

Figure 46 – Example of answer using the pdf search functionality

To activate the 'search on the web' functionality instead, click the related button, it will become green.

Before submitting your question, check the drop-down menu shown in Figure 47. You can choose one or more of the predefined links or add your own. In this case, the web search engine will search for information only within the selected websites.

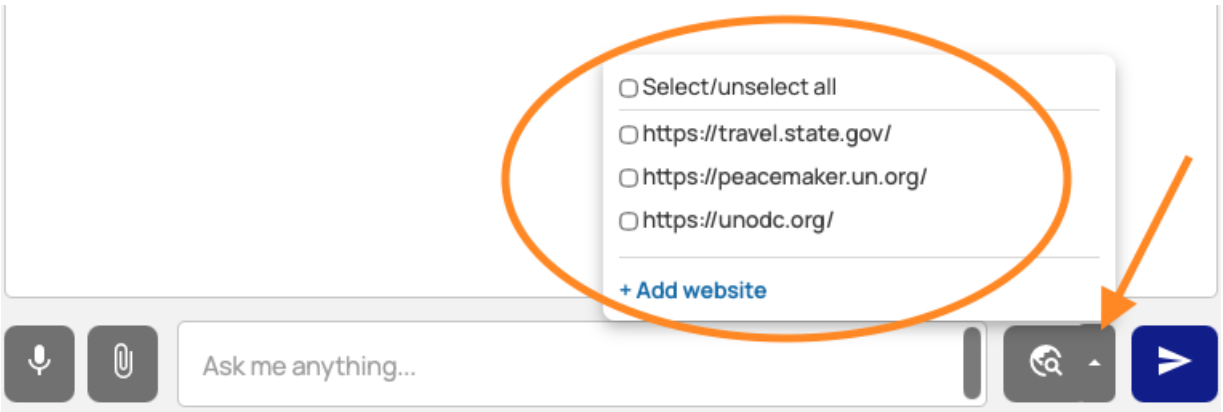

Figure 47 – Drop down menu of the websearch

If you do not specify any links, the web search engine will search the broader web and retrieve information from webpages selected according to its own search criteria.

Figure 48 shows an example of information retrieved from https://peacemaker.un.org website. The bottom part of the answer points to the web pages used to retrieve the answer.

Peaece agreements in Myanmar

Based on the provided texts, there are multiple peace agreements related to Myanmar documented in the Peace Agreements Database. The agreements include:

Recent Myanmar Peace Agreements:

- Chairman's Statement on the ASEAN Leaders' Meeting: Five Point Consensus on Myanmar (24/04/2021)
- Union Accord Part III (21/08/2020)

Earlier Myanmar Peace Agreements (2011-2012):

- Rakhine State Liberation Party (RSLP) and State Government Peace-Making Group 5-point State-level Agreement (05/04/2012)
- NMSP Government 4-point Union-level Peace Agreement (25/02/2012)
- Agreement between the State-Level Peace-Making Team and the KNU/KNLA Peace Council (07/02/2012)
- Initial Agreement between Mon State Level Peace-Making Group and the New Mon State Party (NMSP) (01/02/2012)
- Agreement between the Union Level Peace-Making Team and the Shan State Progressive Party/Shan State Army (28/01/2012)
- Agreement between the State-Level Peace-Making Team and the Shan State Progressive Party/Shan State Army (28/01/2012)
- SSA-S Government 11-Point Peace Agreement (16/01/2012)
- Statement on Initial Agreement between KNU and Burmese Government (13/01/2012)
- Chin National Front (CNF) and Government 9-point State-level Peace Agreement (06/01/2012)
- Agreement between the Government and the Mongla Armed Group (30/12/2011)
- Agreement between "Wa" Special Region and the Government (28/12/2011)
- NDAA Government 6-point Union-level Peace Agreement (27/12/2011)
- Kalo Htoo Baw (DKBA-5) Government Union Level Peace Agreement (11/12/2011)
- SSA-S Government Ceasefire Agreement (02/12/2011)
- Kalo Htoo Baw (DKBA-5), Government State Level Peace Agreement (03/11/2011)
- NDAA Ceasefire Agreement (07/09/2011)

All agreements are classified as Intra-State conflicts and are available in English.
References: https://peacemaker.un.org/en/areas-of-work/peace-agreements-database-and-language-of-peace-tool/peace-agreements-search, https://peacemaker.un.org/en/areas-of-work/peace-agreements-database-and-language-of-peace-tool, https://peacemaker.un.org/en, https://peacemaker.un.org/en/node/9158, https://peacemaker.un.org/en/areas-of-work/peace-agreements-database-and-language-of-peace-tool/peace-agreements-search?page=3

Figure 48 – Example of web search answer