The GSMA represents the interests of mobile operators worldwide, uniting more than 750 operators with over 350 companies in the broader mobile ecosystem, including handset and device makers, software companies, equipment providers and internet companies, as well as organisations in adjacent industry sectors. The GSMA also produces the industry-leading MWC events held annually in Barcelona, Los Angeles and Shanghai, as well as the Mobile 360 Series of regional conferences.

For more information, please visit the GSMA corporate website at www.gsma.com

Follow the GSMA on Twitter: @GSMA

**Mobile for Development**

Mobile for Development brings together our mobile operator members, the wider mobile industry and the development community to drive commercial mobile services for underserved people in emerging markets.

We identify opportunities for social and economic impact and stimulate the development of scalable, life enhancing mobile services.

Learn more: www.gsma.com/mobilefordevelopment/

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**Connected Society**

The GSMA Connected Society programme works with the mobile industry and key stakeholders to increase access to and adoption of mobile internet, focusing on underserved population groups in developing markets.

For more information, please contact us:
Web: www.gsma.com/connectedsociety
Email: connectedsociety@gsma.com

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Introduction

This document contains a detailed description on how to use the GSMA Mobile Coverage Maps tool, available at mobilecoveragemaps.com

Home Page

The first page lists all the countries for which the tool has been developed to date, and provides access to this How-to Guide, a video tutorial (available in both English and French), as well as a description of the project and its supporting organisations.

Clicking on a country will open up the map for this country. To explore another location, go back to this page, either by accessing mobilecoveragemaps.com or by clicking on the globe icon in the top banner, and select another country.
Country map

When a country has been selected and opened, its map fills the browser window to let the user explore the map and discover the various tools and information panels displayed around the map.

Map Navigation

The site uses the typical controls found on the majority of online maps:

- **Using a computer mouse**
  - Clicking the left mouse button and keeping it pressed down while moving the mouse will allow you to move the map around. This is known as "map panning".
  - If the mouse is equipped with a scroll wheel, scrolling the wheel will change the zoom level at which the map is displayed. This zoom in/out feature is also available through the +/- buttons located in the top left corner of the map.
  - Clicking on a map feature (e.g. a Point of Interest marker such as a school) will open an information panel, providing additional details on the selected feature.

- **Using a touch interface**
  - Touching the screen and sliding the finger in the required direction will allow you to move the map around ("map panning").
  - Using the "pinch and zoom" gesture, i.e. widening or closing the gap between two fingers while touching the screen on the map area will enable you to zoom in and out.
  - Tapping on the feature marker will open the information panel on a feature.
Featured Controls

Country Map

1. **Zoom controls** can be used to zoom in and out on the map. In addition to these buttons, the zoom can also be controlled by using the scroll wheel on a computer mouse or with a pinch gesture on tactile devices.

2. **Full screen** toggles the map to a full-screen mode.

3. **Search** for places and/or coordinates. While typing, possible matches are suggested and can be selected. Once a place is selected, a blue pin will be shown on the map. The expected format for coordinates is a latitude/longitude pair (in that order) separated by a comma.

4. **Tools** are available to interact with the map and the data. See the next section for further detail.

5. **Background** can be changed depending on viewer preferences. Several map backgrounds can be chosen by hovering over the background button.

**Available backgrounds**

- Dark
- Terrain
- Light
- Satellite
- Roads
- **Terrain** is the default map background. It shows a limited amount of place names and various terrain related features such as water, relief and natural parks.

- **Dark** shows a black and grey version of the map. It can be used to enlarge the contrast between the background and the population density or signal coverage.

- **Light** is the inverse of the dark map and can be useful for print-friendly extracts.

- **Satellite** shows satellite images.

- **Roads** places emphasis on the visualisation of infrastructure such as roads, railways and buildings.

6 **Coverage transparency** is a slider that controls the transparency of the mobile coverage layer shown on the map in shades of purple. Sliding the slider to the left will increase the transparency, while sliding it to the right will decrease it.

7 **Coverage type** allows switching between different types of radio access technology (only one is displayed on the map at any given time). The list of available types depends on the selected country. Note: 2G is also referred to as GSM/EDGE, 3G as UMTS/HSxPA and 4G as LTE. The coverage being displayed is the merged coverage of all operators in the market.

8 **Legend** indicates the values corresponding to the colours in the population and coverage layer. For the population, red indicates high density, orange medium density and yellow a low-density area. The legend for the coverage is as follows:

- **Dark purple** (strong coverage): satisfactory quality of service for indoor voice calls and data.

- **Medium purple** (medium coverage): satisfactory quality of service for outdoor voice calls and data (indoor service may be degraded).

- **Light purple** (weak coverage): outdoor service may be limited to SMS and USSD.

9 **Overlays** allows for disabling and enabling of two additional layers:

- **Population layer** is used to visualise the population density (on by default).

- **Region boundaries** indicates the boundaries of the country's administrative areas (off by default).

10 **Sources & disclaimer** shows a panel on the right side of the screen containing attributions to sources used for the study as well as a disclaimer.

11 **Home** redirects to the country selection page.

### Tools

The tools (#4 in Figure 2) can be used to gain in-depth insights about the map and the underlying data and are explained in more detail in this section.

#### Stats

Stats is used to display statistics about a map feature such as an administrative boundary or settlement. Click once on the button to activate it. With the Stats button on the left side of the screen active, click once on an area of interest on the map and a stats panel will appear on the left-hand side of the screen.

Settlements can be found by clicking on (large) groups of population coloured squares. If an underlying settlement is found, its outline will be coloured in green. An example of a selected settlement along with the corresponding statistics panel is shown in Figure 4.

![Settlement statistics panel (left) along with the selected settlement in green (right)](source: GSMA)
Administrative boundaries are visualised directly if the user clicks in an area where no settlement is found. Otherwise, the boundary can be revealed by clicking on the second tab in the information panel. This will disable the green outline of the settlement and show a red outline for the administrative boundary. An example of administrative boundary statistics is shown in Figure 5. On the right-hand side, the selected boundary is coloured in red.

The information displayed in the stats panel can also be downloaded as an Excel file by clicking on the download button next to Additional Data. The Excel file is made available inside a ZIP archive.

At the top of the statistics panel, tabs enable the user to switch between the settlement and administrative boundary views. Below the tabs are the names of the different administrative boundary levels (e.g. for Tanzania: region, district and ward), as well as coverage rings indicating the percentage of the population covered by technology for the selected feature.

### Additional data field descriptions

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Population</td>
<td>The total population contained in the selected area</td>
</tr>
<tr>
<td>Area*</td>
<td>Total area of the settlement in square kilometres</td>
</tr>
<tr>
<td>Elevation*</td>
<td>Average elevation of the settlement</td>
</tr>
<tr>
<td>Population under 15 rate</td>
<td>Percentage of the population in the area that is below 15 years of age</td>
</tr>
<tr>
<td>Adult Population</td>
<td>Absolute number of individuals in the area that are above 15 years of age</td>
</tr>
<tr>
<td>Poverty rate</td>
<td>Percentage of population in the area having an income below the poverty line</td>
</tr>
<tr>
<td>Cap. Stock (m$)</td>
<td>Total economic value of buildings in million US Dollars. This value is retrieved from the Global Assessment Report 2015 (GAR).</td>
</tr>
<tr>
<td>Population uncovered by 2G</td>
<td>Absolute number of individuals not under 2G coverage</td>
</tr>
<tr>
<td>Population uncovered by 3G</td>
<td>Absolute number of individuals not under 3G coverage</td>
</tr>
<tr>
<td>Population uncovered by 4G</td>
<td>Absolute number of individuals not under 4G coverage</td>
</tr>
</tbody>
</table>

Source: GSMA  * = field only available for settlements

Filter

The filter tool allows the user to identify specific settlements according to two filter criteria: total population in settlement and population not covered by one radio access type (2G/3G/4G). The total population in settlement criteria can only be expressed in absolute numbers. Depending on the chosen configuration, the from/to fields signify the higher and lower bounds of the query. For percentage queries, the expected values are between 0 and 100.

Note: the filter tool only returns settlements that are contained in the currently visible area of the map. Any settlements outside of it will not be returned. If needed, use the zoom out feature in the map navigation tools to retrieve additional settlements.

Once the criteria are all specified, a click on the filter button queries the database and returns all matching results. Feedback messages about the number of results found in the query are shown in the bottom right corner of the screen. The resulting settlements may be grouped under a single marker for visualisation purposes and are shown individually when zooming in or clicking on the green markers.

Distance (to nearest coverage)

The distance tool computes the shortest distance (“as the crow flies”) to the nearest coverage. Three distances are computed: one for each radio network technology (2G/3G/4G). To use this tool, select the Distance tool on the left-hand side of the screen and click anywhere on the map to reveal the side panel containing the results.

Measure

The measure tool is used to measure a distance on the map. Click on the Measure button to start measuring. The first click on the map will set a starting point, after which each subsequent click adds a line segment to the measured path. The cumulative distance and the segment length are both displayed next to each line segment.

V-Cell (Virtual Cell)

The virtual cell is used to give an estimate of the total population inside a given area. By default, the radius of the virtual cell is set to 10 kilometres but can be decreased to 3 kilometres or 1 kilometre by clicking on the appropriate button that appears below the tool bar. The V-Cell can be dragged around, and the population living inside the V-Cell circle is recomputed when the V-Cell is released.
POIs (Points of Interest)

POIs are points that can be shown on the map. Depending on the availability of data for each country, a POI can be one of four types: airports, refugee camps, health sites and educational facilities. Upon clicking on a point of interest, a side panel is shown on the left with the following information:

- Name
- Administrative region names
- Coordinates
- Coverage status by radio access technology

Depending on the active zoom level and how close the POIs are, they may be clustered together as long as they belong to the same category. A cluster is represented by a marker using the same colour as the facility type along with the number of points contained in the cluster. Clicking on a cluster marker will zoom in to that location and de-cluster either into points, smaller clusters or a combination of both.

Figure 8

Points of interest and clusters

Source: GSMA

Bookmarking / sharing specific locations

Any map view can be shared and sent to other potential users by either copying the web link displayed in the browser address field, or using the 'share link via email' feature of the browser.

Locations may also be remembered using the browser bookmarking functionality.

Links bookmarked or shared this way will directly position the map in the appropriate country, at the selected coordinates, using the same zoom level.
gsma.com/mobilefordevelopment/connected-society/
To access the GSMA Connected Society programme’s Mobile Coverage Maps platform, please visit [www.mobilecoveragemaps.com](http://www.mobilecoveragemaps.com)