

## **User guide for the Global Food Security Index: Understanding the index and leveraging it for your work**

### **Understanding the GFSI**

#### **What is the Global Food Security Index (GFSI)?**

The Global Food Security Index, developed by the Economist Intelligence Unit (EIU) and sponsored by DuPont, considers three core pillars of food security—Affordability, Availability, and Quality & Safety—across 109 countries. The index is a dynamic quantitative and qualitative benchmarking model, constructed from 28 unique indicators, that provides an objective framework for evaluating food security across a wide range of countries worldwide. By creating a standardised metric around food security, the EIU seeks to empower users to explore the issues surrounding food security—including the rankings and results—and draw conclusions for policy, business operations and future research.

While food security research is the focus of many organisations worldwide, this index is distinct for two reasons. First, the study looks beyond hunger to the underlying factors affecting food insecurity. Second, the study employs an adjustment factor for global food price fluctuations to examine the risk countries face in the area of food affordability throughout the course of the year.

#### **How does the model define food security?**

Food security is defined as the state in which people at all times have physical, social and economic access to sufficient and nutritious food that meets their dietary needs for a healthy and active life. This framework is based on the internationally accepted definition established at the 1996 World Food Summit.

#### **How do I access the GFSI?**

The Global Food Security Index (GFSI) has several different components, all of which can be found at <http://foodsecurityindex.eiu.com/>. On this site you can access:

- An overview of the GFSI,
- Results for the GFSI and for all three categories—Affordability, Availability, and Quality & Safety—covered in the index,
- Year-on-year trends,
- Individual country profiles,
- A resource library of reports, presentations, videos and key findings for all three years of the GFSI and related research projects,
- The GFSI Findings and Methodology report and
- The underlying Excel model.

There are two key tools for exploring the GFSI data:

- The model (the Excel workbook, which can be downloaded throughout the website)
- The data visualisation tool (the features available online).

### Leveraging information in the GFSI: EXCEL MODEL

The Excel model offers the richest and most in-depth look into the GFSI data and results. The Excel workbook offers a comprehensive set of tools that will allow users to explore key results, year-on-year trends, indicator- and country-specific findings, and the underlying scores and data that drive the model.

### How can I acquaint myself with the results of the GFSI model?

The following overview of the structure of the Excel workbook shows users where to find information in the model and how to best understand and use the results of the model. Results are provided for each category—Affordability, Availability, and Quality & Safety—and indicator, and on a country basis. Note that each sub-tab of the model can be exported as either an Excel or PDF document by using the icons in the top right-hand corner.

The workbook is organised into five<sup>1</sup> main modules (plus two additional tabs), each of which has a number of sub-tabs that can be accessed by clicking on the appropriate name in the menu bar on the top of each module’s pages.

- 1) **Overview:** This module displays the overall results from the index. The **Map** sub-tab divides the geographies included in the index into four categories based on their food security environments and provides a heat-map based on country performance. The Overview module also allows users to see the overall results and the rankings and scores for the three categories of the index (on the **Category Ranking** sub-tab), which helps answer the initial question of “What is this index measuring?”. This module also contains a scatterplot (see **Scatterplot** sub-tab) that allows users to examine the correlations among the overall GFSI scores, individual category scores, the underlying data of individual indicators and the dependent variables. These correlations can be filtered by geographic region and income levels.
- 2) **Series Explorer:** This module provides the most in-depth view of the individual metrics (called “indicators”) in the index and their definitions. Users can explore the Top and Bottom ten performers in each category and across each indicator on the **Summary** sub-tab. They can also see the ten most improved and the ten most declined countries between the 2013 and 2014 indices. In the **Series Ranking** sub-tab, the overall results, category results and indicator results are presented for all countries, as are year-on-year score changes and the raw data (where applicable). Results can be further refined by using the *country* and *group highlighters* and the *group filters*. Viewers can use the descriptions on the right-hand side to understand what each indicator is measuring.

---

<sup>1</sup> The Quarterly Adjustment module is only available in the three quarterly updates and is not present in the baseline (annual) model.

Additionally, users can discover which countries have experienced score improvements and declines across indicators in the **Y-O-Y Changes** sub-tab, which sorts all countries from largest to smallest change in score. Filters to refine results are also available. Finally the **Regional Scores** tab shows aggregated scores and year-on-year changes for geographic regions and income levels across all categories and indicators.

- 3) **Country Explorer:** This module explores the data on a country-specific basis. After users develop an understanding of the model framework in the Series Explorer, they can delve into the food security environment for specific countries. The **Country Profile** sub-tab provides an overall assessment of food security for each country. A graph of food price inflation is also provided. In the **Indicator Scores** sub-tab, users can identify which indicators are strengths or weaknesses to determine drivers of a country's overall scores and areas that may require attention. The **Y-O-Y Changes** sub-tab organises indicators by whether a country has experienced an improvement or decline, which allows users to identify areas of progress. The **Score Table** provides scores and year-on-year changes for a country across each indicator and category for all three years of the index, while the **Data Table** provides the raw data and sources for all three years (a full table of the raw data and sources for all countries and indicators across the 2012, 2013 and 2014 indices can be found in the Data Explorer).
- 4) **Country Comparison:** This module allows the results of two countries to be compared. The **Summary** sub-tab provides a high-level comparison of the overall and category ranks, scores and year-on-year changes for two selected countries. More detailed comparisons of any two countries are provided on the **Indicator Scores** sub-tab, where users can see for which indicators one country outperforms another. Finally, users can compare food price inflation for any two countries over time on the **Food Price Inflation** sub-tab.
- 5) **Quarterly Adjustment:** This module, which is only available in the three quarterly adjustment models and not in the baseline (annual) model, presents the results of the food price adjustment factor, which shocks the Affordability score. Users can explore **Affordability Rank Changes** and **Overall Rank Changes**, to understand which countries' ranks have improved or declined over the quarter. The **Quarterly Scores Table** provides scores, ranks and the adjustment factor for all countries. Finally, the **Adjustment Factor** sub-tab provides a classification of the countries that have seen their food affordability improve or deteriorate over the quarter. The **About** sub-tab explains the methodology for calculating the food price adjustment factor. The quarterly scores and ranks provided in this module will differ from the baseline scores and ranks as provided in all other sections of the workbook.
- 6) **Data:** This tab presents all raw data, normalised scores and data years in tabular form for all countries, regions and income levels, allowing a user to readily compare countries or export data for external use. A sub-tab is available for each of the three years of the GFSI.
- 7) **Weights:** This tab shows the weights assigned to each indicator and category that are used to calculate scores and ranks in the GFSI. Two pre-set weighting schemes—equal weights and peer panel (default)—are provided. Users can further explore the index and

test alternative scenarios by assigning their own weights with one of six customisable weighting schemes.

### How can I explore country issues with the GFSI Excel model?

Users can assess country performance and explore strengths and weaknesses through the following:

- **Country scores and ranks:** Use the *country highlight* function on the Series Ranking sub-tab (in the Series Explorer) to show a country's performance relative to other countries across each category and indicator. A country's performance within its region or income level can be assessed by using the *group filter* function on the same sub-tab. In the Country Profile sub-tab in the Country Explorer, users can see an overview of the scores and ranks, including year-on-year developments for an individual country.
- **Strengths and weakness:** Absolute strengths and weaknesses (measured by scores of above 75 points and below 25 points respectively) can be found on the Indicator Scores sub-tab in the Country Explorer. Relative strengths and weaknesses are most easily identified using the rankings and scores in the Series Ranking sub-tab in the Series Explorer. Using the *group filter* function, relative strengths and weaknesses can be identified at a regional or income group level.
- **Year-on-year changes:** The Y-O-Y Changes sub-tab in the Country Explorer shows a country's score improvements and declines from 2013 to 2014. If users want to identify overall, category or indicator score changes compared with all other countries in the GFSI or a group of countries, the Y-O-Y Changes sub-tab in the Series Explorer can be used. The *country highlight*, *group highlight* and *group filter* function facilitate these comparisons. The Series Ranking sub-tab in the Series Explorer also provides data regarding yearly score changes.
- **Raw data:** The Data Table sub-tab in the Country Explorer simultaneously provides data and sources for all three years of the index for each indicator. On the Data tab, users can examine the full GFSI dataset across countries for one year at a time. Each sub-tab in this tab (organised by years) provides raw data, normalised scores and data year.

The country scores and ranks and relative score comparisons help provide an overview of food security in the country. The strengths and weaknesses by indicator and the year-on-year changes are the most useful for building a conversation.

*For example: Start on the Indicator Scores sub-tab in the Country Explorer. Select Colombia at the top from the "Select Country" menu. Once Colombia's profile appears, scroll down to view which indicators were Strengths, Moderate or Weaknesses in the 2014 GFSI. Notice that 3.2 Nutritional standards is in the "Strengths" category and 2.2 Public expenditure on agricultural R&D is in the "Weaknesses" category.*

*Users could conclude that "Colombia does very well on nutritional standards, but it could improve its public expenditure on agricultural R&D."*

To explore further, users could look at the indicators in more detail by moving to the Series Ranking sub-tab in the Series Explorer. In the upper part of the page, select “Country highlight” to highlight Colombia. Select an indicator—nutritional standards—from the dropdown box to see how Colombia compares to other countries.

On the indicator measuring nutritional standards, Colombia received the highest possible score, which has not changed over the past two years. Read the Scoring Method on the right-hand side to understand the definition of the indicator and how it is scored. This indicator is a composite indicator of three sub-indicators. Select each sub-indicator and read the descriptions on the right-hand side.

Based on this indicator-specific information, users could conclude that “Colombia has published national nutritional guidelines on a balanced and nutritious diet and a national plan or strategy to improve nutrition. The government also monitors the nutritional status of the population. It appears that Colombia is doing well in this category.”

Users can now explore Colombia’s relative performance in public expenditure on agricultural R&D by changing the indicator in the “Select indicator” dropdown box. Colombia does not do well in public expenditure on agricultural R&D. The country scores 1, which means the government is spending between 0% and 0.5% of agricultural GDP on research and development. Read the description and scoring criteria on the right for this information. Then select the “Group filter” dropdown at the upper right-hand side and select “Central and South America”. “Nine countries in the region spent more on research and development than Colombia. Spending more in this area may improve Colombia’s score so that it will be tied with Bolivia, Costa Rica, Nicaragua, Peru and Venezuela. Research and development is an important long-term investment in food security, since it keeps a country at the cutting edge of efficiency-increasing technology.”

### **How can I explore thematic issues with the GFSI Excel model?**

There are three main avenues for exploring thematic issues within the Excel model.

First, users can use the Series Ranking sub-tab in the Series Explorer to examine the relative performance of all countries in the index on a single issue (indicator) at a time.

For example, vitamin A and iron availability are two of the leading nutritional deficiencies in the world. By selecting each indicators on the top of the page (see “Select Indicator”), users can see the countries with the highest vitamin A deficiencies: Bangladesh, Burkina Faso, Cote d’Ivoire, etc. (all countries with a “0” score). Users can see similar results for both animal and vegetal iron deficiencies.

The second avenue is through the Y-O-Y Changes sub-tab in the Series Explorer, which shows areas where the greatest advances and declines have occurred in food security over the past year.

For example, users might be interested in discovering whether the proportion of the population under the global poverty line decreased between the 2013 and the 2014 indices. By selecting the indicator at the top of the page (see “Select Indicator”), users would determine that scores either improved or remained constant for the majority of the countries in the index. Only the Democratic Republic of Congo, Romania, Sierra Leone and Zambia experienced declines in this indicator. Users might then conclude, “The proportion of people under the global poverty line is decreasing in most countries.”

Users can then explore why the scores declined for each of these four countries. By going to the Data Table sub-tab in the Country Explorer and selecting Congo (Dem. Rep.), users will see that the Democratic Republic of Congo (DRC) experienced a large increase in the proportion of the population under the global poverty line.

By switching the country from Congo (Dem. Rep) to Romania, it would become apparent that poverty did increase in Romania, but by a much smaller amount than in the DRC. Users could then conclude, “All four countries that had score declines also saw increases in the percentage of people living in poverty.”

Third, the Scatterplot sub-tab in the Overview module allows users to explore the relationship between particular topics. The sub-tab provides simple correlations, which show the strength of the relationship between two variables, as quantified by the correlation coefficient (at the top left of the page, denoted by “Correl(X,Y)”). A correlation coefficient above 0.7 shows a strong, positive relationship between the two variables. A correlation coefficient below -0.7 shows a strong, inverse relationship.

For example, compare the Overall score (for food security) with the EIU Democracy Index ratings. Select “Overall score” in the “select x-axis indicator” box and “4.6 EIU Democracy Index” in the “select y-axis indicator” box. At the top of the page, users will see that the correlation coefficient is 0.74. This means that the model suggests there is a positive relationship between democracy and food security: countries that are democratic may be more food secure.

If users select “Overall score” and “4.2 Percentage of children stunted,” they would discover a negative correlation. The two variables have a correlation coefficient of -0.88, meaning that countries with a higher percentage of stunted children are less likely to be food secure.

**An important note when using the Scatterplot tab:** Establishing a correlation is not sufficient to establish causation. A correlation can be evidence of a possible causal relationship, but cannot tell us what that causal relationship may be. Its only value, then, is to suggest relationships between the variables that might prompt further investigation or allow the development of new theories. Correlations can still be important, as they point to a relationship that could be meaningful. The validity of these relationships and theories, however, has to be tested outside of the index and the correlation tool.

## Leveraging information in the GFSI: DATA VISUALISATION TOOL

The [data visualisation tool](#) on the website offers an alternative way for users to engage with the data. It presents scores, ranks, year-on-year changes and country profiles through a series of unique features. The data visualisation tool is best used as a way to introduce users to the breadth of the GFSI. To answer data specific questions that arise from exploring the tool, it is recommended that users download the Excel model.

### How can I explore overall results and year-on-year changes with the GFSI data visualisation tool?

The Key findings section visualises the overall results of the GFSI, the results across each category, regional performance and year-on-year changes. The Key findings page has two components: [Rankings and trends](#) and the [2014 Overview](#). The [2014 Overview](#) provides key findings from the 2014 GFSI, while the [Rankings and trends](#) page allows users to interact with the results of the index:

- The [Country rankings 2014](#) page presents country scores and rankings for the overall index and each of the three categories. The sorting tool allows countries to be sorted by their performance in each of the three categories rather than by their overall scores. The score and rank toggle allows ranks to be substituted for scores to provide users with a better understanding of where countries stand within each category. The global and regional filter permits a user to compare the countries within a region by score and rank across the categories.
- The [Year-on-year trends](#) page explores country performance over the past three years. Yearly changes may be viewed either graphically or numerically. Filtering tools allow countries to be assessed by global rank over the past three years. Regional performance is also available.
- The [Biggest changes](#) page shows those countries whose overall score have increased or declined the most from 2013 to 2014.
- The [Visual analysis](#) page provides an interactive tool that allows users to explore the relationships between different indicators and categories with the GFSI. It provides both a global and regional perspective on important interactions within the GFSI. It also contains an interactive chart to examine key linkages with other variables. Users can change the variables under consideration in each chart and the relevant regions in the Regional section. By clicking on a particular country, users can ascertain additional information about its performance in the GFSI.

### How can I explore country performance and thematic issues with the GFSI data visualisation tool?

#### Country performance

The [Explore countries](#) page provides access to the country profiles that allow users to explore the performance of individual countries. Selecting the [Explore countries](#) page will bring up a list of countries included in the index. Selecting a specific country leads to its country profile page

(the interactive map can also be used to navigate to individual country profiles). A country profile page includes:

- Overall food security ranking (out of 109);
- Regional performance;
- Individual rankings in each core issue: Affordability, Availability, and Quality & Safety;
- Food security strengths and weaknesses;
- Summary statistics on GDP (at PPP), population, land area, prevalence of malnourishment, intensity of food deprivation and the Human Development Index. Each statistic is compared to the global average.

Selecting one of the three categories (Affordability, Availability or Quality & Safety) will expand the webpage to include all the individual indicators that are evaluated within a category. For example, selecting Affordability will reveal the country's score on: food consumption as a share of household expenditure, proportion of population under global poverty line, gross domestic product per capita, agricultural import tariffs, presence of food system net programmes and access to financing for farmers. It also shows, in parenthesis, the difference between the country's score and the global average, highlighting countries' strengths and deficiencies to identify areas that need to be addressed.

### **Thematic exploration**

At the bottom of each country profile page is a graph that visually brings thematic topics within the index to life. The chart is customisable along four dimensions: the vertical-axis, the horizontal-axis, the size of the bubble and the bubble brightness. The chart denotes the country profile that the user is viewing in orange. All countries in the same region are purple; the rest of the world is grey. The default settings show each country's overall score (x-axis), its longitude (y-axis) and its population (bubble size). The bubble brightness default is neutral.

With this tool, users can examine the relationship between key variables and food security.

*For example, users may be interested in visualising how population size and poverty relate to the affordability of food in different regions around the world. Users can select % of the population in poverty (for the horizontal axis), Affordability score (for the vertical axis) and population (for bubble size). The graph illustrates a relatively linear relationship between Affordability scores in the index and the percentage of the population in poverty. If users then select Population density for the horizontal access, it will become apparent that there is very little relationship between population density and a country's Affordability score.*

### **How do I find more information about the indicators?**

To obtain the definitions and individual scores for all countries and all indicators, users need to register and download the Excel model.

## **Understanding the significance of the indicators in the index**

### **How can I explain the importance of each of these data points to food security?**

The EIU's *Global food security index 2014: An annual measure of the state of global food security findings and methodology report* provides a wealth of information that can add context and depth to the data in the index. The report explains the relevance of every indicator in the index for food security. A quick "Find" search through the report for the name of an indicator can return valuable context on the components of the index.

For more information on regional and country specific findings, consult the EIU's *Food security in focus* regional report series.