



**AGRIFOOD**

Monitor

# Methodological Notes

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# List of abbreviations

- **FAO** - The Food and Agriculture Organization of the United Nations
- **LPI** - Logistics Performance Index
- **Comtrade** - United Nations Commodity Trade Statistics Database
- **WDI** - World Development Indicators
- **HCSS** - The Hague Centre for Strategic Studies

# Key takeaways

The **HCSS Agrifood Monitor** is a dashboard designed to provide insights into global, regional, and national agrifood trade dynamics. By integrating data from diverse sources, including the FAO, World Bank, and Comtrade, the tool enables users to analyse trade flows, evaluate trade balances, and benchmark performance across various indicators. Its focus on agricultural Trade Partners, Trade Balance and corresponding indicators allows users to identify strengths, weaknesses, and opportunities in agrifood systems, making it relevant for policymakers, businesses, and researchers alike.

One of the key features of the dashboard is its ability to highlight **trade relationships** and **balances**, offering a detailed breakdown of import and export partners and their contributions to a country's trade dynamics. Users can analyse trade flows, identify key markets, and assess trade balances across various product categories. This functionality supports stakeholders in understanding global trade patterns, evaluating trade strengths and vulnerabilities, and exploring opportunities for market diversification and strategic partnerships.

The dashboard also provides access to **nutritional, logistical, and developmental** indicators, offering a threefold perspective on agrifood systems. Users can compare countries' performance against regional averages, benchmark progress across multiple metrics, and explore trends over time. These tools enable a deeper understanding of factors influencing trade dynamics, from supply chain efficiency to economic development, equipping users with the insights needed for effective decision-making and policy development.

# 1. Introduction

The HCSS Agrifood Monitor is a dashboard tailored to provide global, regional, and national perspectives on the agrifood sector, with a particular focus on trade. This tool is designed to empower a wide range of stakeholders – from agricultural attachés to small and medium-sized enterprises, large corporations, and policymakers – offering insights that could be utilised for strategic decision-making across multiple domains within the agrifood industry.

Harnessing data from diverse sources such as World Development Indicators, the Food and Agriculture Organization (FAO), the Logistics Performance Index (LPI), United Nations trade data (Comtrade), and various innovation metrics, the Agrifood Monitor offers a framework based on dyadic quantitative data. The Integration of data from various sources enables users to navigate through complex agricultural data and make informed decisions based on reliable, up-to-date information<sup>1</sup>. Structured into five key components, the dashboard facilitates targeted analyses across various dimensions of the agrifood sector:

- **Trade Partners:** Provides an in-depth look at key export and import partners for selected countries, highlighting trade volumes, major traded commodities, and trends over time. This section aids in identifying and assessing potential markets for expansion and partnership.
- **Trade Balance:** Analyses of the trade dynamics of agrifood products, detailing exports versus imports, trade deficits, and surpluses across different regions. This information helps understand market positions and economic health relative to global trade flows.
- **Nutritional Indicators:** Offers a comparative analysis of nutritional statistics such as calorie intake, food variety, and nutritional quality across countries. This data is vital for addressing global nutritional challenges and ensuring food security.<sup>2</sup>
- **Logistic Performance Indicators:** Evaluates the efficiency and reliability of agricultural logistics in different regions, encompassing metrics like shipment efficiency and infrastructure quality. Insights from this section could support strategic decision making in terms of logistics planning.<sup>3</sup>
- **World Development Indicators:** Provides a broader context by comparing development indicators related to agrifood, such as agricultural productivity, technological adoption, and economic stability across countries and regions. This global perspective aids in understanding broader trends that impact the agricultural sector.<sup>4</sup>

This document articulates the methodological foundations, aiming to equip users with an understanding of how data is collected, analysed, and presented. By sharing the methodologies employed, we intend to enhance transparency and foster a more intuitive and effective interaction with the dashboard. The insights generated here are crafted to support policymaking, strategic planning, and operational adjustments within the agricultural sector. In the sections that follow, we will explore the specific HCSS Agrifood monitor components. This explanatory note of our methodology and tooling is designed to ensure that stakeholders can leverage the Agrifood Monitor not just as a tool for viewing data, but as a strategic asset in navigating the complexities of the agricultural industry.

<sup>1</sup> The latest update to the Agrifood Monitor was completed in mid-2024, incorporating data and metrics up until 2023. Please consult original data sources if more recent data is required.

<sup>2</sup> The Food and Agriculture Organization (FAO) of the United Nations provides detailed statistical data on global agriculture, food security, and nutrition. This resource is relevant for understanding agricultural trends and food systems. Available at: <https://www.fao.org/statistics/en>.

<sup>3</sup> The Logistics Performance Indicators, developed by the World Bank, provides a global benchmark for logistics efficiency, focusing on customs, infrastructure, and shipment reliability. It is widely used for assessing the logistics performance of countries in the context of global trade. Available at: <https://lpi.worldbank.org/international/global>.

<sup>4</sup> The World Development Indicators from the World Bank offer a comprehensive dataset covering economic, social, and environmental development trends globally. This resource includes over 1,500 indicators and serves as a key tool for analyzing global development. Available at: <https://databank.worldbank.org/source/world-development-indicators>.

## 2. Trade Partners

Trade Partners serves as a functionality for exploring the agricultural trade relationships of countries worldwide. It allows users to select a country and analyse its largest trade partnerships across both countries and regions, as further detailed in Section 2.1. The main focus is on total agricultural trade, encompassing both imports and exports, to provide a comprehensive view of trade flows. However, users can also refine their exploration further by filtering across specific sectors and product categories, as described in Section 2.2.

### 2.1. Categorisation of Regions and Countries

In the HCSS Agrifood monitor we utilised the countries from the UN member and observer states as a basis for exploring agricultural trade dynamics. To better understand global agricultural flows, we also examined different regions within each continent. These regions were identified based on their unique agricultural characteristics, including trade dynamics, infrastructure, nature, and climate. Each subregion represents distinct agricultural opportunities and challenges, reflecting its geographical and socio-economic context.

It is important to note, however, that these regional groupings are not definitive or exhaustive. Agricultural systems are complex, and the reality often transcends these simplified boundaries. For example, trade relationships, cultural practices, and climate impacts can create overlaps and variations within and between regions. While these divisions help provide a structured framework for analysis, they are ultimately a generalisation designed to facilitate exploration rather than capture every nuance of the real world.

Table 1 below provides a breakdown of these regions and explains why each was selected as an agricultural unit of analysis, while recognising that each region's agricultural dynamics are shaped by factors that often extend beyond these classifications.

Continent	Region	Why this region makes sense as an Agricultural Region
America	Northern America	Includes the USA and Canada, known for their advanced agricultural infrastructure, large-scale farming, and significant export capacity. Therefore, within this grouping, Mexico is aligning more closely with Central America
	Central America	Features diverse climates and crops such as coffee, bananas, and sugar, playing a key role in global agricultural supply chains. Yet, some nations, like Panama, might lean more towards service economies and transport, rather than agricultural trade.
	South America	Home to major agricultural exporters like Brazil and Argentina, known for soybeans, beef, and other commodities relevant to global trade. Still, countries like Suriname and Guyana often diverge in agricultural focus.
	Caribbean	Unique for its focus on tropical fruits, spices, and niche agricultural products, contributing to local economies and international markets. Nevertheless, small-scale production and trade barriers can limit the global impact of this region.
Europe	European Economic Area	Includes highly developed agricultural economies with access to EU subsidies, enabling competitive exports and innovation in the sector. However, agricultural practices can vary widely, from intensive farming in the Netherlands to more traditional systems in parts of Southern Europe.
	Eastern Europe	An emerging agricultural region with significant potential for grain and livestock production, driven by fertile lands and growing markets. Political instability and uneven infrastructure, however, present challenges.

<b>Africa</b>	<b>Northern Africa</b>	Features agriculture driven by Mediterranean and arid climate conditions, focusing on olives, dates, and wheat, with growing export markets. However, reliance on imports for staples creates vulnerabilities.
	<b>Western Africa</b>	A hub for cocoa and tropical crops, essential for global chocolate production and local food security. Yet, the region often struggles with underdeveloped infrastructure and supply chain inefficiencies.
	<b>Middle Africa</b>	Dominated by subsistence farming but increasingly recognised for its untapped potential in cassava, maize, and other staples. Political and logistical challenges often hinder development.
	<b>Eastern Africa</b>	Known for coffee and tea exports, as well as horticulture, supported by favourable climates and access to global markets. However, drought and political instability create ongoing risks.
<b>Asia</b>	<b>Western Asia</b>	Focused on date production and arid-region agriculture, leveraging innovative irrigation and trade with neighbouring regions. Nonetheless, water scarcity and geopolitical tensions pose challenges.
	<b>Southern Asia</b>	Includes countries like India, a global leader in rice, wheat, and spice production, essential for feeding large populations and exports. Yet, smallholder farming and rural poverty are significant hurdles.
	<b>Central Asia</b>	Features agricultural systems adapted to semi-arid climates, with growing cotton and wheat industries. However, weak trade infrastructure often limits global integration.
	<b>Eastern Asia</b>	Home to some of the world's largest agricultural economies, such as China, known for rice, pork, and diverse agricultural exports. But rapid urbanisation is shrinking arable land.
	<b>South-Eastern Asia</b>	Renowned for palm oil, rubber, and rice production, integral to both local economies and international trade. Environmental concerns, particularly deforestation, complicate agricultural expansion.
<b>Oceania</b>	<b>Australia and New Zealand</b>	Major exporters of beef, dairy, and grains, with strong trade links to Asia and advanced agricultural technologies. However, climate variability poses increasing challenges.
	<b>Melanesia</b>	Includes tropical islands with unique agricultural products such as coconut and taro, significant for local and niche international markets. Limited land area and high transportation costs remain key obstacles.

**Table 1 - Overview of Agricultural Regions**

While this regional framework provides a structured lens for analysing agricultural trade, it is important to acknowledge that the realities of agricultural production and trade are far more dynamic. Cross-border trade, shared ecosystems, and cultural influences often blur these divisions. For instance, agricultural trade in Northern Africa is heavily tied to the Mediterranean region, crossing into Southern Europe. Similarly, trade in Central Asia often integrates with Western and Eastern Asia, reflecting complex regional interdependencies which are not represented in the HCSS Agrifood Monitor.

This approach is not a perfect representation of the global agricultural landscape but serves as a practical starting point for deeper exploration and understanding of trade patterns, challenges, and opportunities.



## 2.2. Categorisation of Agrifood Products

The HCSS Agrifood Monitor categorises various food products and agricultural goods based on the internationally recognised Harmonised System (HS) of tariff nomenclature and is sourced from Comtrade.<sup>5</sup> This classification provides a standardised framework for identifying and analysing traded products, enabling a better understanding of agricultural trade flows across the globe. The table below outlines the categories (with corresponding HS-codes) used in this monitor and provides a brief description of each.<sup>6</sup>

HS	Category	Description
10	<b>Cereals</b>	Includes grains like wheat, barley, rye, oats, used primarily for food, feed, and in milling industries.
11	<b>Products of the milling industry; malt, starches, inulin, wheat gluten</b>	Covers flour, meal, starch, or malt extract products not specifically included in other headings.
12	<b>Oil seeds and oleaginous fruits based foods, such as canned vegetables and fruit preserves.; miscellaneous grains, seeds and fruit, industrial or medicinal plants; straw and fodder</b>	Includes seeds like sunflower, rapeseed, sesame seeds used for oil extraction, along with various nuts and fruits.
13	<b>Lac; gums, resins and other vegetable saps and extracts</b>	Includes natural substances like lac, plant saps, and resins used in various applications.
14	<b>Vegetable plaiting materials; vegetable products not elsewhere specified or included</b>	Materials not elsewhere specified or included, used for plaiting and weaving.
15	<b>Animal or vegetable fats and oils and their cleavage products; prepared animal fats; animal or vegetable waxes</b>	Covers both processed and unprocessed fats and oils derived from animals or plants, and various waxes.
15	<b>Animal, vegetable or microbial fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes</b>	Mostly similar to above category, but emphasises on edible fats and microbial sources.
16	<b>Meat, fish, crustaceans, molluscs or other aquatic invertebrates; preparations thereof</b>	Includes all types of fresh, preserved, or cooked meats and seafood, as well as preparations like fish fillets, canned fish, and other processed seafood items.
16	<b>Meat, fish, crustaceans, molluscs or other aquatic invertebrates, or insects; preparations thereof</b>	Mostly similar to above category, but includes insects among other types of animal sources.
17	<b>Sugars and sugar confectionery</b>	Includes raw and refined sugars, as well as sweet confectionery like candies and chocolates.
18	<b>Cocoa and cocoa preparations</b>	Encompasses all products derived from cocoa, including cocoa powder, cocoa butter, and chocolates.
19	<b>Preparations of cereals, flour, starch or milk; pastrycooks' products</b>	Includes baked goods, pastries, and other food products made from cereal, flour, starch, or milk.
20	<b>Preparations of vegetables, fruit, nuts or other parts of plants</b>	Includes processed or prepared plant-based foods, such as canned vegetables and fruit preserves.

**Table 2 - Overview of Agrifood Product Categories**

<sup>5</sup> The Harmonised System (HS) codes are maintained by the World Customs Organization (WCO) and are used internationally for classifying traded goods. This system is essential for global trade analysis and tariff calculation. More details about the system available at: [https://taxation-customs.ec.europa.eu/customs-4/calculation-customs-duties/customs-tariff/harmonized-system-general-information\\_en](https://taxation-customs.ec.europa.eu/customs-4/calculation-customs-duties/customs-tariff/harmonized-system-general-information_en).

<sup>6</sup> For a more detailed breakdown of product categories, visit <https://www.foreign-trade.com/reference/hscodet.htm>.

While these categories provide a useful high-level framework for analysing agrifood trade, it's important to recognise their inherent limitations. The HS codes, especially at higher aggregation levels, can mask the complexity and diversity of products within each category. For example:

- **Cereals:** The category includes a wide range of grains, from staple crops like wheat and rice to less common grains like quinoa and millet, which have vastly different production systems and trade patterns.
- **Animal or vegetable fats and oils:** This category aggregates diverse products, from olive oil to palm oil and butter, each with unique environmental, economic, and cultural implications.
- **Preparations of cereals, flour, starch, or milk:** This broad grouping encompasses everything from simple baked goods to highly processed products like infant formula or specialised gluten-free items, which serve very different markets.

By focusing on these high-level categories, the HCSS Agrifood Monitor provides a structured and comparable approach to analysing global trade, but it inevitably simplifies the diversity of agrifood systems. This trade-off is necessary for creating a clear and usable tool, but users should remain mindful that these categories only capture a fraction of the complexities of global agricultural production and trade.

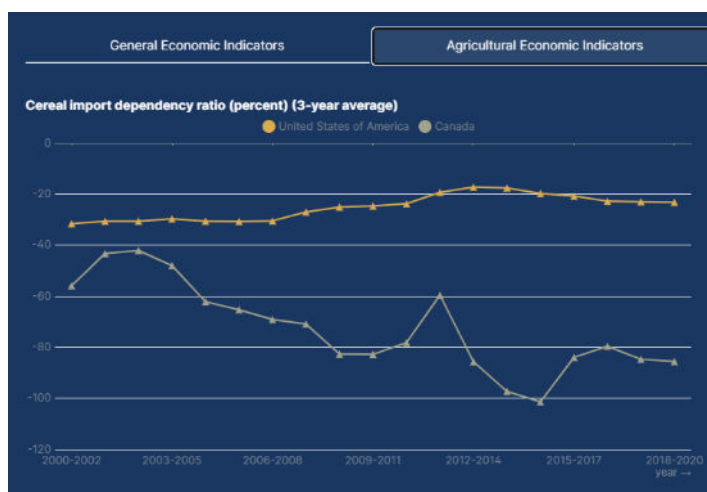
## 2.3. Identifying Trade Partners and Opportunities

The HCSS Agrifood Monitor combines the regional and country classifications from Section 2.1 with the product categories from Section 2.2 to provide a comprehensive analysis of agricultural trade flows. By listing the 10 largest import and export partners for a selected country, the monitor highlights the most significant trade relationships. Each partner's International Institute for Management Development (IMD) World Competitiveness Ranking is included, adding another dimension to the analysis by providing insights into the economic and business competitiveness of these trade partners.<sup>7</sup>

The IMD ranking is particularly relevant for assessing the long-term stability and growth potential of trade relationships. For instance, highly ranked partners like Germany exemplify strong economies with robust infrastructure, making them reliable markets for agricultural exports and dependable sources for high-quality imports. By integrating this ranking, the monitor enables users to not only evaluate current trade flows but also understand the structural strengths that underpin these relationships.

In addition to identifying the top 10 partners, the monitor shows strategic opportunities by highlighting the top 30 countries from the IMD World Competitiveness Ranking that do not feature among the selected top trade partners. This approach is especially valuable for identifying competitive yet underutilised markets. When selecting a trade partner from the map on this page this allow you to compare across four domains: general economic indicators, agricultural economic indicators, agricultural cultural indicators and logistic indicators. Figure 1 shows the comparison for the agricultural cultural indicator 'Cereal import dependency ratio' between the United States and Canada.

<sup>7</sup> Published by the IMD World Competitiveness Center, this ranking evaluates countries' economic performance, government efficiency, business efficiency, and infrastructure. It serves as a key resource for assessing the competitiveness of nations in the global economy. Available at: <https://www.imd.org/centers/wcc/world-competitiveness-center/rankings/world-competitiveness-ranking/>.



**Figure 1** – Trade partner comparison between United States and Canada

To support more in-depth exploration, the monitor provides detailed profiles for all countries in the top 10 and top 30 lists for the selected country. These profiles include indicators from the Food and Agriculture Organization (FAO), World Development Indicators (WDI), and Logistics Performance Indicators (LPI), offering a richer understanding of the trade partner’s agricultural capacity, logistical efficiency, and level of humanitarian development. These additional insights, discussed further in Chapter 3, allow for a more nuanced view of each country’s role in the global agricultural trade landscape.

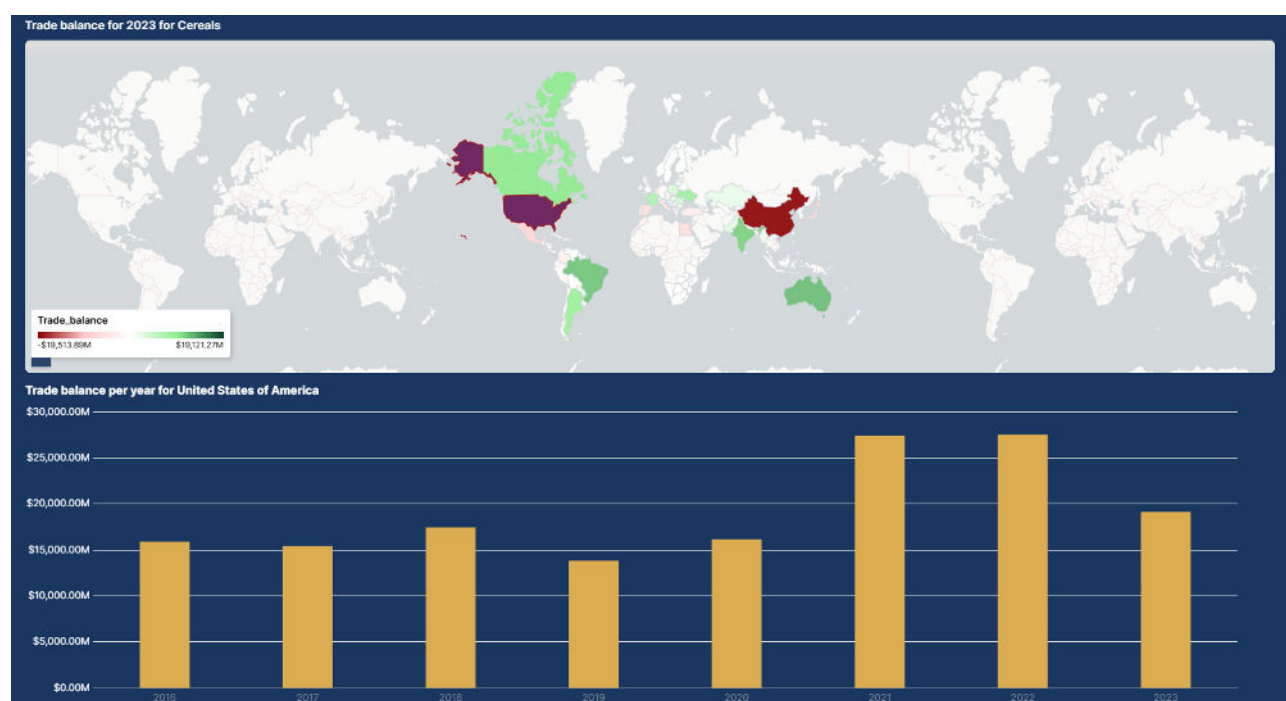
While the trade partners component of the dashboard provides insight into the agrifood sector, it is important to recognise its limitations. Trade relationships are influenced by dynamic factors such as geopolitical shifts, trade agreements, and sector-specific trends. The IMD rankings and indicators provide a snapshot of competitiveness and trade potential but may not fully capture emerging developments. Users are encouraged to use the monitor as a foundation for deeper analysis, supplementing its insights with additional data and expertise to inform strategic decision-making.

# 3. Trade Balance

In addition to trade partners, the HCSS Agrifood Monitor also provides insights into the trade balances of agricultural goods categorised in Section 2.2. For each country, users can view whether the trade balance for specific categories is positive (export surplus) or negative (import surplus). This functionality helps users identify trade strengths and vulnerabilities, offering insights into the developments of agricultural trade at both the country and product levels.

A positive or negative trade balance is a key indicator of a country's position in the global agricultural trade network. A **positive trade balance** reflects a country's ability to produce and export more than it imports in a specific category, often signifying competitive strength, self-sufficiency, or specialisation. Conversely, a **negative trade balance** can highlight dependency on imports, potential vulnerabilities, or opportunities for domestic production growth.

For example, in the case of cereals, a positive trade balance in a country like the United States indicates its role as a leading exporter of crops such as wheat and maize, reinforcing its importance in global food security. In contrast, a negative balance in a country like Egypt, which heavily relies on cereal imports to meet domestic demand, underscores the country's agricultural dependency and the need for robust supply chains.



**Figure 2** – Trade balance development for the United States 2018-2023

# 4. Indicators

To enhance the understanding of agricultural trade, the HCSS Agrifood Monitor incorporates three levels of indicators. These indicators enable cross-country and regional comparisons, offering valuable insights into the nutritional, logistical, and developmental aspects of agrifood systems. Users can benchmark individual country scores against regional averages, as defined in Section 2.1, to identify trends, strengths, and opportunities.

## 4.1. Nutritional Indicators

Sourced from the Food and Agriculture Organization (FAO) of the United Nations, the nutritional indicators provide insights into the dietary and food security aspects of agrifood systems. Covering approximately 50 indicators, this dataset includes metrics such as:

- **Prevalence of undernourishment:** Reflects the proportion of the population unable to meet dietary energy requirements.
- **Dietary diversity:** Measures the range of food groups consumed within a population, indicating nutritional quality.
- **Food availability:** Tracks per capita supply of calories, protein, and fats from various food groups.

These indicators provide insights for addressing global challenges like hunger, malnutrition, and dietary imbalances. For instance, a country with high prevalence of undernourishment may prioritise policies to improve food imports, enhance local production, or fortify nutritional programs. Conversely, countries with diverse diets and high food availability may serve as models for sustainable agricultural practices.

## 4.2. Logistics Performance Indicators

Logistics indicators, sourced from the World Bank's Logistics Performance Index, assess the efficiency and reliability of countries' logistics systems, which are relevant for the smooth functioning of agrifood supply chains. This dataset includes approximately 20 indicators, focusing on areas such as:

- **Customs efficiency:** Measures the effectiveness of customs and border clearance processes.
- **Infrastructure quality:** Assesses the quality of trade and transport infrastructure.
- **Timeliness:** Reflects the reliability and speed of shipments.

By analysing logistics performance, users can identify bottlenecks and opportunities for improvement. For example, a country with efficient customs and robust infrastructure may act as a regional trade hub, facilitating the movement of agricultural goods across borders. On the other hand, countries with poor logistics may face challenges in accessing global markets, limiting their trade potential and increasing food costs for consumers.

## 4.3. World Development Indicators

The World Development Indicators, sourced from the World Bank's databank, provide a wide-ranging view of global development trends with over 1,500 indicators. Relevant agrifood-related metrics include:

- **Agricultural value added:** Tracks the economic contribution of agriculture to GDP.
- **Rural population:** Reflects demographic trends and the potential agricultural workforce.
- **Access to electricity:** Indicates infrastructure availability, which can affect agricultural productivity and processing.

For all three levels of indicators, users can compare a country's performance against the average of its respective region. This feature helps contextualise a country's standing, highlighting relative strengths and weaknesses. For example, a country with a high logistics performance score relative to its region may serve as a regional hub for agricultural trade, while one with below-average nutritional indicators may require targeted interventions to improve food security.

For all three levels of indicators, users can compare a country's performance against the average of its respective region. This feature contextualises a country's standing and helps identify relative strengths and weaknesses. For example:

- A country with a high logistics performance score compared to its regional average may serve as a trade gateway, facilitating the flow of agricultural goods to and from neighboring countries.
- Conversely, a country with below-average nutritional indicators may require targeted interventions, such as improving local food production or trade policies to address food insecurity.



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