

DEEP
KNOWLEDGE
ANALYTICS

Global Food Security

Q2 2022

Teaser

July, 2022

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Introduction

Developed by Deep Knowledge Analytics, the new '**Global Food Security Q2 2022**' report provides a comprehensive overview of the Food Security sector.

This is done by focusing on the key trends – root causes of food crises and overview of major aspects of food security such as food dependency, inflation, and policy developments. Further, the attention is drawn to the regional overview.

In the course of the study, the **Food Security Index** was constructed considering the issues of access to food, crisis risks, and the resilience of economy across 171 countries. The index is a dynamic quantitative and qualitative benchmarking model constructed from 40 unique factors that measure the drivers of food security across both developing and developed countries. Essentially, Food Security Index concept envisages three dimensions: **Access to Food, Crisis Level, and Food System and Economy Resilience**.

All these aspects are explored with reference to legislative acts, policy papers, and academic literature on the topic.

The final section explores latest innovations to advance the state of food security policy to help mitigate consequences of the crisis.



868
million

people do not have sufficient food consumption



30%
rise

of fertilizer prices since the beginning of 2022



35
countries

implemented food-export restrictions



88% of
population

in low income countries without access to healthy food



25
countries

considered 'high risk' and deteriorating



20%
rise*

of food prices in 2022

Global Food Insecurity at a Glance

All countries/territories with major food crises mainly driven by conflict were also affected by either weather extremes, economic shocks, including the COVID-19 pandemic, or both. These two drivers often fuel tensions and conflicts by increasing competition around limited natural resources and income opportunities.

In 2020

768 Million

Were chronically hungry (undernourished globally)



In 2021

193 Million

Experienced acute hunger across 53 countries

In 2022

As of June 2022,

868 Million

People do not have sufficient food consumption across 92 countries.

Chronic hunger

Means that people are not able to meet food consumption requirements long-term (also referred to as undernourishment)

Chronic hunger

Countries with the highest prevalence of undernourishment:

Somalia, Haiti, Yemen, Madagascar, Democratic People's Republic of Korea, Liberia, Democratic Republic of the Congo.

Acute hunger

Means that people are not able to meet food consumption requirements in the short term, often due to different crises

Acute hunger

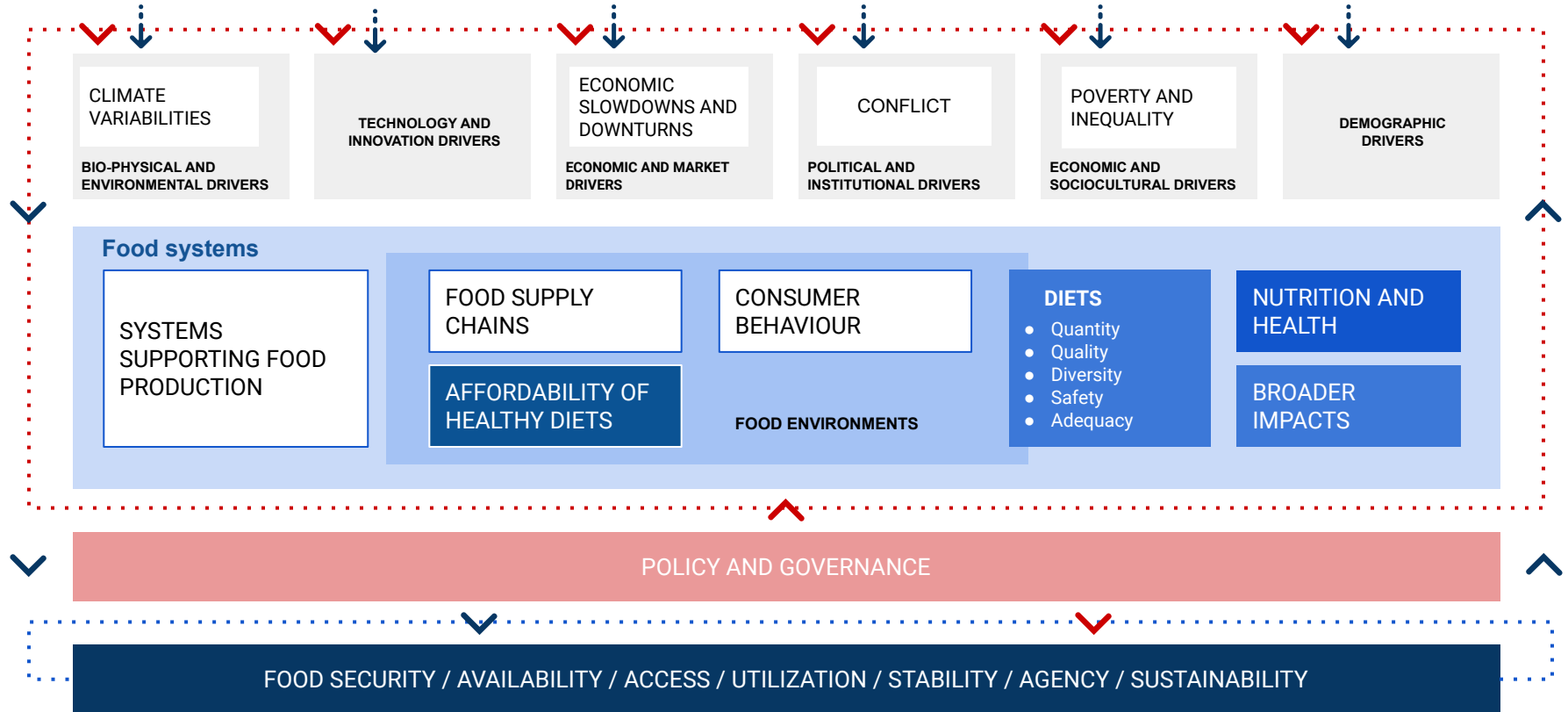
Countries with the worst food crises in 2021
Democratic Republic of The Congo, Nigeria, Sudan, Pakistan, Haiti, Yemen, Ethiopia, Syria, South Sudan, Afghanistan

Number of people in crisis by the primary driver, 2018-2021

	2018	2019	2020	2021
Conflict/insecurity	73.9M 21 countries	77.1M 22 countries	99.1M 23 countries	139.1M 24 countries
Weather extremes	28.8M 26 countries	33.8M 25 countries	15.7M 15 countries	23.5M 8 countries
Economic shocks	10.2M 6 countries	24.0M 8 countries	40.5M 17 countries	30.2M 21 countries

Drivers of the Food Crisis

Impacts of various drivers are transmitted through food systems, undermining food security and nutrition.

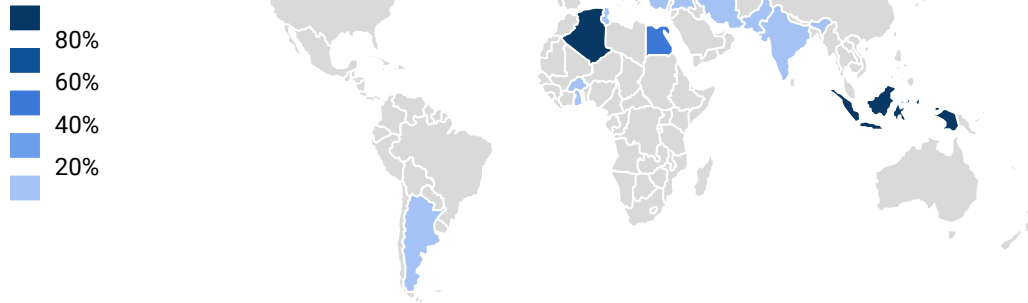


Food Export Restrictions

The number of countries enacting food-export restrictions has risen by 25%, bringing the total to 35 within a few weeks in 2022. As of the end of March, 53 new policies affecting food trade had been adopted, 31 of which restricted exports and nine curbed wheat exports.

Major food exporters such as Argentina, India, Indonesia, Kazakhstan, and Russia, as well as smaller exporters such as Algeria, Turkey, and Serbia have introduced food export restrictions:

Promotion of countries exports (in calorie terms) subject to restrictions.



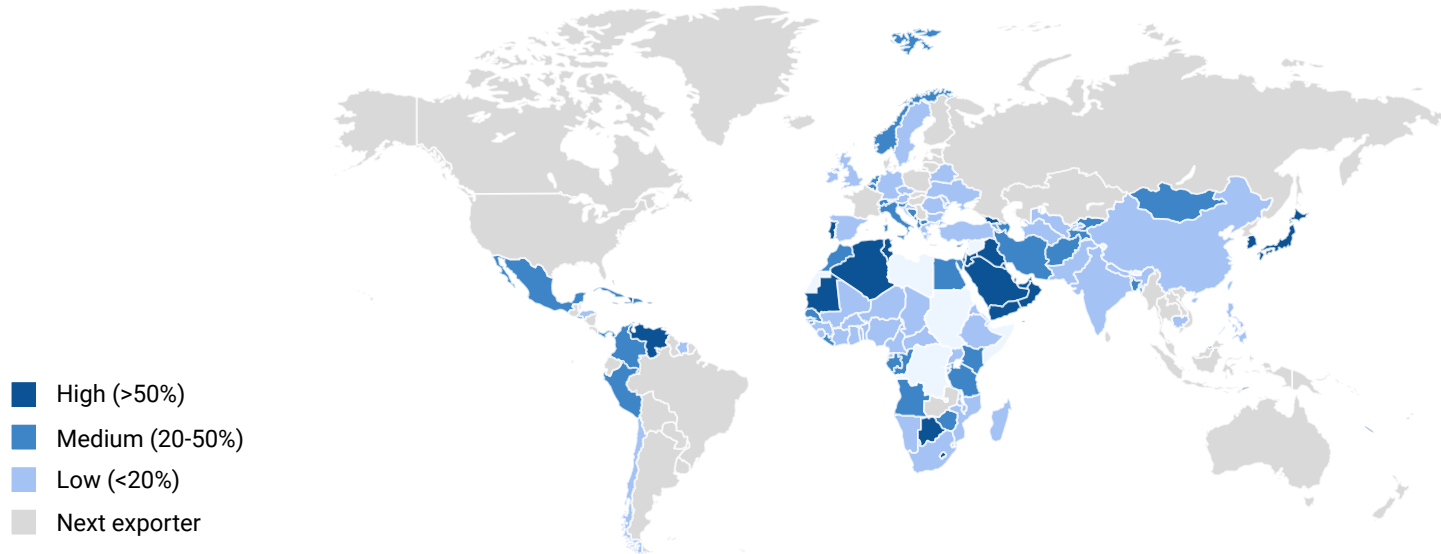
Country	Type of food product	Ban end day
Argentina	Soybean oil, soybean meal	31 Dec 2023
Algeria	Pasta, wheat derivatives, oil, sugar	31 Dec 2022
Egypt	Vegetable oils, maize	12 Jun 2022
	Wheat, flour, lentils, pasta, beans	10 Jun 2022
India	Wheat	31 Dec 2022
Indonesia	Palm oil, palm kernel oil	31 Dec 2022
Iran	Potatoes, eggplants, tomatoes, onion	31 Dec 2022
Kazakhstan	Wheat, wheat flour	15 Jun 2022
Kosovo	Wheat, corn, flour, vegetable oil, salt, sugar	31 Dec 2022
Turkey	Beef, goat meat, butter, cooking oils	31 Dec 2022
Ukraine	Wheat, oats, millet, sugar	31 Dec 2022
Russia	Sugar, sunflower seeds	31 Aug 2022

The impact of export restrictions alone can result in downward pressure on domestic prices under certain circumstances. However, with more countries imposing restrictions, there is a greater risk of price volatility, panic buying, shortages, and hoarding.

Food Import Dependency Globally

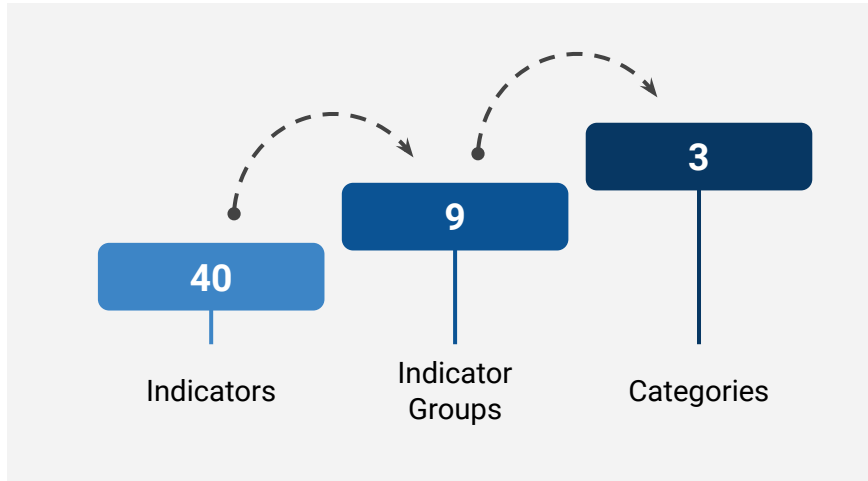
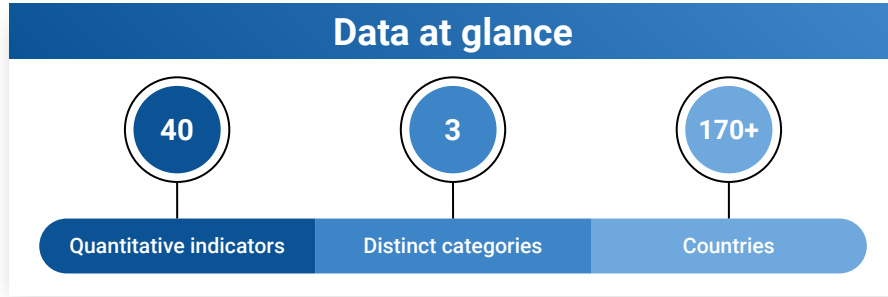
Food imported out of necessity leads to countries' dependence on external sources as a means of providing food for their populations. This is when food insecurity occurs. Currently, at least 34 countries in the world are unable to produce their own food because of water and land shortages. This represents a significant portion of the global population who are forced to rely on imported food to survive.

Net Food Imports as a Percentage of Domestic Food Supply



While food crises have a negative effect on everyone, they are devastating for the poorest and most vulnerable populations. The reasons for this are twofold. First, a common feature of the poorest countries is their reliance on food imports. Second, in low-income countries, food makes up at least half of household expenditures.

Food Security Index: Data at a Glance



171
countries

Ranked in the research according to the likelihood of food crisis in the near future



6
regions

Have a risk profile which shows the level of the individual components of risk



3
categories

Access to Food, Crisis Level, Food System and Economy resilience



40
unique factors

Grouped in 9 subgroups that measure major drivers of food security



22 countries

Considered 'high risk' and deteriorating



7000+
data points

Collected in total in order to conduct the research

Food Security Index: Objective and Methodology

In the course of the study, the Food Security Index (FSI) was constructed considering the issues of access to food, crisis risks, the resilience of economy across 171 countries. The index is a dynamic quantitative and qualitative benchmarking model constructed from 40 unique factors that measure the drivers of food security across both developing and developed countries.

It is a composite indicator that identifies countries at risk from humanitarian emergencies and disasters that could overwhelm current national response capacity, and therefore lead to a need for international assistance.

Essentially, Food Security Index concept envisages three dimensions:

- **Access to Food** - measures ease of access to sufficient and nutritious food that meets people's dietary needs for a healthy and active life.
- **Crisis Level** - assesses a country's exposure to the impacts of a changing climate, sociological or biological hazards.
- **Food System and Economy Resilience** - resources available that can alleviate the impact of global food crisis.

Applied Research and Analytics Methods

Descriptive
Analysis

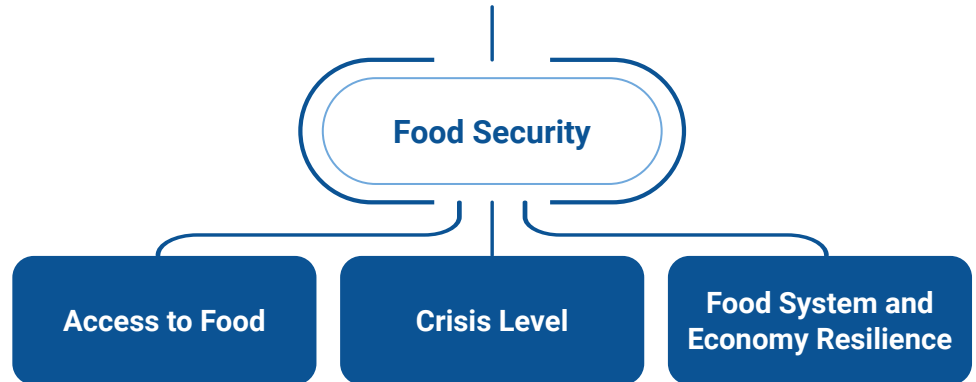
Mixed Data
Research

SWOT
Analysis

Comparative
Analysis

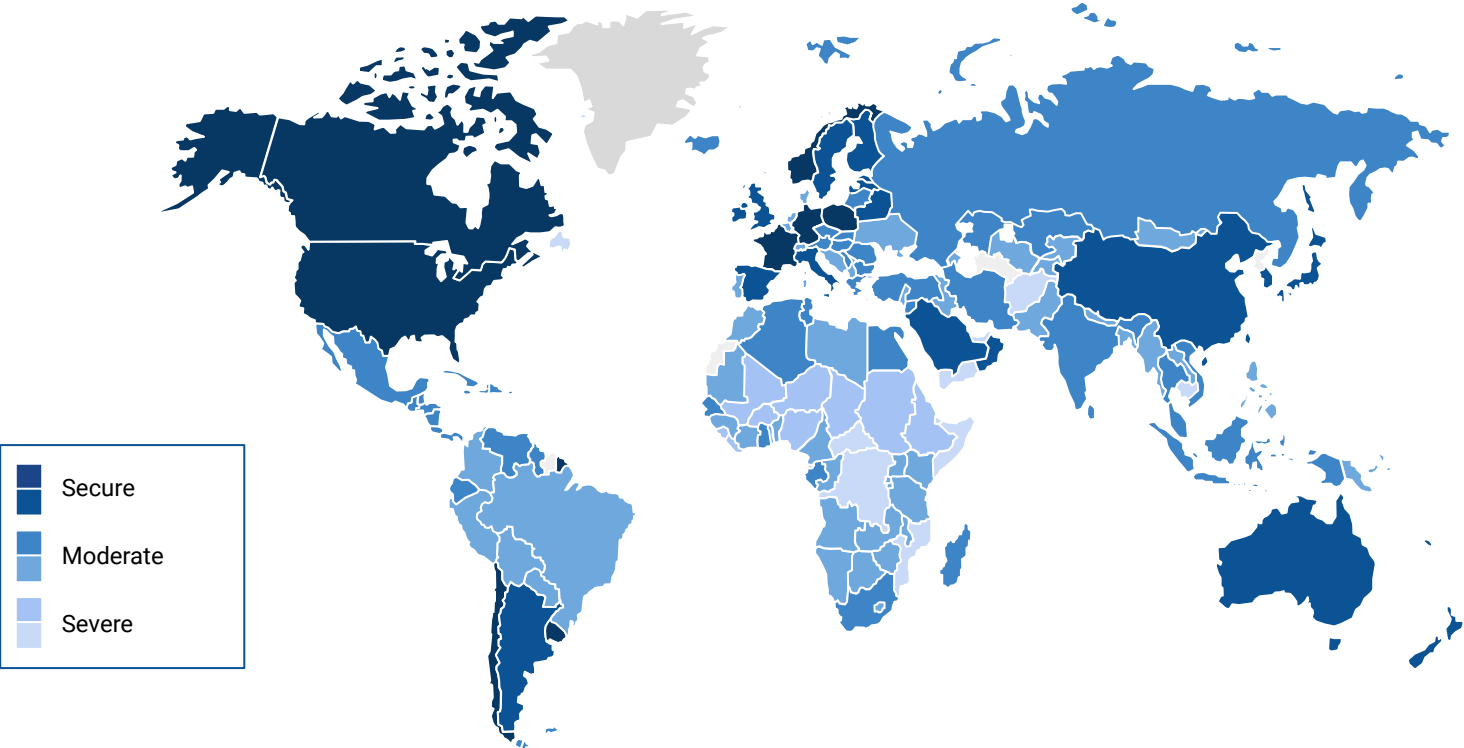
Qualitative Data
Collection

Data
Filtering



Food Security Index World Map

The Food Security Index was constructed considering the issues of access to food, crisis risks, and the resilience of the economy across 171 countries. The Index ranges from 0 to 10 where the value closer to 0 shows a more insecure state of the certain country and the value closer to 10 shows a more secure and stable state.



Food Security Index: Overall Ranking (1/2)

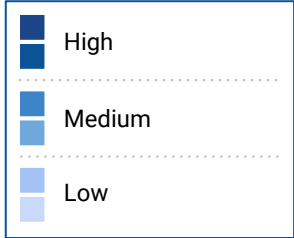
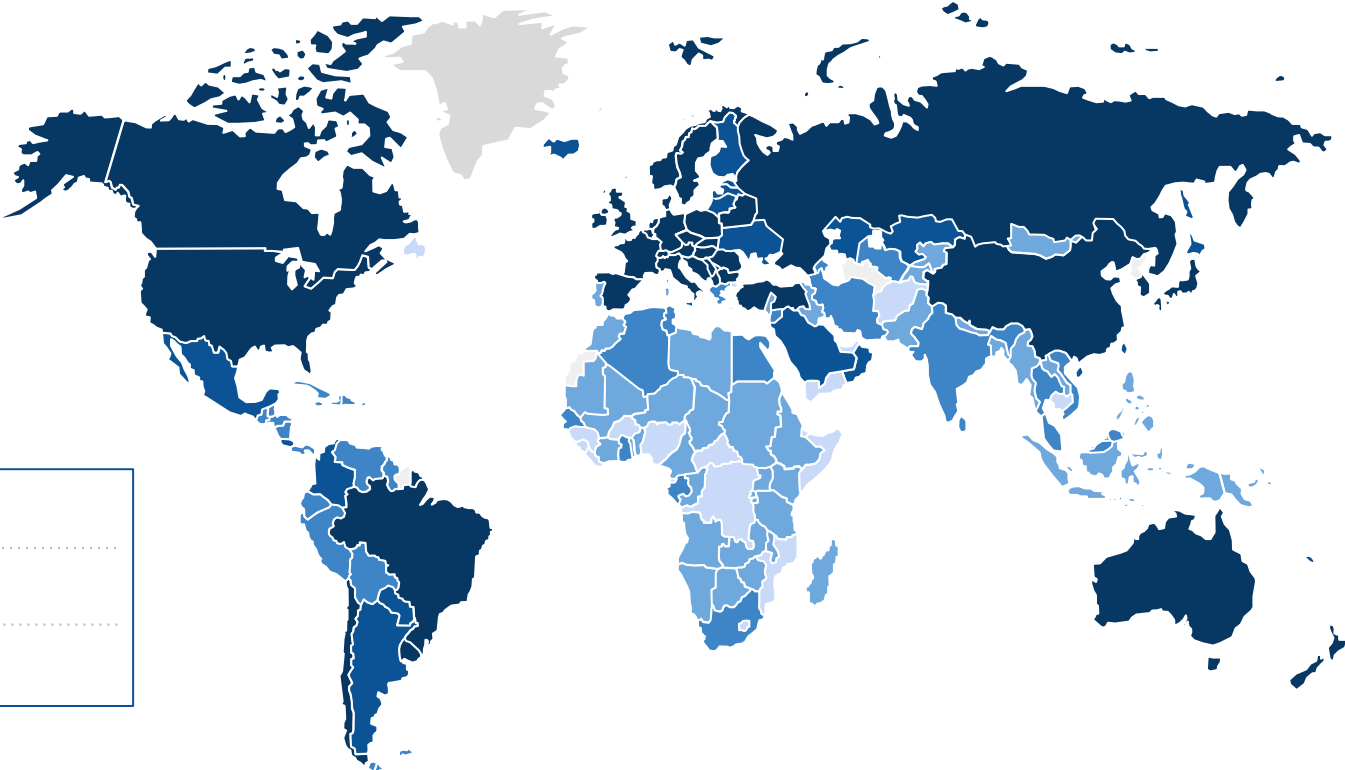
United States	7.90	Qatar	6.99	Thailand	6.51
Norway	7.89	Bahrain	6.99	Paraguay	6.48
Ireland	7.82	Russian Federation	6.93	Panama	6.47
Netherlands	7.79	Hungary	6.93	Venezuela	6.47
Canada	7.79	Kazakhstan	6.87	Croatia	6.42
Germany	7.75	Luxembourg	6.86	Samoa	6.40
France	7.54	Greece	6.86	Morocco	6.40
New Zealand	7.52	Malaysia	6.86	Tunisia	6.39
Poland	7.50	South Korea	6.85	Turkey	6.36
Finland	7.49	Costa Rica	6.84	Dominican Republic	6.30
Denmark	7.48	Portugal	6.83	Ecuador	6.25
Belgium	7.43	Estonia	6.78	Nicaragua	6.25
Sweden	7.41	Oman	6.77	Mauritius	6.24
United Kingdom	7.39	Lithuania	6.76	Fiji	6.24
Belarus	7.35	Algeria	6.76	Moldova	6.16
Austria	7.31	Saudi Arabia	6.75	Cuba	6.16
Switzerland	7.29	Malta	6.74	Vietnam	6.13
Czech Republic	7.28	Slovak Republic	6.72	Belize	6.12
Italy	7.26	Kuwait	6.69	Indonesia	6.10
Spain	7.25	Slovenia	6.69	Jordan	6.10
Australia	7.23	Romania	6.67	Sri Lanka	6.10
Uruguay	7.20	Bulgaria	6.60	Grenada	6.08
Chile	7.18	Latvia	6.59	Mexico	6.08
Japan	7.16	Cyprus	6.57	Barbados	6.05
Singapore	7.09	Seychelles	6.56	Ukraine	6.03
United Arab Emirates	7.07	Argentina	6.56	Iran	6.02
China	7.02	Israel	6.55	Bhutan	5.99
Iceland	6.99	Serbia	6.51	India	5.99

Food Security Index: Overall Ranking (2/2)

Jamaica	5.98	Mongolia	5.56	Togo	5.09
Vanuatu	5.97	Bangladesh	5.54	Zimbabwe	5.08
Uzbekistan	5.96	Georgia	5.53	Malawi	5.06
Guyana	5.95	Cabo Verde	5.52	Philippines	5.05
Brunei Darussalam	5.95	Honduras	5.51	Kenya	5.05
Brazil	5.94	Tajikistan	5.49	Syria	5.01
Lebanon	5.94	Pakistan	5.45	Madagascar	5.00
Bolivia	5.93	Cote d'Ivoire	5.44	Mauritania	4.98
Peru	5.92	Rwanda	5.41	Cameroon	4.97
North Macedonia	5.92	Azerbaijan	5.41	Guinea	4.78
Bosnia and Herzegovina	5.91	Tanzania	5.36	Congo, Rep.	4.70
Guatemala	5.90	Iraq	5.35	Liberia	4.61
Lao PDR	5.86	Senegal	5.35	Haiti	4.61
Albania	5.86	Namibia	5.34	Lesotho	4.54
Gabon	5.85	Cambodia	5.34	Ethiopia	4.48
Colombia	5.84	Timor-Leste	5.33	Sierra Leone	4.47
Solomon Islands	5.83	Uganda	5.33	Mali	4.46
South Africa	5.81	Myanmar	5.32	Yemen	4.41
Montenegro	5.79	Armenia	5.31	Sudan	4.38
El Salvador	5.78	Benin	5.30	Chad	4.28
Kyrgyz Republic	5.78	Guinea-Bissau	5.26	Niger	4.24
Kiribati	5.78	Botswana	5.26	South Sudan	4.15
Ghana	5.77	Eswatini	5.22	Nigeria	4.11
West Bank and Gaza	5.76	Libya	5.18	Burkina Faso	4.05
Papua New Guinea	5.76	Zambia	5.14	Afghanistan	3.79
Egypt	5.76	Burundi	5.12	Central African Republic	3.79
Sao Tome and Principe	5.74	Gambia, The	5.11	Mozambique	3.76
Nepal	5.74	Angola	5.10	Congo, Dem. Rep.	3.75
Comoros	5.60	Djibouti	5.09	Somalia	2.97

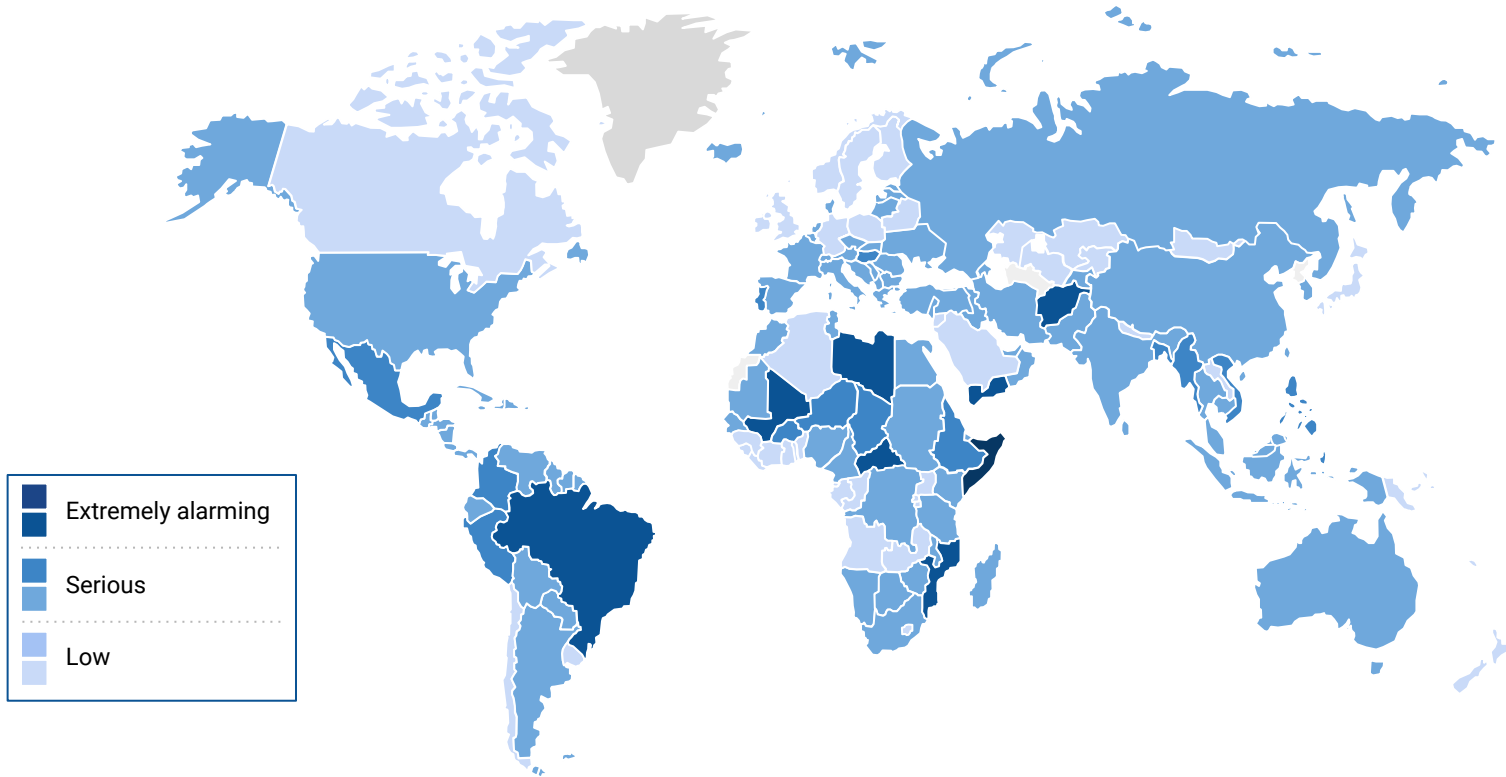
Food Security Index by Access to Food

The 'Access to Food' dimension measures ease of access to sufficient and nutritious food that meets people's dietary needs for a healthy and active life.



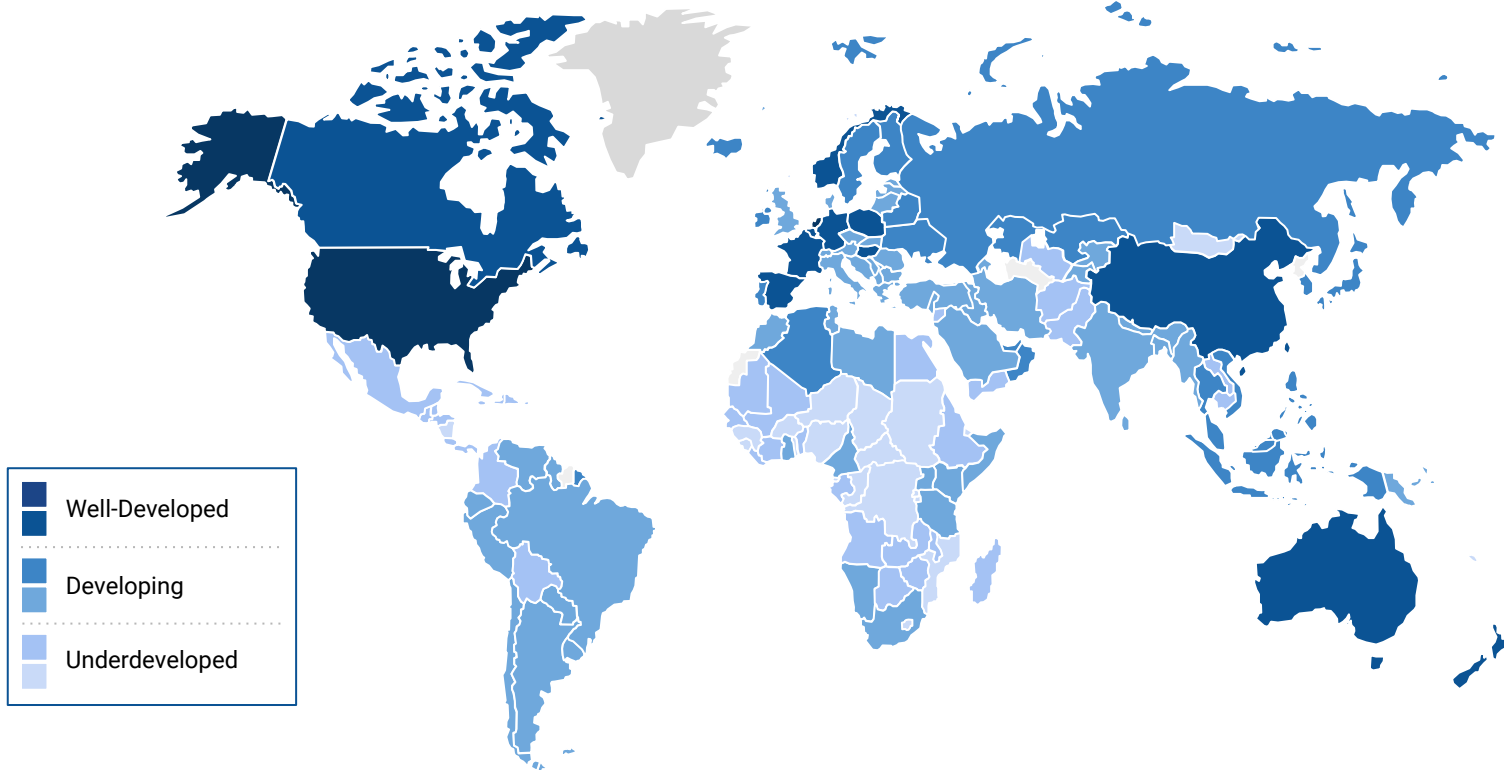
Food Security Index by Crisis Level

Crisis Level evaluates a country's exposure to the impacts of a changing climate, sociological or biological hazards. The maximum value of 6 in our ranking represents an extremely alarming situation in the countries.



Food Security Index by Food System and Economy Resilience

Food System and Economy Resilience assesses resources available that can alleviate the impact of the global food crisis. Food imported out of necessity leads to countries' dependence on external sources as a means of providing food for their populations. This is when food insecurity occurs. The maximum value of 7.7 in our ranking represents a well-developed situation in terms of food system and economy resilience.



Latest Innovations in Food Security

The challenge of sustainably feeding a world of 10 billion people is going to require a lot of solutions. Entrepreneurs and innovators all over the globe are working hard to come up with answers. For this purpose, innovators of AgTech & New Food develop services and technologies with a focus on improving agricultural efficiency and sustainability, innovating food processing, and improve food ingredients, and create next-generation food.

Improving agricultural efficiency and sustainability



- Field sensors
- Drones
- Farm-management software
- Robotics
- Vertical farming

U-Sync, Taiwanese company, provides low-cost IoT sensors with a built-in SIM card and solar power supply features at a reasonable monthly fee. Farmers can easily adjust the location of the sensors based on the needs of their farms. This allows farmers to monitor the environmental information of the farms in real time.

Food supply chain optimisation



- Apps and services that provide access to food;
- Direct-to-consumer food delivery platforms;
- Meal kit and grocery delivery services;
- Products and services that innovate food processing and ingredients.

Unilever uses digital twins [of their factories](#). Factory equipment and machines are connected with IoT sensors and intelligent edge services in the Azure IoT platform. They send data on everything, from temperature to production cycle times to its digital twin software.

'New food' innovations as next-generation food and drinks



- Cultivated meat
- Plant-based meat and milk
- Insect-based products
- Fermented foods

The US company Eat Just makes its lab-grown chicken products in Singapore, which operates as its headquarters. Other homegrown start-ups such as Umami Meats and Shiok Meats are producing cell-cultured fish and offering cultivated red meat and seafood.

Key Takeaways



The global food system in 2022 has been destabilised by the recent Russian invasion of Ukraine. Levels of hunger and existing acute food insecurity in Sub-Saharan Africa and MENA region, along with higher food insecurity in Latin American and South Asia, are expected to increase even further by the end of this year.



High-income countries of North America and the EU lead the Food Security Index as the most food secure countries in the world. United States tops the ranking with 7.90 points out of 10. Thus, developed food secure countries will not face hunger but rather will experience the deficit of certain food products and high inflation.



Similarly, Sub-Saharan Africa and MENA region dominate the bottom of the Food Security Index, with Somalia scoring the lowest 2.97 points out of 10. The bottom top countries have not demonstrated the capacity to build food security through national policies and are affected by conflicts (northern Nigeria, Yemen, Burkina Faso, and Niger), weather conditions such as consecutive seasons of drought/below average rains (Kenya, South Sudan, and Somalia), and economic shocks.



The role of technology in achieving global food security becomes more important than ever. Big Data analytics, Artificial Intelligence, real-time monitoring will be helpful to tackle food security issues by enabling companies to develop food management solutions in order to optimise manufacturing processes and supply chain operations.



A number of food secure countries have announced and implemented national strategies specifically aimed at tackling food insecurity in 2022 and earlier, but that does not apply to the majority of countries in the developing world. Having a food security strategy policy that would encounter issues of domestic food insecurity to date must be considered by governments across the world during such times of uncertainty and global crises.

Looking Ahead: Global Food Security State

Past decade as well as key developments from the beginning of 2022 have demonstrated the importance of examining hunger from both the food system and external shocks perspective. Hereby, our Food Security Index was constructed considering the issues of access to food, crisis risks, the resilience of the economy across 171 countries. The index is a dynamic quantitative and qualitative benchmarking model constructed from 40 unique factors that measure the drivers of food security across both developing and developed countries.

The numbers on hunger and people in acute food insecurity portray a grey image. As this report is being published, the ongoing conflict in Ukraine, involving two of the biggest producers of wheat, fertilizers, and oilseeds, is destabilising the existing supply chains and pushing food, energy, and fertilizer prices even higher.

Looking further, the need to weight up main factors shaping the food security such as food access, affordability, production, and presence of crisis situation globally is essential. Next iterations of the 'Global Food Security' reports series will add new submeasures, reflecting on distribution of wheat on food security and nutritional profile of countries and forecasting possible food security scenarios.

25

countries considered 'high risk' and deteriorating are in Sub-Saharan Africa and MENA region

8

countries considered most Food secure, according to the FSI

40%

wheat prices increase forecast in 2022

110

countries considered as moderate-level food secure, according to the FSI

36

countries import more than 50% of their wheat from Russia and Ukraine

53

countries considered severely food insecure, according to the FSI

About Deep Knowledge Analytics

Deep Knowledge Analytics is a DeepTech-focused agency producing advanced analytics on DeepTech and frontier-technology industries, using sophisticated multidimensional frameworks and algorithmic methods that combine hundreds of specially designed and specifically weighted metrics and parameters to deliver insightful market intelligence, pragmatic forecasting, and tangible industry benchmarking.

Deep Pharma
Intelligence

GovTech
E-Governance
Analytics

COVID-19
Assessments

Innovation Eye

Interactive
Mind Maps

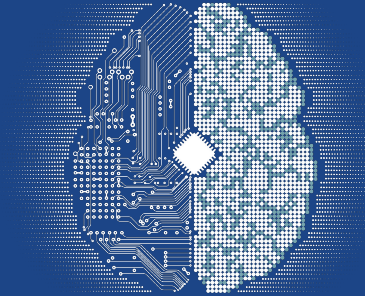
SpaceTech
Analytics



Deep Knowledge Analytics specialises in conducting special case studies and producing advanced industry analytical reports on the topics of Artificial Intelligence, DeepTech, GovTech, Blockchain, FinTech, and Invest-Tech.

Deep Knowledge Analytics can engage with strategic partners via several different approaches, including:

- Conducting customised case studies, research, and analytics for internal (organisational) use, tailored to the precise needs of specific clients;
- Producing analytical reports for open source use (freely accessible);
- Performing customised solutions, using specialised software, industry and technology databases, and interactive IT-platforms.



Link to the Report:

www.dka.global/global-foodtech-landscape-overview-2021-q4

E-mail: info@dka.global

Website: www.dka.global

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