Economic and Social Commission for Western Asia



Food and Agriculture
Organization of the United Nations

The League Of Arab States
Arab Organization For Agricultural Development

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Manual for Monitoring Food Security in the Arab Region

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Economic and Social Commission for Western Asia

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UNITED NATIONS
Beirut

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Background

Within the context of Food Security, ESCWA is implementing a Sida funded project on "Promoting food and water security through cooperation and capacity development in the Arab region" that includes a component on enhancing capacity in the Arab countries to assess the status of food security.

In this respect, a Regional Framework on Monitoring Food Security in the Arab Region was developed in consultation and coordination with the Arab Organization for Agriculture Development (AOAD), FAO, national focal points and experts from the region.

This framework takes into consideration regional specificities and its alignment with the integrated approach of the 2030 Agenda for Sustainable Development and intends to highlight national strength, weakness and priorities for interventions under the 4 pillars defining Food Security (access, availability, utilization, and sustainability).

On 28 March 2019, this framework was adopted by the Executive Council of AOAD after being presented to its General Assembly in its 35th Session.

Introduction

The framework is built using three outcome indicators; referred to as "core indicators". Revolving around them, are 21 causal indicators, divided into the four dimensions of food security (availability, access, utilization and stability) according to the scope and nature of each indicator.

This Manual contains a detailed description of each of the 24 used indicators and its computation method. Each indicator starts with a definition that is directly extracted from its official metadata page, followed by its method of measurement by the source itself, justification for its selection, its linkages with the SDGs, the possible data source and finally the normalization procedure.

Each indicator's relationship and effect on food security, in addition to its relevance to the Arab Region and link to regional strategies has been detailed in the related publication on "Tracking food security in the Arab region" (ESCWA, forthcoming).

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Normalization of the Indicators

All indicators in this framework are normalized to a 0-10 scale with 0 being the worst performance and 10 being the best. The normalization is performed using the following equations:

When a high value is best (e.g., yields):	(X – min) * 10 / (max – min)
When a low value is best (e.g., obesity):	(X – max) * 10 / (min – max)
X= value to be normalized	

For those indicators where a high value implies a worsening condition, such as prevalence of undernourishment or stunting among children under 5 years old then the equations are inverted.

Why normalize?

The normalization is required to unify the layout so that all indicators use a similar scale rather than having some indicators ranging from 0 to 100%, with others ranging from 0 to 1 or 1 to 5, etc. This allows us, as well, to fit all indicators on a same chart. Hence, a score between 0 and 10 was computed based on their original numerical data.

What are the minimum and maximum values?

Minimum and maximum are global values meaning that they are worldwide minimum and maximum and not regional specific. This makes the framework more stable and not subject to swings as conditions change at the regional level.

Why those values?

The 2010 global minimums and maximums were selected for the normalization process as:

- 2010 has the most data for most indicator for all countries and as such can serve as a baseline
- To compare the performance between 2 periods (here, 2010 vs. latest data), the same baseline had to be used, in this case, 2010.

Note that the baseline can be changed, therefore, the minimums and maximums of 2010 mentioned in this manual are only indicative and will be changed in the future to reflect reality. If the new chosen baseline is 2015, for example, the global minimums and global maximums of 2015 will be used when normalizing both 2015 data and the latest data.

The global values were chosen instead of 0% and 100% as minimums and maximums to allow for a more realistic scale. In real life, values of 0% or 100% are never reached regardless of the indicator or the level of development/income of the country, e.g. no country can have 0% or 100% obesity, poverty or unemployment. Thus, using those values would imply comparing countries to perfect or imperfect case scenarios. On the other hand, using the minimum and maximum values for each of the individual countries would lead to scores, which are not comparable. Thus, a low-income country could have a good performance on undernourishment if it experiences a slight improvement between the reference year and the current one while the overall level of undernourishment remains substantially high. Vice versa, a high-income country could have a low score on undernourishment if it experienced a slight increase while, overall, it has low levels of undernourishment. As a result, the middle ground has meant the use of global minimums and maximums to allow for comparability while not penalizing countries through the use of perfect or imperfect (unachievable) levels.

Core Indicators

CO1: Prevalence of undernourishment (PoU)

Definition

As per FAO, the prevalence of undernourishment (PoU) is an estimate of the proportion of the population whose habitual food consumption is insufficient to provide the dietary energy levels that are required to maintain a normal active and healthy life. It is expressed as a percentage.[1]

Method of measurement

The FAO measure of food deprivation, which is referred to as the prevalence of undernourishment, is based on a comparison of usual food consumption expressed in terms of dietary energy (kcal) with certain energy requirement norms. The part of the population with food consumption below the energy requirement norm is considered undernourished ("underfed").[2]

More details on the methodology for computing the prevalence of undernourishment are available in "Annex 2" of the "State of Food Insecurity in the World 2015" Report[3] and on the Indicator's official metadata page.[4]

Justification

Undernourishment is closely linked to food availability and access and thus, to overall food security. It is linked to various illnesses, mortality and childhood metabolic imprinting leading to long term developmental challenges. Monitoring undernourishment is crucial for tracking food security performance globally and more specifically in the Arab region in the light of recent and ongoing conflicts and protracted crisis.

Link to SDGs

This indicator is linked to SDG 2:



- *Target 2.1: By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round.*
- *Target 2.2: By 2030 end all forms of malnutrition, including achieving by 2025 the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women, and older persons.*

Possible Data source

This indicator is calculated by applying the estimated prevalence of undernourishment to total population in each period and is expressed as a percentage. Related data can be found on the World Bank data page on the link below:

https://data.worldbank.org/indicator/sn.itk.defc.zs.

Normalization

This indicator was normalized on a scale from 0 to 10 as a reversed indicator, meaning that the lowest value represents the best case scenario (used as minimum value in the normalization formula) and the highest value represents the worst case scenario (used as a maximum value in the normalization formula).

Currently figures of the reference year 2010 where used to assign the minimum and maximum values. They can be subject to change if the reference year is changed:

Minimum: 2.5% representing best case scenario with a score of 10.
Maximum: 50%; as 50% is the threshold to famine as the worst-case scenario with a score of 0.

Notes

CO2: Prevalence of severe food insecurity measured using FIES

Definition

As per FAO Severe food insecurity is characterized by feeling hungry but not eating, or not eating for an entire day, due to lack of money or other resources. This indicator is used to estimate the percentage of individuals in the population who have experienced food insecurity at severe levels.

Method of measurement

This FAO-developed indictor consists of an-8 questions questionnaire that investigates people's experience of access to adequate food.[5] Further details on the method of calculation can be found on the indicator's metadata link.[6]

Justification

The inability to access food results in a series of determined experiences and conditions. They range from being concerned about the ability to obtain enough food, to the need to compromise on the quality or the diversity of food consumed, to being forced to reduce the intake of food or to skip meals, up to the extreme condition of not having the necessary means to access food regularly. This indicator relates to the four pillars of food security and is crucial for tracking food security performance. In the Arab region, it helps monitor the food security situation in light of recent and ongoing conflicts and protracted crisis.

Link to SDGs

This indicator is linked to SDG 2:



- *Target 2.1: By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round.*

- *Target 2.2: By 2030 end all forms of malnutrition, including achieving by 2025 the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women, and older persons.*

Possible Data source

Related data can be found on FAOSTAT: http://www.fao.org/faostat/en/#data/FS.

Published results are available in the FAO 2018 "Regional overview of food security and nutrition in the Near East and North Africa". http://www.fao.org/3/ca3817en/ca3817en.pdf.

Normalization

This indicator was normalized on a scale from 0 to 10 as a reversed indicator, meaning that the lowest value represents the best case scenario (used as minimum value in the normalization formula) and the highest value represents the worst case scenario (used as a maximum value in the normalization formula).

Currently figures of the reference year 2010 where used to assign the minimum and maximum values. They can be subject to change if the reference year is changed:

Minimum: 0.6% representing best case scenario with a score of 10.
Maximum: 70.6% as the worst-case scenario with a score of 0.

Notes

C03: Prevalence of obesity in the adult population (18 years and older)

Definition

As per WHO, obesity is defined as abnormal or excessive fat accumulation that may impair health. BMI is a simple index of weight-for-height that is commonly used to classify overweight and obesity in adults. It is defined as a weight in kilograms divided by the square of height in meters (kg/m^2). Obesity is defined as having a Body Mass Index (BMI) equal or greater than 30.[7]

Method of measurement

This indicator reveals the percentage of individuals in the population reaching or surpassing this BMI of 30 kg/m^2.

Justification

Obesity is due to overconsumption of calories usually associated with less physical activities. It leads to many illnesses and non-communicable diseases and impedes economic participation and growth. Low income groups suffer from obesity due to the overconsumption of cheap, unhealthy foods, especially in the absence of healthy food alternatives. This indicator was specifically selected in this framework because obesity rates in the Arab region are escalating at alarming rates becoming the highest in the world with nearly one quarter of the population estimated as obese (ESCWA, 2017).[8] This calls for urgent action especially as food consumption patterns are still transitioning towards westernized habits.

Link to SDGs

There is no direct mention of "obesity" in the SDGs, but as it is related to food consumption quality and patterns leading to the widespread increase of non-communicable diseases, it relates to the SDGs through SDG3 "Good health and wellbeing" Obesity was selected as it is the outcome of food access and food utilization, thus being an ex-post indicator and could be linked to SDG3:



- *Target 3.4: By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being.*

Possible Data source

Related Obesity data can be found on WHO:
http://apps.who.int/gho/data/node.main.A900A?lang=en

Normalization

This indicator was normalized on a scale from 0 to 10 as a reversed indicator, meaning that the lowest value represents the best case scenario (used as minimum value in the normalization formula) and the highest value represents the worst case scenario (used as a maximum value in the normalization formula).

Currently figures of the reference year 2010 where used to assign the minimum and maximum values. They can be subject to change if the reference year is changed:

Minimum: 1.3% representing best case scenario with a score of 10.
Maximum: 58.5% as the worst-case scenario with a score of 0.

Notes

Food Availability Indicators

AV1: Primary wheat yield as a percentage of potentially achievable yield

Definition

This indicator reflects the wheat yield gap, a major limiting factor for food availability from national sources. It was developed for the specific purpose of this monitoring framework. It shows the recorded primary cereal yield as a percentage of a country's potentially achievable yield, to assess if countries are reaching their production potential.

Method of measurement

Unlike the remaining indicators, it is not associated with a metadata page but needs to be calculated from various sources. This indicator uses data on potentially achievable wheat yield from Mueller et al, 2012, a paper in Nature.[9] The actually achieved wheat yield, extracted from FAOSTAT is then used to calculate the percentage, using the following formula:

$$X = 100 * Achieved\ yield\ /\ Potentially\ achievable\ yield$$

Justification

Closing the wheat yield gap would contribute to higher availability of food. Reducing the yield gap will decrease food import dependency. This indicator is particularly relevant to the Arab region as wheat is a major staple food in the MENA region, accounting for some 37% of total food supply (Solh, 2013).[10] The region is also one of the largest cereal importers in the world.

Link to SDGs

This indicator is linked to SDG 2:



- *Target 2.3 : By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment.*

Possible Data source

Related data can be found on the following link below:
https://www.nature.com/articles/nature11420?platform=oscar&draft=journal.

Normalization

This indicator was normalized on a scale from 0 to 10, meaning that the highest value represents the best- case scenario (used as maximum value in the normalization formula, meaning the country is achieving its full potential) and the lowest value represents the worst- case scenario (used as a minimum value in the normalization formula meaning the country is not achieving any of its potential).

Currently figures of the reference year 2010 where used to assign the minimum and maximum values. They can be subject to change if the reference year is changed:

Minimum: 28% as the worst-case scenario with a score of 0.
Maximum: 142% representing best case scenario with a score of 10.

Notes

AV2: The agriculture orientation index for government expenditures (AOI)

Definition

As per FAO, the Agriculture Orientation Index (AOI) for Government Expenditures is defined as the Agriculture share of Government Expenditure, divided by the Agriculture value added share of GDP, where Agriculture refers to the agriculture, forestry, fishing and hunting sector.[11]

Method of measurement

The measure is a currency-free index, calculated as the ratio of these two shares mentioned above. An Agriculture Orientation Index (AOI) greater than 1 reflects a higher governmental orientation towards the agriculture sector, which receives a higher share of government spending relative to its contribution to economic value-added.

An AOI less than 1 reflects a lower governmental orientation to agriculture, while an AOI equal to 1 reflects neutrality in a government's orientation to the agriculture sector. Therefore, the best-case scenario would be when both numerator and denominator are proportionally scaled, as the closer the ratio is to 1, the wiser the investments are. More details are available on the indicator's metadata page.[12]

Justification

National Food security status is affected by the government spending in agriculture with the aim of enhancing the sector's productive capacity, thus reflecting into the sector's overall contribution to total economy. Indeed the agriculture orientation index (AOI) fell from 0.42 in 2001 to 0.26 in 2017 worldwide while for the 2015-2017 period, the average AOI was highest in Western Asia & Northern Africa (0.42), and lowest in Sub-Saharan Africa (0.20).[13]

Link to SDGs

This indicator is linked to SDG2:



- *Target 2.a : Increase investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to enhance agricultural productive capacity in developing countries, in particular least developed countries*

Possible Data source

Related data can be found on FAOSTAT: http://www.fao.org/faostat/en/#data/IG.

Normalization

This indicator was normalized on a scale from 0 to 10, meaning that the highest value represents the best case scenario (used as maximum value in the normalization formula) and the lowest value represents the worst case scenario (used as a minimum value in the normalization formula).

Currently figures of the reference year 2010 where used to assign the minimum and maximum values. They can be subject to change if the reference year is changed:

Minimum: 0.2 as the worst-case scenario with a score of 0.
Maximum: 8.5 representing best case scenario with a score of 10.

Notes

AV3: Food loss (as a percent of total food available)

Definition

As per FAO, It is defined as the "Amount of the commodity in question lost through wastage during the year at all stages between the level at which production is recorded and the household, i.e. storage and transportation. Losses occurring before and during harvest are excluded. Waste from both edible and inedible parts of the commodity occurring in the household is also excluded. Quantities lost during the transformation of primary commodities into processed products are taken into account in the assessment of respective extraction/conversion rates. Waste is often estimated as a fixed percentage of availability, the latter being defined as production plus imports plus stock withdrawals".[14]

Method of measurement

The amount of total food available was first calculated based on data from FAOSTAT's food balance sheets,[15] for each individual country in a specific year, according to the following formula:

Available food = Imports + Production – Exports

To define the losses with upper and lower bounds (i.e. maximum and minimum), the losses are converted to percentages of the available quantity of food using the following formula:

$X = 100 * losses \ / \ Available \ food$, where losses and available food are in tons

Justification

Food losses impact food availability, access, and utilization. Preventing food loss could lead to the availability of more safe and nutritious food compared to investing only in food production increase. It is a concern for the Arab region where it is due to deficient practices and infrastructure in production and imports while the region is highly dependent on food import (ESCWA, 2017).[16]

Link to SDGs

This indicator is linked to SDG 12:



- *Target 12.3: By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.*

Possible Data source

FAOSTAT's food balance sheets,[17] for each individual country in a specific year.

Normalization

This indicator was normalized on a scale from 0 to 10 as a reversed indicator, meaning that the lowest value represents the best case scenario (used as minimum value in the normalization formula) and the highest value represents the worst case scenario (used as a maximum value in the normalization formula).

Currently figures of the reference year 2010 where used to assign the minimum and maximum values. They can be subject to change if the reference year is changed:

Minimum: 0% representing best case scenario with a score of 10.
Maximum: 41.3% as the worst-case scenario with a score of 0.

Notes

AV4: Average dietary energy supply adequacy (ADESA)

Definition

As per FAO, the indicator expresses the Dietary Energy Supply (DES) as a percentage of the Average Dietary Energy Requirement (ADER).

Method of measurement

Each country's or region's average supply of calories for food consumption is normalized by the average dietary energy requirement estimated for its population to provide an index of adequacy of the food supply in terms of calories.

Justification

ADESA reflects the adequacy of the supplied dietary energy at the national level and therefore, food availability in terms of quantity. The quantity of food provided should fulfill the energy needs of the population to allow a healthy development.

Link to SDGs

This indicator is implicitly linked to SDG2, and has a direct effect on food security as it reflects if the supplied food satisfies the population's caloric needs, more specifically:



- *Target 2.1: By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round.*

- *Target 2.2: By 2030 end all forms of malnutrition, including achieving by 2025 the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women, and older persons.*

Possible Data source

Related data can be accessed on FAOSTAT : http://www.fao.org/3/ca3817en/ca3817en.pdf.

Normalization

This indicator was normalized on a scale from 0 to 10, meaning that the highest value represents the best- case scenario (used as maximum value in the normalization formula) and the lowest value represents the worst- case scenario (used as a minimum value in the normalization formula).

Currently figures of the reference year 2010 where used to assign the minimum and maximum values. They can be subject to change if the reference year is changed:

Minimum: 81% as the worst-case scenario with a score of 0.
Maximum: 155% representing best case scenario with a score of 10.

Notes

AV5: Cereal import dependency ratio

Definition

As per FAO, the cereal imports dependency ratio informs on the ratio of imported cereals and country cereal production in the available domestic food supply of cereals.[18]

Method of measurement

The indicator is calculated on the basis of three year averages, from 1990-92 to 2009-11, to reduce the impact of possible errors in estimated production and trade.

It is computed as:

(Cereal imports - cereal exports) / (cereal production + cereal imports - cereal exports) * 100

Given this formula the indicator assumes only values lower or equal to 100. Negative values indicate that the country is a net exporter of cereals.[19]

Justification

Cereals are the main source of dietary energy globally and specifically in the Arab region, and they constitute the bulk of the food imports. This indicator provides a measure of the dependence on cereal import. The greater the indicator, the higher the dependence hence the higher the vulnerability to the vagaries of global markets.

Link to SDGs



This indicator is related to SDG 2, as increased cereal availability through imports can contribute to ending hunger when local production cannot cover with local demand.

Possible Data source

Related data can be accessed on FAOSTAT: http://www.fao.org/faostat/en/#data/FS.

Normalization

This indicator was normalized on a scale from 0 to 10 as a reversed indicator, meaning that the lowest value represents the best case scenario (used as minimum value in the normalization formula) and the highest value represents the worst case scenario (used as a maximum value in the normalization formula).

Currently figures of the reference year 2010 where used to assign the minimum and maximum values. They can be subject to change if the reference year is changed:

Minimum: -187.5 % representing best case scenario with a score of 10.
Maximum: 100% as the worst-case scenario with a score of 0.

Notes

AV6: Share of water resources used in agriculture, out of total renewable water resources

Definition

This indicator provides information about the sustainable use of water in food production. Agricultural water withdrawal is defined as[20] the Annual quantity of self-supplied water withdrawn for irrigation, livestock and aquaculture purposes. It can include water from primary renewable and secondary freshwater resources, as well as water from over-abstraction of renewable groundwater or withdrawal from fossil groundwater, direct use of agricultural drainage water, direct use of (treated) wastewater, and desalinated water.

Total renewable water resources is defined as [21] Total Renewable Water Resources (TRWR): The sum of internal renewable water resources (IRWR) and external renewable water resources (ERWR). It corresponds to the maximum theoretical yearly amount of water available for a country at a given moment

Method of measurement

This indicator represents the ratio of water withdrawn for agriculture to the total renewable water resourcesAV6 was calculated using the following formula:

$$X = 100 * Agricultural\ water\ withdrawal\ /\ Total\ renewable\ water\ resources$$

Justification

Water is crucial for food production. The region suffers from renewable water resources scarcity, and unsustainable agricultural practices with increased demand on food leading to an overexploitation of freshwater resources.

Link to SDGs



This indicator was selected due to its direct and indirect relation to SDG 2, SDG 6, SDG 12 and SDG 15, as water usage is connected to agricultural practices, natural resource use, sustainable production and ecosystem health and desertification.

Possible Data Source

Related data can be found on AQUASTAT :
http://www.fao.org/nr/water/aquastat/data/query/results.html?regionQuery=true&yearGrouping=SURVEY&showCodes=false&yearRange.fromYear=1958&yearRange.toYear=2017&varGrpIds=4250%2C4251%2C4252%2C4253%2C4257&cntIds=&regIds=9805%2C9806%2C9807%2C9808%2C9809&edit=0&save=0&query_type=WUpage&lowBandwidth=1&newestOnly=true&_newestOnly=on&showValueYears=true&_showValueYears=on&categoryIds=-1&_categoryIds=1&XAxis=VARIABLE&showSymbols=true&_showSymbols=on&_hideEmptyRowsColoumns=on&lang=en.

Normalization

This indicator was normalized on a scale from 0 to 10 as a reversed indicator, meaning that the lowest value represents the best case scenario (used as minimum value in the normalization formula) and the highest value represents the worst case scenario (used as a maximum value in the normalization formula).

Currently figures of the reference year 2010 where used to assign the minimum and maximum values. They can be subject to change if the reference year is changed:

Minimum: 0.1 % representing best case scenario with a score of 10.
Maximum: 107% as the worst-case scenario with a score of 0.

Notes

Food Access Indicators

AC1: Poverty headcount ratio at 3.2$ a day (2011 PPP) (% of population)

Definition

National poverty headcount ratio is the percentage of population living under the national poverty lines. National estimates are founded on population-weighted subgroup assessments from household surveys.[22]

Method of measurement

The World Bank has intended to apply a joint standard in measuring extreme poverty, as alterations in the cost of living across the world grow, the international poverty line has to be intermittently updated using new PPP price data to reflect the changes. The $3.20 poverty line is resultant from typical national poverty lines in countries classified as Lower Middle Income. In the monitoring framework $3.20 will be used as a poverty cutoff figure, because the data is more relevant to the current situation in Arab countries than $1.9 a day[23].

Justification

Poverty is a main determinant of economic access to food as it reflects a lack of means. The poverty headcount ratio is a good indicator to assess poverty levels in Arab countries as it determines accessibility to food and thus the status of food security.

Link to SDGs

This indicator is linked to many SDGs as follows:

SDG 1



- *Target 1.1: By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than $1.25 a day;*
- *Target 1.2: By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions.*

SDG 8



- *Target 8.5:By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value.*

Possible Data Source

Related data can be collected from the World Bank.
https://data.worldbank.org/indicator/SI.POV.LMIC?end=2017&name_desc=false&start=2000

Normalization

This indicator was normalized on a scale from 0 to 10 as a reversed indicator, meaning that the lowest value represents the best case scenario (used as minimum value in the normalization formula) and the highest value represents the worst case scenario (used as a maximum value in the normalization formula).

Currently figures of the reference year 2010 where used to assign the minimum and maximum values. They can be subject to change if the reference year is changed:

Minimum: 0 % representing best case scenario with a score of 10.
Maximum: 91% as the worst-case scenario with a score of 0.

Notes

AC2: Share of food consumption expenditure in total household consumption expenditure of the lowest quintile (%)

Definition

Food consumption expenditure refers to the monetary value of acquired food, purchased and non-purchased, including non-alcoholic and alcoholic beverages as well as food expenses on away from home consumption in bars, restaurants, food courts, work canteens, street vendors, etc.[24]

Method of measurement

This indicator is calculated with data from Household Consumption and Expenditure Surveys (HCES) that comprise the monetary value of household consumption disaggregated into food and non-food items. The portion of household spending on food is equal to:

$$\frac{\text{Expenditure on Food}}{\text{Total Expenditure}} * 100$$

The monetary value of non-purchased items, comprising consumption from own production and in-kind payments and transfers, must be calculated from available price information.[25]

Justification

The share of food consumption expenditure in total household consumption expenditure allows the assessment of how affordable it is for people to access food and therefore how food secure a household is. Spending money on food is a fundamental requirement for survival. The more vulnerable a household is, the larger is the share of household income spent on food.

Link to SDGs

This indicator is related to many SDGs as follows:

SDG 1:



- *Target 1.5: By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters.*

SDG 2:



- *Target 2.c: Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility.*

SDG 8:



- *Target 8.5: by 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value.*

Possible Data Source

Related data is collected from FAO:
http://www.fao.org/giews/country-analysis/country-briefs/index.jsp

Normalization

This indicator was normalized on a scale from 0 to 10 as a reversed indicator, meaning that the lowest value represents the best case scenario (used as minimum value in the normalization formula) and the highest value represents the worst case scenario (used as a maximum value in the normalization formula).

Currently figures of the reference year 2010 where used to assign the minimum and maximum values. They can be subject to change if the reference year is changed:

Minimum: 0 % representing best case scenario with a score of 10.
Maximum 100% as the worst-case scenario with a score of 0.

Notes

AC3: Unemployment rate, by sex and age (%)

Definition

Unemployment rate is the percentage of unemployed people in the labor force based on age and sex.

Method of measurement

Unemployment rate is calculated by dividing the number of unemployed people by the total number of people in the labor force. Labor force implying the total number of employed and unemployed persons within a defined age category, for this framework the age group selected was 25 years and above.

Justification

The Unemployment rate is rising according to the ILO with the youth being disproportionately affected. The Arab States have among the highest unemployment rates in the world, with huge gender gaps. The unemployment rate is a critical indicator as it provides the percentage of the Arab population without a steady source of income and therefore who have difficulty accessing food.

Link to SDGs

This indicator is related to many SDGS as follows:

SDG1:



- *Target 1.1: By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than $1.25 a day;*
- *Target 1.2: By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions;*
- *Target 1.5: By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters.*

SDG2:



- *Target 2.1: By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round.*

SDG8:



- *Target 8.10: Strengthen the capacity of domestic financial institutions to encourage and expand access to banking, insurance and financial services for all.*

Possible Data Source

Related data is collected from the World Bank:
https://databank.worldbank.org/reports.aspx?source=world-development-indicators.

Normalization

This indicator was normalized on a scale from 0 to 10 as a reversed indicator, meaning that the lowest value represents the best case scenario (used as minimum value in the normalization formula) and the highest value represents the worst case scenario (used as a maximum value in the normalization formula).

Currently figures of the reference year 2010 where used to assign the minimum and maximum values. They can be subject to change if the reference year is changed:

Minimum: 0.3 % representing best case scenario with a score of 10.
Maximum: 29.3% as the worst-case scenario with a score of 0.

Notes

AC4: Logistics performance index: Quality of trade and transport-related infrastructure

Definition

As per World Bank, Logistics Performance Index (LPI) overall score echoes insights of a country's logistics founded on efficiency of customs clearance process, quality of trade- and transport-related infrastructure, ease of arranging competitively priced shipments, quality of logistics services, ability to track and trace shipments, and frequency with which deliveries reach the consignee within the scheduled time. The index ranges from 1 to 5, with a higher score representing better performance.[26]

Method of measurement

Data from the Logistics Performance Index surveys are conducted by the World Bank in partnership with academic and international institutions, private companies and individuals engaged in international logistics. Respondents appraise eight economies on six main dimensions scaled from 1 (worst) to 5 (best). The economies are selected based on the most important export and import markets of the respondent's country. Scores for the six areas are averaged across all respondents and aggregated to a single score using principal components analysis.[27]

Justification

The LPI aims to assist countries to identify the challenges and opportunities faced in terms of their performance on logistics and supply chains, which are necessary to move the food around. It assists countries to adopt strategies to improve their performance. This indicator is related to food security as it looks at the quality of trade and transport related infrastructure, which determines access to food through port logistics, red tapes and roads infrastructure among others.

Link to SDGs

This indicator is related to many SDGS as follows:

SDG 1:



- *Target 1.4: By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance.*

SDG2:



- *Target 2.1: By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round;*
- *Target 2.a: Increase investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to enhance agricultural productive capacity in developing countries, in particular least developed countries.*

Possible data Source

Related data is collected from the World Bank:

https://data.worldbank.org/indicator/LP.LPI.OVRL.XQ?end=2010&name_desc=false&start=2007.

Normalization

This indicator was normalized on a scale from 0 to 10, meaning that the highest value represents the best case scenario (used as maximum value in the normalization formula) and the lowest value represents the worst case scenario (used as a minimum value in the normalization formula).

Currently figures of the reference year 2010 where used to assign the minimum and maximum values. They can be subject to change if the reference year is changed:

Minimum: 1.3 as the worst-case scenario with a score of 0.
Maximum: 4.1 representing best case scenario with a score of 10.

Notes

AC5: Food Consumer Price Index

Definition

Consumer price index (CPI) reflects variations in the cost to the average consumer of acquiring a basket of goods and services that might be fixed or changed at specific time intervals, such as yearly basis.

Method of measurement

The Laspeyres formula is commonly used to calculate this indicator[28]. In case of calculating the price index, assuming that for individual item i, price at the base period to be pi 0, at the observation period to be pi t, and quantity at the base period to be qi 0, the following equation is called "Laspeyres formula".[29]

$$\frac{\sum_i p_{it} q_{i0}}{\sum_i p_{it} q_{i0}} \quad .....(1)$$

Consumer price indexes are created explicitly, using surveys of the cost of a defined basket of consumer goods and services.

Justification

The CPI measures increases in the average prices of goods and services in the economy, which should be distinguished from a change in the relative prices of individual goods and services. The estimation of the CPI is based on the prices of a representative basket of goods and services purchased by the typical household. The consumer price index is usually calculated on the basis of periodic surveys of consumer prices. Other price indices are derived implicitly from indexes of current and constant price series.

Link to SDGs

This indicator is related to many SDGs as follows:



SDG1:

- *Target 1.5: By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters.*

SDG2:



- *Target 2.1: By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round;*
- *Target 2.c: Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility.*

Possible data Source

Related data for this indicator is collected from the World Bank.
https://data.worldbank.org/indicator/FP.CPI.TOTL.

Normalization

This indicator was normalized on a scale from 0 to 10 as a reversed indicator, meaning that the lowest value represents the best case scenario (used as minimum value in the normalization formula) and the highest value represents the worst case scenario (used as a maximum value in the normalization formula).

Currently figures of the reference year 2010 where used to assign the minimum and maximum values. They can be subject to change if the reference year is changed:

Minimum: 100 % representing best case scenario with a score of 10.
Maximum: 341% as the worst-case scenario with a score of 0.

Notes

Food Utilization indicators

UT1: Proportion of population using at least basic drinking water services

Definition

This indicator encompasses both people using basic water services as well as those using safely managed water services. Basic drinking water services is defined as drinking water from an improved source, provided collection time is not more than 30 minutes for a round trip. Improved water sources include piped water, boreholes or tube wells, protected dug wells, protected springs, and packaged or delivered water.[30]

Method of measurement

Data on drinking water, sanitation and hygiene are produced by the Joint Monitoring Programme of the World Health Organization (WHO) and United Nations Children's Fund (UNICEF) based on administrative sources, national censuses and nationally representative household surveys.[31]

Estimations begin with the identification of nationally representative data sources that contain information on the use of water and sanitation services and the availability of hand washing facilities in the home. For most countries this information is collected from households during interviews conducted by national statistical offices.[32] The aggregates are computed using a weighted population average, and only if at least 65% of the data are available.

Justification

Access to clean and safely managed drinking water is a determinant of safe food production and consumption practices. As such, it plays a major role in food security as clean water prevents nutritional diseases and infections, and therefore reduces the incidence of illnesses that can hinder the absorption of nutrients and debilitate the workforce particularly in rural areas. It is crucial to monitor this indicator in the Arab region, as the WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene for March 2018 showed that 51 million people in the Arab Region lacked a basic drinking water service in 2015, 73% of whom live in rural areas (WHO/UNICEF, 2018).[33]

Link to SDGs

This indicator is related to SDG6:



- *Target 6.1: By 2030, achieve universal and equitable access to safe and affordable drinking water for all;*
- *Target 6.3: By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.*

Possible data Source

Related data can be extracted from the World Bank:
https://data.worldbank.org/indicator/SH.H2O.SMDW.ZS.

Normalization

This indicator was normalized on a scale from 0 to 10, meaning that the highest value represents the best case scenario (used as maximum value in the normalization formula, meaning that the whole population is using safely managed drinking water services) and the lowest value represents the worst case scenario (used as a minimum value in the normalization formula).

Currently figures of the reference year 2010 where used to assign the minimum and maximum values. They can be subject to change if the reference year is changed:

Minimum: 18.1% as the worst-case scenario with a score of 0.
Maximum: 100 %representing best case scenario with a score of 10.

Notes

UT2: Proportion of population using at least basic sanitation services

Definition

This indicator is defined as "The percentage of people using at least basic sanitation services, that is, improved sanitation facilities that are not shared with other households. This indicator encompasses both people using basic sanitation services as well as those using safely managed sanitation services. Improved sanitation facilities include flush/pour flush to piped sewer systems, septic tanks or pit latrines; ventilated improved pit latrines, compositing toilets or pit latrines with slabs.

Method of measurement

Data on drinking water, sanitation and hygiene are produced by the Joint Monitoring Programme of the World Health Organization (WHO) and United Nations Children's Fund (UNICEF) based on administrative sources, national censuses and nationally representative household surveys.[34]

Estimations begin with the identification of nationally representative data sources that contain information on the use of water and sanitation services and the availability of handwashing facilities in the home. For most countries this information is collected from households during interviews conducted by national statistical offices.[35]

National, regional and income group estimates are made when data are available for at least 50 percent of the population.[36]

Justification

Access to sanitation facilities prevents the spreading of diseases and the contamination of water resources. It is part of food security as it promotes healthier life and improves the assimilation of nutrients allowing for a higher productive life and reduced health costs among other, which support economic development. It is relevant to the Arab region, as the WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene for March 2018 showed that 74 million people in the Arab Region lacked a basic sanitation service in 2015, 25 million of whom practice open defecation (WHO/UNICEF, 2018).

Link to SDGs

This indicator is related to SDG6:



- *Target 6.2 "By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations".*

Possible data Source

Related data can be extracted from the World Bank:
https://data.worldbank.org/indicator/SH.STA.BASS.ZS.

Normalization

This indicator was normalized on a scale from 0 to 10, meaning that the highest value represents the best case scenario (used as maximum value in the normalization formula, meaning that the whole population is using safely managed sanitation services) and the lowest value represents the worst case scenario (used as a minimum value in the normalization formula).

Currently figures of the reference year 2010 where used to assign the minimum and maximum values. They can be subject to change if the reference year is changed:

Minimum: 5.7% as the worst-case scenario with a score of 0.
Maximum: 100 %representing best case scenario with a score of 10.

Notes

UT3: Percentage of children under 5 years of age affected by stunting (%)

Definition

Child growth is an internationally accepted outcome reflecting child nutritional status. Child stunting refers to a child who is too short for his or her age and is the result of chronic or recurrent malnutrition. Stunting is a contributing risk factor to child mortality and is also a marker of inequalities in human development. Stunted children fail to reach their physical and cognitive potential. Child stunting is one of the World Health Assembly nutrition target indicators.[37]

Method of measurement

Stunting is measured (height-for-age <-2 standard deviation from the median of the World Health Organization (WHO) Child Growth Standards) among children under 5 years of age.[38]

Percentage of children aged <5 years stunted for age = (number of children aged 0-5 years that fall below minus two standard deviations from the median height-for-age of the WHO Child Growth Standards / total number of children aged 0-5 years that were measured) * 100. Children's weight and height are measured using standard technology, e.g. children less than 24 months are measured lying down, while standing height is measured for children 24 months and older. The data sources include national nutrition surveys, any other nationally-representative population-based surveys with nutrition modules, and national surveillance systems.

Justification

Stunting is a major health issue as it is due to poor diets and affected children tend to face recurrent infections and possibly death. The percentage of children with low height-for-age result from cumulative effects of under-nutrition and infections from birth or even before. Thus, it is as well a measure of poor environmental conditions and/or long-term restriction of a child`s growth potential. This indicator is relevant to the Arab region due to the protracted crises (ESCWA, 2017).[39]

Link to SDGs

This indicator is related to SDG 2:



- *Target 2.2: By 2030 end all forms of malnutrition, including achieving by 2025 the internationally agreed targets on stunting and wasting in children under five years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women, and older persons.*

Possible data Source

Related data can be extracted from the World Bank:
https://data.worldbank.org/indicator/SH.STA.BASS.ZS.

Normalization

This indicator was normalized on a scale from 0 to 10 as a reversed indicator, meaning that the lowest value represents the best case scenario (used as minimum value in the normalization formula) and the highest value represents the worst case scenario (used as a maximum value in the normalization formula).

Currently figures of the reference year 2010 where used to assign the minimum and maximum values. They can be subject to change if the reference year is changed:

Minimum: 4.1 % representing best case scenario with a score of 10.
Maximum: 52% as the worst-case scenario with a score of 0.

Notes

UT4: Percentage of children under 5 years of age affected by wasting (%)

Definition

Child growth is an internationally accepted outcome reflecting child nutritional status. Child wasting refers to a child who is too thin for his or her height and is the result of recent rapid weight loss or the failure to gain weight. A child who is moderately or severely wasted has an increased risk of death, but treatment is possible. Child wasting is one of the World Health Assembly nutrition target indicators.[40]

Method of measurement

The percentage of children aged <5 years suffering from wasting = (number of children aged 0-5 years that fall below minus two standard deviations from the median weight-for-height of the WHO Child Growth Standards / total number of children aged 0-5 years that were measured) * 100. Children's weight and height are measured using standard techniques, e.g. children less than 24 months are measured lying down, while standing height is measured for children 24 months and older. The data sources include national nutrition surveys, any other nationally-representative population-based surveys with nutrition modules, and national surveillance systems.

Justification

Wasting is a major health issue due to the risk of morbidity. Affected children are more subject to diseases that could devolve into death when the weight loss is too much body height. The frequency of illnesses further affects their nutritional status, which locks them into a vicious cycle (UNICEF, childinfo.org).[41] This indicator is of particular relevance to the Arab region in light of the protracted crises.

Link to SDGs

This indicator is related to SDG 2:



- *Target 2.2 By 2030 end all forms of malnutrition, including achieving by 2025 the internationally agreed targets on stunting and wasting in children under five years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women, and older persons.*

Possible data Source

Related data can be extracted from the World Bank:
https://data.worldbank.org/indicator/SH.STA.WAST.ZS.

Normalization

This indicator was normalized on a scale from 0 to 10 as a reversed indicator, meaning that the lowest value represents the best case scenario (used as minimum value in the normalization formula) and the highest value represents the worst case scenario (used as a maximum value in the normalization formula).

Currently figures of the reference year 2010 where used to assign the minimum and maximum values. They can be subject to change if the reference year is changed:

Minimum: 0.7 % representing best case scenario with a score of 10.
Maximum: 22.7% as the worst-case scenario with a score of 0.

Notes

UT5: Prevalence of anemia among women of reproductive age (15-49 years) (%)

Definition

Prevalence of anemia among women of reproductive age refers to the combined prevalence of both non-pregnant with haemoglobin levels below 12 g/dL and pregnant women with haemoglobin levels below 11 g/dL.[42]

Method of measurement

It is the weighted average of both non-pregnant with haemoglobin levels below 12 g/dL and pregnant women with haemoglobin levels below 11 g/dL.

Justification

Anemia is a serious public health, given its impact on psychological and physical development, behavior and work performance. It is the most common nutritional disorder in the world (Verster and van der Pols, 1995).[43] This is a gender specific indicator as it reflects women's health and access to nutritious food and is crucial to their reproductive capacities. Increased prevalence of anemia among women of reproductive age indicates inadequate intake of micronutrients, hence, anemia is representative of the food security situation.

Link to SDGs



This indicator is related to SDG 2 and SDG 3, as micronutrient deficiencies occur from poor food diversity resulting in poor health and pregnancy status.

Possible data Source

Related data can be found on the World Bank's website: https://data.worldbank.org/indicator/SH.ANM.ALLW.ZS.

Normalization

This indicator was normalized on a scale from 0 to 10 as a reversed indicator, meaning that the lowest value represents the best case scenario (used as minimum value in the normalization formula) and the highest value represents the worst case scenario (used as a maximum value in the normalization formula).

Currently figures of the reference year 2010 where used to assign the minimum and maximum values. They can be subject to change if the reference year is changed :

Minimum: 8.1 % representing best case scenario with a score of 10.
Maximum: 70% as the worst-case scenario with a score of 0.

Notes

Stability indicators

ST1: Climate change vulnerability index

Definition

The climate change vulnerability index reflects the relative standing of several countries taking into consideration three major impacts of climate change: weather related disasters; sea level rise; and loss of agriculture productivity.

Method of measurement

This indicator was selected among others, to monitor the stability of food security in the Arab region as climate change can have major impact on agriculture productivity, thus implying its food availability, but can as well impact the stability of food supply within and between Arab countries.

Justification

This indicator was selected as climate change can have major impact on food security, by affecting agriculture production and productivity, thus affecting food availability, but it could affect also the food supply system within and between countries.

Link to SDGs

This indicator is related to many SDGs as follows:

SDG 12:



- *Target 12.2: By 2030, achieve the sustainable management and efficient use of natural resources.*

SDG 13:



- *Target 13.3: Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.*

SDG 15:



- *Target 15.3: By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world.*

Possible data Source

Related data is available on http://projects.hcss.nl/monitor/70/.

Normalization

This indicator was normalized on a scale from 0 to 10 as a reversed indicator, meaning that the lowest value represents the best case scenario (used as minimum value in the normalization formula) and the highest value represents the worst case scenario (used as a maximum value in the normalization formula).

Currently figures of the reference year 2010 where used to assign the minimum and maximum values. They can be subject to change if the reference year is changed:

Minimum: 0 representing best case scenario with a score of 10.
Maximum: 0.5 as the worst-case scenario with a score of 0.

Notes

ST2: Food Price anomalies

Definition

Indicator for food price anomalies measures the number of "Price Anomalies" that happen on a given food commodity price series over a certain period of time.[44]

Method of measurement

The indicator of food price anomalies IFPA is calculated as follows:

$$IFPPA_t = \alpha\left(\frac{CQGR_{yt} - \overline{CQGR_t}}{\hat{\sigma}\,CQGR_t}\right) + (1-\alpha)\left(\frac{CAGR_{yt} - \overline{CAGR_t}}{\hat{\sigma}\,CAGR_t}\right)$$

Where α is equal to 0.40

- CQGRyt and CAGRyt are the quarterly and annual compound growth rates in year y and month t respectively;
- And are weighted means of the quarterly and annual compound growth rates in month t;
- The weights are increasing time weights, so the more recent past has a higher weight in the calculation of the mean and standard deviation than the beginning of the price series;
- $\overline{\hat{\sigma}\,CQGR_t}$ and $\overline{\hat{\sigma}\,CAGR_t}$ are weighted standard deviations of the quarterly and annual compound growth rates in month t.

Justification

Food price anomalies allows the evaluation of changes in prices over a determined period, month or year, while taking into account prevailing seasonality in food markets and inflation so as to detect abnormal price changes over the selected period. As such, it ensures the proper functioning of the food market, as well as facilitating access to information on markets, including food reserves that could help limit extreme food price volatility that could lead to a heightened state of food insecurity.

Link to SDGs

This indicator is related to SDG2:



- *Target 2.c: To adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility.*

Possible Data Source

Related data for this indicator is collected from UNSTAT:
https://unstats.un.org/sdgs/indicators/database/?indicator=2.c.1.

Normalization

This indicator was normalized on a scale from 0 to 10 as a reversed indicator, meaning that the lowest value represents the best case scenario (used as minimum value in the normalization formula) and the highest value represents the worst case scenario (used as a maximum value in the normalization formula).

Currently figures of the reference year 2010 where used to assign the minimum and maximum values. They can be subject to change if the reference year is changed:

Minimum: -1.7 representing best case scenario with a score of 10.
Maximum: 1.9 as the worst-case scenario with a score of 0.

Notes

ST3: Political stability and absence of violence

Definition

Political stability and absence of violence measures insights of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism.[45]

Method of measurement

The perceptions of the likelihood of political instability and/or violence is measured by Worldwide Governance Indicators by looking at a list of individual variables from different data source such as armed conflict, violent demonstrations, social unrest and international tensions etc.

Justification

A high level of political instability and violence indicates the likelihood of further unrests and a lack of a conducive environment for economic growth and development. In countries affected, there is usually a high level of food insecurity and in the Arab region countries experiencing famine and severe food insecurity are also affected by war and conflicts.

Link to SDGs

This indicator is related to many SDGs as follows:

SGD1:



- *Target 1.5: By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters.*

SGD2:



- *Target 2.c: Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility.*

Possible Data Source

Related data on this indicator is collected from the World Bank:
https://databank.worldbank.org/data/reports.aspx?source=1181&series=PV.PER.RNK.

Normalization

This indicator was normalized on a scale from 0 to 10, meaning that the highest value represents the best case scenario (used as maximum value in the normalization formula, meaning the higher the political stability and absence of violence the better the situation is) and the lowest value represents the worst case scenario (used as a minimum value in the normalization formula).

Currently figures of the reference year 2010 where used to assign the minimum and maximum values. They can be subject to change if the reference year is changed:

Minimum: 0% as the worst-case scenario with a score of 0.
Maximum: 100 %representing best case scenario with a score of 10.

Notes

ST4: Per capita food production variability

Definition

This indicator, as per FAO, corresponds to the variability of the "food net per capita production value in constant 2004-2006 international $". This indicator compares the variations of the per capita food production across countries and time.

Method of measurement

As mentioned by the FAO, missing values in the food net per capita production value are interpolated using a linear trend. The series is then detrended by fitting a cubic spline by ordinary least squares to the series. The difference between the cubic fit and the actual values are then calculated. Lastly, the volatility for a specific year is defined as the standard deviation of these differences over the previous five years. The aggregates are computed applying the same methodology to the aggregates of the per capita food production variable.

Justification

The indicator helps mitigate the vagaries prevailing in global food markets. As such, it is an important aspect of food security as with high levels of food production and productivity there is a higher likelihood that the population will have access to affordable food sourced locally.

Link to SDGs

This indicator is related to SGD 2:



- *Target 2.1: By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round;*
- *Target 2.4: By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality;*
- *Target 2.c: Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility.*

Possible Data Source

Related data for this indicator was collected from FAOSTAT:
http://www.fao.org/faostat/en/#data/FS.

Normalization

This indicator was normalized on a scale from 0 to 10 as a reversed indicator, meaning that the lowest value represents the best case scenario (used as minimum value in the normalization formula) and the highest value represents the worst case scenario (used as a maximum value in the normalization formula).

Currently figures of the reference year 2010 where used to assign the minimum and maximum values. They can be subject to change if the reference year is changed:

Minimum: 0.5 representing best case scenario with a score of 10.
Maximum: 80.1 as the worst-case scenario with a score of 0.

Notes

ST5: Per capita food supply variability

Definition

This indicator, as per FAO, corresponds to the variability of the "food supply in kcal/caput/day". This indicator uses data on dietary energy supply from Food Balance Sheet (FBS) to measure annual fluctuations in the per capita food supply (kcal), represented as the standard deviation over the previous five years per capita food supply. Variability in food supply is a result of instability in supply, trade, consumption, and storage, in addition to changes in government policies such as trade restrictions, taxes and subsidies, stockholding, and public distribution.[46]

Method of measurement

As mentioned by FAO, missing values in the dietary energy supply are interpolated using a linear trend. The series is then detrended by fitting a cubic spline by ordinary least squares to the series. The difference between the cubic fit and the actual values are then calculated. Lastly, the volatility for a specific year is defined as the standard deviation of these differences over the previous five years. The aggregates are computed applying the same methodology to the aggregates of the food supply variable.

Justification

This indicator assesses the variability prevailing in the food supply system, which affects the ability of people, particularly the most vulnerable, to access enough food. Assessing food supply variability allows a better understanding of the cycles prevailing in the food system, which usually correlates with price volatility, and allows policy makers to adopt measures to enhance resilience notably against price shocks. This indicator will be a measure of how stable and reliable the food supply is within the country including its evolution overtime.

Link to SDGs

This indicator is related to SDG 2:



- *Target 2.1: By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round;*

- *Target 2.4: By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality;*
- *Target 2.b: Correct and prevent trade restrictions and distortions in world agricultural markets, including through the parallel elimination of all forms of agricultural export subsidies and all export measures with equivalent effect, in accordance with the mandate of the Doha Development Round;*
- *Target 2.c: Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility;*

Possible Data Source

Related data for this indicator was collected from FAOSTAT:
http://www.fao.org/faostat/en/#data/FS.

Normalization

This indicator was normalized on a scale from 0 to 10 as a reversed indicator, meaning that the lowest value represents the best case scenario (used as minimum value in the normalization formula) and the highest value represents the worst case scenario (used as a maximum value in the normalization formula).

Currently figures of the reference year 2010 where used to assign the minimum and maximum values. They can be subject to change if the reference year is changed:

Minimum: 4 representing best case scenario with a score of 10.
Maximum: 120 as the worst-case scenario with a score of 0.

Notes

Endnotes

1. https://unstats.un.org/sdgs/metadata/files/Metadata-02-01-01.pdf
2. http://www.fao.org/3/Y4249E/y4249e06.htm http://www.fao.org/3/a-i4046e.pdf
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