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Working Group 2

Indicator 14 "Contributions of forests, trees, and agroforestry to Food Security and Nutrition (FSN) "

Draft discussion paper

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Forest, trees and agroforestry provide multiple contributions to Food Security and Nutrition (FSN). There is currently no indicator to assess and show these contributions. The purpose of this paper is to propose options to fill this gap.

The Collaborative Partnership on Forests (CPF) convened a Global Forest Expert Panel (GFEP) in November 2013 and produced a report on the role of forests in FSN (Vira et al., 2015), which was released at the United Nations Forum on Forests (UNFF) in May 2015. In October 2014, at its 41st session, the Committee on World Food Security (CFS) requested the High Level Panel of Experts on food security and nutrition (HLPE) to prepare a study on sustainable forestry for FSN to inform the debates at the 44th CFS Plenary Session of October 2017. These two major reports have played a considerable role in clarifying the contributions of forests, trees and agroforestry to FSN and in raising awareness on their importance in both the forestry and food security communities.

Food security exists when all people, at all times, have physical, social and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. In 2009, the World Summit on Food Security stated that the "four pillars of food security are availability, access, utilization, and stability". Availability refers to the supply of food through production, distribution and exchange. Access covers physical and economical accessibility, referring thus to the affordability, means to buy and it and consequent allocation of food; utilization refers to the metabolism of food by individuals and what contributes to it; and stability refers to the constancy and resilience of the three previous pillars over time.

Forests, trees and agroforestry provide multiple contributions to the four dimensions of FSN (see figure 1). They can be summarized under four main items (HLPE, 2017):

- direct provision of food and feed such as nuts, oils, vegetables (leaves, flowers, roots), fruits, bushmeat, herbs, saps, mushrooms, tubers, and insects.
- provision of wood energy, particularly for cooking food and boiling of water in developing countries which is critical for preparing many nutrient-rich foods (such as legumes and meats) as well as in good assimilation of nutrients and reduction of risks of diarrhoea;
- formal and informal employment and sources of income in the forestry sector and through sales of wood and Non-Wood Forest Products (NWFP), with significant differences by gender and social groups.
- provision of ecosystem services that sustain all food production and agriculture activities through water regulation; soil formation and protection, nutrient cycling, pest control and pollination;

There is general agreement that all of these contributions need to be taken into account to assess the contribution of forests, trees and agroforestry to FSN. However, many of these contributions, while being well known and described at local level, like the contribution to livelihoods and to balanced diets (see Vira et al., 2015, HLPE, 2017), are not covered by national statistics. For others, particularly those regarding the contribution of ecosystem services provided by forests, trees and agroforestry to agricultural production, there are multiple dimensions, each of which involves complex interactions and is very research-intensive to measure even at a local scale.

The notion of forest dependent people could be a way to apprehend a wide range of such contributions, assessing them indirectly through the number of people to whom they benefit. Broadly speaking, any

people who rely on forest products for their livelihood could be considered “forest-dependent. In a review paper, Newton and colleagues (2016) note that despite a long history and widespread use of the term “forest dependent”, there are substantial divergences on who it refers to. They propose a taxonomy exposing the dimensions that characterize the relationships between people and forests and conclude that a universal definition would be untenable. A widely used definition is the one of Fisher et al. (1997) that distinguishes between three types of forest-dependent people:

(a) People who live in and around natural forests, or on the forest frontier, often living as hunter–gatherers or shifting cultivators, and who are heavily dependent on forest resources for their livelihoods, primarily, but not always, for subsistence. Shifting cultivation is a major contributor to their food security. People in this category are often indigenous peoples or people from minority ethnic groups. They are, thus, usually outside both the political and economic mainstream.

(b) People who live in proximity to forests, are usually involved in agricultural practices either within or outside the forest, and regularly use forest products (timber, fuelwood, forest foods, medicinal plants, etc.) partly for their own subsistence and partly for income generation. For those more involved in agriculture, food from forests can be of critical importance for smoothing consumption when there are agricultural production shortages and for diversifying diets.

(c) People engaged in commercial activities such as hunting, collecting minerals, charcoal production or logging. Such people may be part of a mixed subsistence and cash economy. These people depend on forest mainly as a source of cash income. However, it is important to note that this type of people–forest interaction can exist even in a highly monetized context: for example, small rural communities in highly industrialized countries such as Australia can be almost totally dependent on wages from commercial logging. With increasingly long value chains and the development of recreational activities, this category also includes people depending on forest services (including tourism) and on forest product transformation and distribution as a source of income.

d) people depending on agricultural systems that benefit from the ecosystem services provided by forests and trees. These services are very difficult to quantify, but acknowledging them makes clear that forests not only contribute food directly, but also play a critical role in sustaining agriculture.

These categories have not all been well assessed, but could provide a starting point for acknowledging the diverse contribution of forests, trees and agroforestry to FSN.

Finally, a key consideration for identifying potential indicators is the **availability of data**. The objective is to have indicators calculated at national level for all countries, with as much as possible no additional collection of data as this would be extremely costly. Due to these constraints, we propose that for the first attempt to create a ‘food indicator’, we rely on available data in reliable global databases.

The main data series of interest are:

- The Forest Resource Assessment
- National agricultural census data
- Food balance sheets that contain information on food production and consumption at national level

A set of indicators

To cover the different types of contributions of forests, trees and agroforestry we propose to use a set of sub-indicators using data that is already available for all countries in reliable global databases:

14-1): jobs in forestry, wood transformation and related sectors (as far as possible). National, FRA.

Through indicator 12

14-3): Woodfuel per capita. National, FAOSTAT. There is already an indicator on the contribution of wood fuel to energy production: percentage of primary energy production from wood fuel, with discussions to suppress it. It could be proposed to transform this indicator to wood fuel per capita in kg.

14-4): Annual Fruit consumption per capita in kg. National, Food balance sheets. This indicator will show the contribution of forests, trees and agroforestry to a balanced diet, through the provision of fruits rich in micronutrients. As fruits are the result of pollination it is also an indicator of the efficiency of pollination an emblematic ecosystem service for which trees are essential, particularly as providing undisturbed habitats for wild species.

14-5): Annual Nut consumption per capita in kg. National, food balance sheets. This indicator will show the contribution of forests, trees and agroforestry to a balanced diet, through the provision of nuts that are rich in healthy fats, protein, and micronutrients.

These would need to be complemented by an indicator that could cover in a broader way how forests and trees contribute to FSN through ecosystem services supporting farmers and agricultural production. It could be informed by an additional question in the agricultural census resulting in indicator 14-2.

14-2): percentage of farming households having part of their livelihood coming from trees, and forests (as best as possible). It could be calculated using the national, agricultural census, with a qualitative question: do you draw products and/or income from forests, trees or agroforestry. Such a generic question, while lacking in precision would enable to cover the breadth of people concerned and would complement the indicator on jobs to better cover the range of forest dependent people. It would also constitute a proxy for the number of farmers that depend to various degrees on the ecosystem services provided by forests and trees to agriculture production (the link between the two being often the proximity to forests and trees).

Together, these indicators, or a similar combination, would cover some of the contributions of forests and trees to different dimensions of FSN (see table 1), but they are far from perfect. They will vastly understate the importance of forests for food because there are no nationally representative data of wild food or of the value of ecosystem services of forests and trees. The proposal to include the number of forest dependent people is a way to indirectly capture some of these benefits, but future work could move to national data collection that is more able to address some of these contributions.

Table 1 Links of the proposed indicators to the four dimensions of FSN

| | Availability | Accessibility | Utilization | Stability |
|---|--|---|--------------------|--|
| a) Employment in forestry | | Provides income that can be used to buy food | | Often a buffering function in times of needs |
| b) %age of farming households having part of their livelihood coming from trees or forests | Reflects diverse contributions of ecosystems to agricultural production (including products that | Contribution of forests trees and agroforestry to livelihoods Source of income | | An indicator of the buffering role of forests and trees. |

| | | | | |
|--------------------------------|--|---|---|---|
| | are sources of important nutrients) and households | | | |
| c) Woodfuel consumption | | important source of income especially for the most vulnerable | Used for cooking by 2,4 billion people and also for boiling water | Often an activity providing income in times of need |
| d) Fruit consumption | Tree provides 70% of fruits at global level | | A key source of nutrients | |
| e) Nut consumption | Trees provide all nuts | | key sources of healthy fats, protein & micronutrients | |

Recommendations

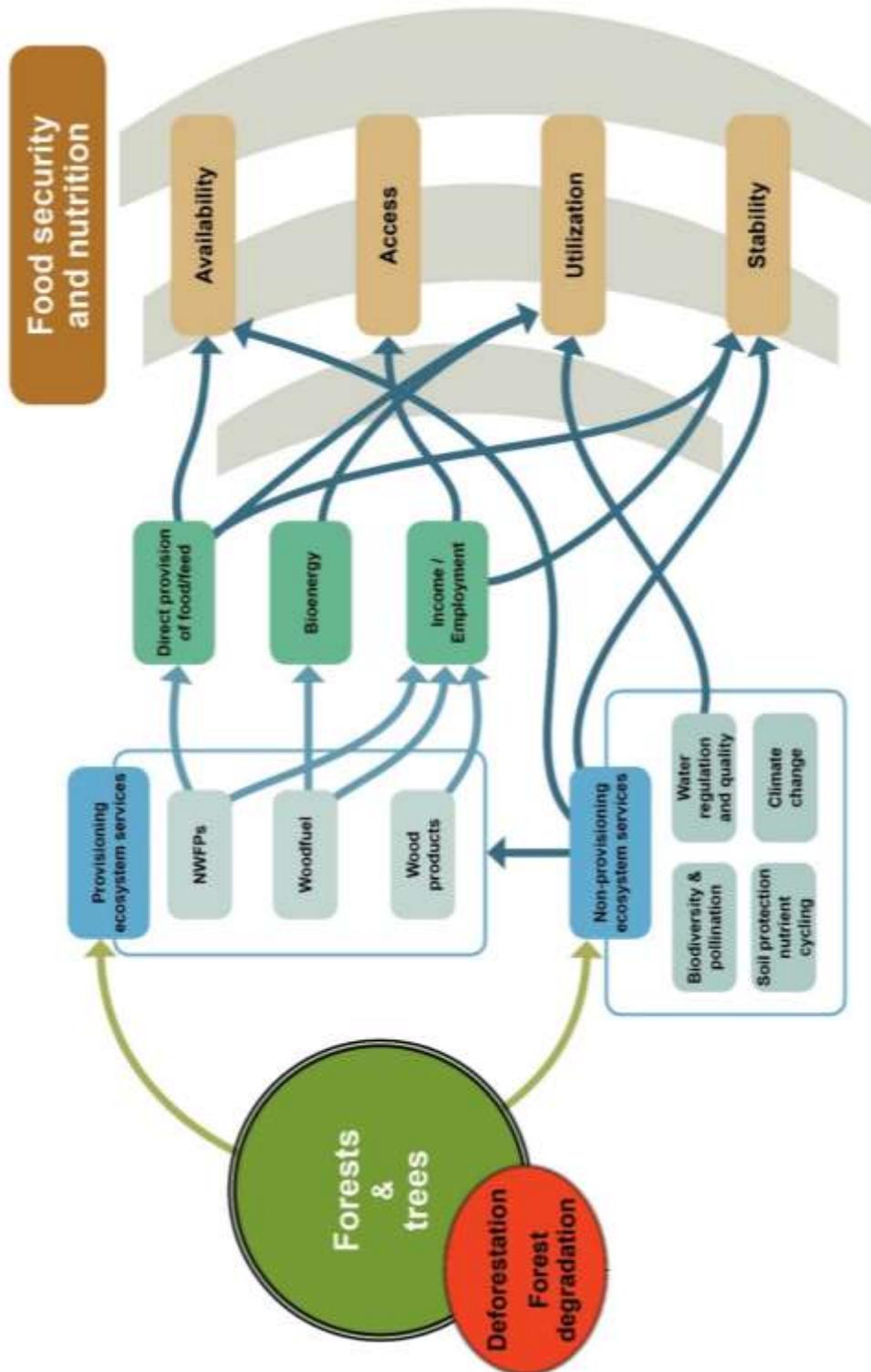
In addition to the proposal of a set of indicators described above, it could be proposed:

- To strengthen the collection of data on NWFP in the FRA
- To consider integrating contribution of wild foods in agriculture census data collection, including through the possibility of having optional answers covering products of importance for balanced diets at subnational level.
- Addition of a few questions in agriculture censuses to try to capture farmer's perceptions of a range of ecosystem services from forests and trees.
- Develop and test the feasibility of an indicator to track provision of ecosystem services from forests at national levels such as through a "forest proximity index" and/or "riparian strip tree coverage index."

References:

- FAO. 2014. *State of the World's Forests. Enhancing the socio-economic benefits from forests*. Rome. <http://www.fao.org/3/a-i3710e.pdf>
- Fisher, R.J., Srimongkontip, S. & Veer, C. 1997. People and forests in Asia and the Pacific: situation and prospects. FAO/RAPA. Working Paper No. APFSOS/WP/27.
- HLPE. 2017. *Sustainable forestry for food security and nutrition*. A report by the High-Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome. <http://www.fao.org/3/a-i7395e.pdf>
- Newton P., Miller D. C., Ateanyi Byenkya M. A., Agrawal A. 2016. Who are forest-dependent people? A taxonomy to aid livelihood and land use decision-making in forested regions. *Land Use Policy* 57, 388-395.
- Vira, B., Wildburger, C. & Mansourian, S., eds. 2015. *Forests, trees and landscapes for food security and nutrition*. IUFRO World Series, 33.

Figure 1 Forest functions and their links to FSN



Source: HLPE, 2017.

SUB-Indicator 14.1: Employment related to the forest sector

Identical to Indicator 12.

Global forest goal 2: Enhance forest-based economic, social and environmental benefits, including by improving the livelihoods of forest-dependent people.

Target 2.3: The contribution to forest and trees to food security is significantly increased. (UNDESA, 2019)

Institutional information

Organization(s):

Food and Agriculture Organization of the United Nations (FAO)

Concepts and definitions

Definition:

Rationale:

Concepts:

Comments and limitations:

Methodology

Computation Method:

Disaggregation:

Treatment of missing values:

- At country level
- At regional and global levels

Regional aggregates:

Sources of discrepancies:

Methods and guidance available to countries for the compilation of the data at the national level:

Quality assurance:

Data Sources

Description:

Collection process:

Data Availability

Description:

Time series:

Calendar

Data collection:

Data release:

Data providers

Data compilers

FAO

References

URL:

References:

UNDESA. 2019. Global forest goals and targets of the UN strategic plan for forests 2030. United Nations, New York, April 2019. <https://www.un.org/esa/forests/wp-content/uploads/2019/04/Global-Forest-Goals-booklet-Apr-2019.pdf>

Related indicators

Identical to Indicator 12.

SUB-Indicator 14.2: Proportion of farmers benefitting from forests and trees

Global forest goal 2: Enhance forest-based economic, social and environmental benefits, including by improving the livelihoods of forest-dependent people.

Target 2.3: The contribution of forest and trees to food security is significantly increased. (UNDESA, 2019)

Institutional information

Organization(s):

Food and Agriculture Organization of the United Nations (FAO),
Statistics Division (ESS)

Concepts and definitions

Definition:

Proportion of farming households (in %) deriving part of their livelihood from trees or forests.

Proportion of farming households (in %) benefiting from forests and trees.

Rationale:

This indicator will reflect the contribution of forests, trees and agroforestry to livelihoods of farmers, as sources of food, income and of ecosystem services essential to agricultural production. It will also illustrate the important buffering role of forests and trees.

This indicator will complement the indicator on employment related to the forest sector (indicator 12) (to better cover the range of people depending on forests and trees for their livelihood and FSN. It will also constitute a proxy of the number of farmers that depend to various degrees on the ecosystem services provided by forests and trees to agriculture production (the link between the two being often the proximity to forests and trees).

Concepts:

Since agricultural censuses are usually undertaken only every ten years, it is natural to associate them with structural aspects of agriculture that change relatively slowly over time. Thus, agricultural censuses are mainly concerned with data on the basic organizational structure of agricultural holdings, such as size of holding, land tenure, land use, crop area, irrigation, livestock numbers, labour, use of machinery and other agricultural inputs. Agricultural censuses have not normally included data that change from year to year, such as agricultural production or agricultural prices.

Comments and limitations:

Methodology

Computation Method:

A simple qualitative question (with a “Yes/No” answer) could be added to the agricultural census of agriculture:

Do you draw any benefits from forests, trees and/or agroforestry (such as products, feed for your cattle, income,...)?

The answer could be Yes/No

Countries could decide to complement it with a closed list of possible answers such as the following and that could include specific products that are of importance locally, especially for diets and, the case being, estimations of quantities as well as, as appropriate, gender disaggregation:

- Products (for auto-consumption):
 - wood (including woodfuel);
 - food (including fruits, nuts, berries, mushrooms, etc.);
 - medicinal plants;
 - other products;
- Income (from the sale of abovementioned products);
- Other benefits:
 - Cultural and recreational value;
 - Tourism and ecotourism;
 - Water and flood regulation;
 - Habitat for pollinators;
 - Other ecosystem services.

Disaggregation:

No further disaggregation of this indicator at global level.

Treatment of missing values:

Regional/Geographical aggregates:

Geographical aggregates would be produced by summation of the data available at national level, according to the United Nations M-49 list.

Sources of discrepancies:

Methods and guidance available to countries for the compilation of the data at the national level:

FAO issued two publications to help/guide countries for the organization and implementation of their own agricultural census at national level for the census of agriculture 2020:

- **FAO.** 2015. *World programme for the census of agriculture 2020. Volume 1: Programme, concepts and definitions.* FAO statistical development series 15. Rome. 204p.
<http://www.fao.org/3/a-i4913e.pdf>
- **FAO.** 2015. *World programme for the census of agriculture 2020. Volume 2: Operational guidelines.* FAO statistical development series 16. Rome. 350p.
<http://www.fao.org/3/CA1963EN/ca1963en.pdf>

Quality assurance:

The definition of quality is necessarily broad and covers relevance, accuracy, reliability, timeliness and punctuality, accessibility and clarity, comparability and coherence. It is important to have a quality assurance plan in place at national level for the census to ensure confidence in the data and to help the users understand the quality issues associated with the data. A Post Enumeration Survey (PES) is an essential component of the quality assurance framework and should be included in the census plan and budget.

Statistics are subject to the general quality assurance framework of FAO¹, where domain-specific quality assurance activities (the use of best practices, quality reviews, self-assessments, compliance monitoring) are carried out systematically.

Data Sources

Description:

This question would be included in the world agriculture census, which is constituted of the national census realized during a 10 years period (2015-2025 for the 2020 WCA). A census of agriculture is a statistical operation that collects, processes, archives and disseminates structural data on the agriculture and aquaculture sectors, covering the whole or a significant part of these sectors in a given country. Each country is encouraged to develop and implement its census of agriculture tailored to its unique situation, but to be mindful of the need to collect a minimum set of data for international comparison purposes.

The census of agriculture is the principal means of collecting basic agricultural statistics in a country as part of an integrated programme of data collection and compilation aimed at providing a comprehensive source of statistical information for agricultural policy purposes, as well as for research, business and other uses, in addition to the usual statistical uses.

Collection process:

Data are collected by the country operators through face-to-face interviews, or methods of interviews (including self-interviews) using advanced technologies. Farm registers and other administrative records can be used as sources for some census data. Global positioning systems and geographical information systems can be very useful tools for the planning, preparation and realization of the census.

Four methodological approaches are distinguished to conduct a census for agriculture:

- the “classical” approach in which all the census information is collected in a single one-off field operation;
- the “modular” approach comprising a core module followed by sample-based supplementary modules;
- the integrated census and survey modality comprising a core census module followed by sample-based rotating modules implemented over the period separating two core census modules; and,
- the use of registers as a source of census data in which administrative records partly or completely replace census field data collection.

Data Availability

Description/Geographical coverage:

208 countries across Africa, North and Central America, South America, Asia, Europe, and Oceania. 95 countries are planning to gather their census data in the year 2020 or after, with 4 countries gathering data across years 2019/2020; 2 countries undertaking the second half of their data gathering in years 2020 or 2021; and 4 countries yet to determine their collection year.

¹ See FAO Statistics Quality Assurance Framework: <http://www.fao.org/docrep/019/i3664e/i3664e.pdf>

Time series:

The World Programme for the Census of Agriculture (WCA) 2020 is the ninth round of WCA since the programme started in 1930. This 2020 round covers agricultural census to be undertaken between 2016 and 2025.

([1930](#), [1950](#), [1960](#), [1970](#), [1980](#), [1990](#), [2000](#), [2010](#))

Calendar

Data collection:

The WCA 2020 covers agricultural censuses to be carried out by countries between 2016 and 2025. Countries are encouraged to carry out their agricultural census as close as possible to the year 2020, to help make international comparisons more meaningful, but it is recognized that the timing of a country's census is determined by many factors, including administrative and financial considerations.

The census has two main reference periods – namely, the census reference year and the census reference day. The census reference year is a period of twelve months, usually either a calendar year or an agricultural year, generally encompassing the various time reference dates or periods of data collection for individual census items. Use of the agricultural year has the advantage that respondents often think of their activities in seasonal terms and thus find recall easier for this reference period. The census reference day is a point in time used for livestock numbers and other inventory items. There may be some exceptions to these census reference periods, such as in the population dynamics for some types of livestock herds where a reference period of less than 12 months may be appropriate.

Data release:

The World Programme for the Census of Agriculture (WCA) is a decennial programme.

Data providers

The main data providers are member countries that carry out their agricultural censuses.

The statistical observation unit for the agricultural census is the agricultural holding. The WCA 2020 maintains the possibility, introduced in the previous programme, to collect data at the community level, due to the strong demand for, and increased use of, this kind of data vis-a-vis the marginal field cost. Community-level data is collected with a view to building an information base on the infrastructure and services available to agricultural holdings (see FAO, 2015; section 9).

Many countries apply a minimum size limit for inclusion of units in the census. This is justified on the grounds that there are usually a large number of very smallholdings making little contribution to total agricultural production and it is not cost-effective to include them in the agricultural census. However, in many developing countries, small-scale agriculture makes a significant contribution to household food supplies and is often an important source of supplementary household income. In some countries, almost all households have some own-account agricultural production activities, such as keeping a few chickens or having a small kitchen garden. The inclusion of smallholdings is also important to reflect women's participation in agricultural work. An alternative to setting minimum size limits is to cover all units regardless of size, but ask only some very limited questions for small units.

Data compilers

FAO, Statistics Division (ESS)

References

URL:

References:

- FAO.** 2015. *World programme for the census of agriculture 2020. Volume 1. Programme, concepts and definitions.* FAO statistical development series 15. Rome. <http://www.fao.org/3/a-i4913e.pdf>
- FAO.** 2015. *World programme for the census of agriculture 2020. Volume 2: Operational guidelines.* FAO statistical development series 16. Rome. <http://www.fao.org/3/CA1963EN/ca1963en.pdf>
- UNDESA.** 2019. *Global forest goals and targets of the UN strategic plan for forests 2030.* United Nations, New York, April 2019. <https://www.un.org/esa/forests/wp-content/uploads/2019/04/Global-Forest-Goals-booklet-Apr-2019.pdf>

Related indicators

Indicator 14.1: Employment related to the forest sector.

SUB-Indicator 14.3: Wood fuel consumption per capita

Global forest goal 2: Enhance forest-based economic, social and environmental benefits, including by improving the livelihoods of forest-dependent people.

Target 2.3: The contribution of forest and trees to food security is significantly increased. (UNDESA, 2019)

Institutional information

Organization(s):

Food and Agriculture Organization of the United Nations (FAO),
Forestry Policy and Resources Division (FOA), Forestry Department

Concepts and definitions

Definition:

Woodfuel consumption per capita (m³/1000 persons)

Rationale:

Woodfuel is an important source of primary energy in developing countries (27 percent in Africa), essential for cooking food and boiling water, which are of fundamental importance to improve food safety and the bio-availability of micronutrients and reduce the incidence of diarrhoea.

Around 2.4 billion people, one-third of the global population (including two-thirds of the households in Africa), use wood as their main source of energy for cooking (FAO, 2014). 764 million people use woodfuel to boil and sterilize water (FAO, 2014), contributing to improve hygiene and sanitary conditions and to avoid diseases such as diarrhoea which is a major cause of malnutrition. In 2010, diarrhoeal diseases alone affected 550 million people and caused 230,000 deaths (WHO, 2015).

Woodfuel collection and use is also an important source of livelihoods in developing countries.

Concepts:

Woodfuel designates the round wood that will be used as fuel for purposes such as cooking, heating or power production. It includes wood harvested from main stems, branches and other parts of trees (where these are harvested for fuel) and wood that will be used for the production of charcoal (e.g. in pit kilns and portable ovens), wood pellets and other agglomerates².

The indicator is expressed in m³/1000 persons.

Comments and limitations:

This indicator is of particular significance for nutrition in developing countries. It is much less the case in developed countries. However, even in developed countries it is an important indicator of benefit provided by forests and trees.

Woodfuel production and consumption might be underestimated as it is often informal and also often self-consumed, even in developed countries.

² See: Joint forest sector questionnaire definitions, <http://www.fao.org/forestry/7800-0aded052ed8904ee31f045d5a3f79ae1d.pdf>

Methodology

Computation Method:

FAOSTAT³ provides, at national level annual woodfuel production, import and export quantities (in m³).

Woodfuel national (in m³) consumption can be obtained by doing:

Consumption = Production + Import – Export

The consumption per capita (in m³/1000 persons) is then obtained by dividing the national woodfuel consumption by the national total population, also provided annually by FAOSTAT⁴.

Disaggregation:

No further disaggregation of this indicator

Treatment of missing values:

Non reporting is supplemented with statistics from alternative sources, official and non-official. In case of non-reporting, last year's figure is repeated until new information is received or found from alternative sources. Non-reported cells are never left blank (flags in FAOSTAT indicate if a figure is official, non-official or estimated/repeated).

Geographical aggregates:

Geographical aggregates are produced by summation of the data available at national level, according to the United Nations M-49 list.

Sources of discrepancies:

The national figures in the database are reported by the countries themselves following standardized format, definitions and reporting years, thus eliminating any discrepancies between global and national figures.

Methods and guidance available to countries for the compilation of the data at the national level:

All data are provided to FAO by countries that fill the annual Joint Forest Sector Questionnaire⁵, that allows data collection based on a set of harmonised product aggregations, codes and definitions⁶.

Quality assurance:

The data providers are the best national experts available and they are encouraged to make informed estimates when they are not provided with data. The country correspondents are responsible for the data quality. However, FAO and other partner agencies (Eurostat, ITTO, UNECE) validate and corrects the data in consultation with the correspondents.

The members of the Eurostat/UNECE/FAO/ITTO Inter-Secretariat Working Group on Forest Sector Statistics have agreed on basic validation rules aimed at identifying and eliminating as many inconsistencies as possible. The countries are requested to comment on any changes or estimates resulting from the validation procedure.

Time series of physical quantities and unit values are reviewed. Data are checked for outliers by Eurostat, UNECE, ITTO and FAO before being published in FAOSTAT database. Statistics are subject to the general quality assurance framework of FAO⁷, where domain-specific quality assurance

³ See FAOSTAT Forestry: <http://www.fao.org/faostat/en/#data/FO>

⁴ See FAOSTAT Annual Population: <http://www.fao.org/faostat/en/#data/OA>

⁵ See Joint Forest Sector Questionnaire 2018:

⁶ See Joint Forest Sector Questionnaire definitions: <http://www.fao.org/forestry/7800-0aded052ed8904ee31f045d5a3f79ae1d.pdf>

⁷ See FAO Statistics Quality Assurance Framework: <http://www.fao.org/docrep/019/i3664e/i3664e.pdf>

activities (the use of best practices, quality reviews, self-assessments, compliance monitoring) are carried out systematically.

Quality assessment:

The quality of data varies considerably between countries and products. There are no routines for accessing the quality, except for some input validation. Quality of data is assessed in ad-hoc studies such as:

1) Wardle, Ph., Van Brusselen, B., Michie, B. and Schuck A. 2003. Forest Products Statistical Information Systems of EU and EFTA. European Forest Institute Research Reports No. 16, ISBN-13: 978 90 04 12919 1; ISBN-10: 90 04 12919 7; 166 pp.

http://www.efi.int/portal/virtual_library/publications/research_reports/16/

2) Whiteman, A., Broadhead, J. and Bahdon, J. 2002. The revision of woodfuel estimates in FAOSTAT. Unasylva, 54(211): 41–45. <ftp://ftp.fao.org/docrep/fao/005/y4450e/y4450e07.pdf>

Data Sources

Description:

For annual population, FAOSTAT uses the national data sent by each country to the UN Population Division for the National Population Census⁸.

FAOSTAT Forestry database contains data on the production and trade in roundwood and primary wood and paper products for all countries and territories in the world. It includes data on production and trade in roundwood, woodfuel and other basic products.

Production of woodfuel is reported in physical units (m³ under bark), while import and export are reported in both monetary and physical units.

Collection process:

The worldwide collection of forestry statistics is carried out by the Inter-Secretariat Working Group (IWG) on Forest Sector Statistics, consisting of Eurostat (Statistical Office of the European Union), FAO (Food and Agriculture Organisation of the United Nations), ITTO (International Tropical Timber Organization) and UNECE (United Nations Economic Commission for Europe). The primary tool for data collection is the above-mentioned annual Joint Forest Sector Questionnaire that is used by all four partners to collect data using a set of harmonised product aggregations, codes and definitions.

Each agency is responsible for data collection in a certain number of countries; for Eurostat, these are the EU and EFTA countries, UNECE – rest of Europe plus Canada and USA, for ITTO – tropical producer countries, FAO – the rest of the world. After validation, the partners share the data and use it in publications. Co-operation is organised through the annual meetings of the IWG.

Data Availability

Description/Geographical coverage:

Data are available for 213 countries and territories included in FAOSTAT.

Time series:

Data are calculated annually with, for some countries and territories, time series dating back to 1961.

⁸ See <http://www.un.org/en/development/desa/population/>

Calendar

Data collection:

Preliminary data are ready 7 months, and final data 12 months after the end of the reference year. Data are uploaded for dissemination twice a year (July and December) irrespectively when they arrive at FAO. Validation of the global dataset before dissemination normally takes 3-4 weeks.

Data release:

Data are disseminated twice a year (July and December, final dataset in December) through FAOSTAT website:

<http://www.fao.org/faostat/en/#data/FO>

Data providers

The basic data collection is carried out yearly by country correspondents in the Member States.

The statistical units for the data on wood removals are private owners, state owners and other public owners of forests. For manufactured wood and paper products, the unit is the enterprise. In each country, different organisations/associations represent companies that supply and use roundwood and/or trade in roundwood and wood products. Data are generally collected from the users of roundwood (the wood industry companies or companies that trade in roundwood). There are however, different methods used for the collection of basic data, e.g. in Sweden, the data on removals rely partly on the National Forest Inventories. In Finland, data are collected from roundwood buyers, i.e. wood industry companies.

Data compilers

FAO, Forestry Policy and Resources Division (FOA), Forestry Department

References

URL:

FAOSTAT Forestry: <http://www.fao.org/faostat/en/#data/FO>

FAOSTAT Population: <http://www.fao.org/faostat/en/#data/OA>

FAO Yearbook of Forest Products: <http://www.fao.org/forestry/statistics/80570/en/>

Global Forest Products Facts and Figures: <http://www.fao.org/forestry/statistics/80938/en/>

References:

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UNDESA. 2019. *Global forest goals and targets of the UN strategic plan for forests 2030*. United Nations, New York, April 2019. <https://www.un.org/esa/forests/wp-content/uploads/2019/04/Global-Forest-Goals-booklet-Apr-2019.pdf>

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Related indicators

Indicator 10

SUB-Indicator 14.4: Fruit consumption per capita

Global forest goal 2: Enhance forest-based economic, social and environmental benefits, including by improving the livelihoods of forest-dependent people.

Target 2.3: The contribution of forest and trees to food security is significantly increased. (UNDESA, 2019)

Institutional information

Organization(s):

Food and Agriculture Organization of the United Nations (FAO),
Statistics Division (ESS)

Concepts and definitions

Definition:

Fruit consumption per capita (kg per year, per capita)

Rationale:

As a source of nuts, fruits, bays, mushrooms, bushmeat, and medicinal plants, forests, trees and agroforestry make an essential contribution to global dietary quality and diversity, and to human health, not only for forest-dependent communities but also, through local, national and even international markets, for people living far from forests.

This indicator will illustrate the contribution of forests, trees and agroforestry to a balanced diet, through the provision of fruits rich in micronutrients and fibre, as around 74% of fruit produced globally are harvested from trees and related species (McMullin et al. forthcoming). It will also illustrate the contribution to food production of ecosystem services provided by forests and trees given their importance for wild pollinators (as source of food and critical undisturbed habitat).

Concepts:

The Food Balance Sheets are compiled every year by FAO, mainly with country-level data on the production and trade of food commodities. They present a comprehensive picture of the pattern of a country's food supply during a specified reference period. They show for each food item - i.e. each primary commodity and a number of processed commodities potentially available for human consumption - the sources of supply and its utilization. The total quantity of foodstuffs produced in a country added to the total quantity imported, deduction made of exports, and adjusted to any change in stocks that may have occurred since the beginning of the reference period gives the supply available during that period.

On the utilization side a distinction is made between the quantities exported, fed to livestock, used for seed, put to manufacture for food use and non-food uses, losses during storage and transportation, and food supplies available for human consumption.

The per capita supply of each such food item available for human consumption is then obtained by dividing the respective quantity by the related data on the population actually partaking of it. Data on per capita food supplies are expressed in terms of quantity and - by applying appropriate food composition factors for all primary and processed products - also in terms of caloric value and protein and fat content.

The Food Balance Sheets cover most crop and livestock products, including processed products, under agricultural activity. In the Food Balance Sheets, production data refer only to primary products while data for all other elements also include processed products derived therefrom, expressed in primary commodity equivalent.

The indicator expresses the food supply per capita for the aggregated item “Fruits – Excluding Wine” in kg per capita per year.

The aggregated item “Fruits – Excluding Wine” includes:

- 2617 Apples and products,
- 2615 Bananas,
- 2614 Citrus, other,
- 2619 Dates,
- 2625 Fruits, other,⁹
- 2613 Grapefruit and products,
- 2620 Grapes and products (excluding wine),
- 2612 Lemons, limes and products,
- 2611 Oranges, mandarins,
- 2618 Pineapples and products
- 2616 Plantains

It excludes wine, which is classified under “Alcoholic beverages”.

Comments and limitations:

As there is a substantial amount of estimated or imputed data points, the accuracy for certain products, countries and/or regions is not that good. There is limited geographical comparability due to differences in methods and coverage, except for regions with homogenous countries. For shorter time periods reasonably good comparability over time can be expected as there is stability in the product definition and classification. However, as the time series are very long (from 1961) full comparability over time cannot be expected.

Methodology

Computation Method:

Food supply per capita is obtained by dividing the food supply by the total population, both variables available in FAOSTAT food balance sheets¹⁰

Disaggregation:

No further disaggregation of this indicator

Treatment of missing values:

⁹ This item “Other fruits” includes: 521 Pears, 523 Quinces, 526 Apricots, 527 Apricots, dry, 530 Cherries, sour, 531 Cherries, 534 Peaches and nectarines, 536 Plums and sloes, 537 Plums dried (prunes), 538 Juice, plum, single strength, 539 Juice, plum, concentrated, 541 Fruit, stone not elsewhere specified (nes), 542 Fruit, pome nes, 544 Strawberries, 547 Raspberries, 549 Gooseberries, 550 Currants, 552 Blueberries, 554 Cranberries, 558 Berries nes, 567 Watermelons, 568 Melons, other (including cantaloupes), 569 Figs, 570 Figs dried, 571 Mangoes, mangosteens, guavas, 572 Avocados, 583 Juice, mango, 587 Persimmons, 591 Cashewapple, 592 Kiwi fruit, 600 Papayas, 603 Fruit, tropical fresh nes, 604 Fruit, tropical dried nes, 619 Fruit, fresh nes, 620 Fruit, dried nes, 622 Juice, fruit nes, 623 Fruit, prepared nes, 624 Flour, fruit, 625 Fruits, nuts, peel, sugar preserved, 626 Fruit, cooked, homogenized preparations.

¹⁰ See: <http://www.fao.org/faostat/en/#data/FBS>

Regional/Geographical aggregates:

Geographical aggregates are produced by summation of the data available at national level, according to the United Nations M-49 list.

Sources of discrepancies:

Methods and guidance available to countries for the compilation of the data at the national level:

National reference metadata are submitted by some countries in conjunction with the production questionnaire but these are not yet disseminated by FAO. No methodological papers, except the classification scheme, has been produced.

Quality assurance:

Countries are responsible for transmitting data, which have already been checked. Validation at FAO concerns any transmission errors and data consistency as well as detecting outliers. Other validations concerns are: consistency over time with earlier data; consistency of totals and partial components; and correspondence between variables from different data sets.

Statistics are subject to the general quality assurance framework of FAO¹¹, where domain-specific quality assurance activities (the use of best practices, quality reviews, self-assessments, compliance monitoring) are carried out systematically.

Quality assessment:

No quality reports or studies made by FAO. No national quality reports are collected.

The quality of data varies considerably between countries. There are no routines for accessing the quality, except for some input validation. Ideally, sample surveys should be representative of at least 95% of the total area and land under that crop. Surveys on production or yields should be conducted using statistically recognized methods as regards quality, objectivity and reliability.

Up until now, FAO has not been in the position to ensure such quality requirements of the data submitted by countries. More information on metadata and certain validation procedures at country level are certainly needed.

Data Sources

Description:

The main source is official statistics from FAO member countries. Exceptionally, unofficial data are also used as well as estimated/imputed data. In both cases this is "flagged". Data are recorded as countries report them, except for eliminating obvious errors. The source data can originate from surveys, administrative data and estimates based on expert observations. Which type of source is used by countries significantly affects reliability and comparability of data.

Collection process:

Food Balance Sheets (FBS) are compiled every year by FAO, mainly with country-level data on the production and trade of food commodities. Sample surveys are generally used but there are also cases where administrative records are used, see country specific metadata.

11 See FAO Statistics Quality Assurance Framework: <http://www.fao.org/docrep/019/i3664e/i3664e.pdf>

Data Availability

Description/Geographical coverage:

FAOSTAT includes the Food Balance Sheets of 184 countries: However, a substantial amount of data points has been imputed and estimated as several countries have not reported data on production and/or trade.

Time series:

Data are calculated annually with, for some countries and territories, time series dating back to 1961.

Calendar

Data collection:

Depends on availability of the Agricultural Production and Trade data.

Data release:

Data are disseminated once per year, through FAOSTAT website:

<http://www.fao.org/faostat/en/#data/FBS>

Dates for new data releases are pre-announced on the FAOSTAT website.

Data providers

The main source is official statistics from FAO member countries.

For production, the observation units are the agriculture holdings and/or food and agriculture enterprises. Trade data include all crops and livestock products registered by the custom office in the country. In case of non-custom trade data, the observation unit is the trade operator.

Data compilers

FAO, Statistics Division (ESS)

References

URL:

FAOSTAT Food Balance Sheets: <http://www.fao.org/faostat/en/#data/FBS>

References:

UNDESA. 2019. *Global forest goals and targets of the UN strategic plan for forests 2030*. United Nations, New York, April 2019. <https://www.un.org/esa/forests/wp-content/uploads/2019/04/Global-Forest-Goals-booklet-Apr-2019.pdf>

McMullin S., Njogu K., Wekesa B., Gachui A., Ngethe E., Stadlmayr B., Jamnadass R., Kehlenbeck K. Developing fruit tree portfolios that link agriculture more effectively with nutrition and health: a new approach for providing year-round micronutrients to smallholder farmers. Forthcoming.

Related indicators

Indicator 14.5: Nuts consumption per capita.

SUB-Indicator 14.5: Nuts consumption per capita

Global forest goal 2: Enhance forest-based economic, social and environmental benefits, including by improving the livelihoods of forest-dependent people.

Target 2.3: The contribution of forest and trees to food security is significantly increased. (UNDESA, 2019)

Institutional information

Organization(s):

Food and Agriculture Organization of the United Nations (FAO),

Statistics Division (ESS)

Concepts and definitions

Definition:

Nuts consumption per capita (kg per year, per capita)

Rationale:

As a source of **nuts**, fruits, bays, mushrooms, bushmeat, and medicinal plants, forests, trees and agroforestry make an essential contribution to global dietary quality and diversity, and to human health, not only for forest-dependent communities but also, through local, national and even international markets, for people living far from forests.

This indicator will show the global contribution of forests, trees and agroforestry to a balanced diet, through the provision of nuts rich in micronutrients and lipids.

Concepts:

The Food Balance Sheets are compiled every year by FAO, mainly with country-level data on the production and trade of food commodities. They present a comprehensive picture of the pattern of a country's food supply during a specified reference period. They show for each food item - i.e. each primary commodity and a number of processed commodities potentially available for human consumption - the sources of supply and its utilization. The total quantity of foodstuffs produced in a country added to the total quantity imported and adjusted from exports and any change in stocks that may have occurred since the beginning of the reference period gives the supply available during that period.

On the utilization side a distinction is made between the quantities exported, fed to livestock, used for seed, put to manufacture for food use and non-food uses, losses during storage and transportation, and food supplies available for human consumption.

The per capita supply of each such food item available for human consumption is then obtained by dividing the respective quantity by the related data on the population actually partaking of it. Data on per capita food supplies are expressed in terms of quantity and - by applying appropriate food composition factors for all primary and processed products - also in terms of caloric value and protein and fat content.

The Food Balance Sheets cover most crop and livestock products, including processed products, under agricultural activity. In the Food Balance Sheets, production data refer only to primary products while data for all other elements also include processed products derived therefrom, expressed in primary commodity equivalent.

The indicator expresses the food supply per capita for the item “Nuts and products”¹² in kg per capita per year.

The item “Nuts and products” includes:

- 216 Brazil nuts, with shell,
- 217 Cashew nuts, with shell,
- 220 Chestnut,
- 221 Almonds, with shell,
- 222 Walnuts, with shell,
- 223 Pistachios,
- 224 Kola nuts,
- 225 Hazelnuts, with shell,
- 226 Areca nuts,
- 229 Brazil nuts, shelled,
- 230 Cashew nuts, shelled,
- 231 Almonds shelled,
- 232 Walnuts, shelled,
- 233 Hazelnuts, shelled,
- 234 Nuts, not elsewhere specified,
- 235 Nuts, prepared (exc. groundnuts).

It excludes groundnuts and coconuts.

Comments and limitations:

As there is a substantial amount of estimated or imputed data points, the accuracy for certain products, countries and/or regions is not that good. There is limited geographical comparability due to differences in methods and coverage, except for regions with homogenous countries. For shorter time periods, reasonably good comparability over time can be expected as there is stability in the product definition and classification. However, as the time series are very long (from 1961) full comparability over time cannot be expected.

Methodology

Computation Method:

Food supply per capita is obtained by dividing the food supply by the total population, both variables available in FAOSTAT food balance sheets¹³

Disaggregation:

No further disaggregation of this indicator

Treatment of missing values:

Regional/Geographical aggregates:

Geographical aggregates are produced by summation of the data available at national level, according to the United Nations M-49 list.

¹² The item “Nuts and products” is equivalent to the aggregated item “Treenuts”.

¹³ See: <http://www.fao.org/faostat/en/#data/FBS>

Sources of discrepancies:

Methods and guidance available to countries for the compilation of the data at the national level:

National reference metadata are submitted by some countries in conjunction with the production questionnaire but these are not yet disseminated by FAO. No methodological papers, except the classification scheme, has been produced.

Quality assurance:

Countries are responsible for transmitting data which have already been checked. Validation at FAO concerns any transmission errors and data consistency as well as detecting outliers. Other validations concerns are: consistency over time with earlier data; consistency of totals and partial components; and correspondence between variables from different data sets.

Statistics are subject to the general quality assurance framework of FAO¹⁴, where domain-specific quality assurance activities (the use of best practices, quality reviews, self-assessments, compliance monitoring) are carried out systematically.

Quality assessment:

No quality reports or studies made by FAO. No national quality reports are collected.

The quality of data varies considerably between countries. There are no routines for accessing the quality, except for some input validation. Ideally, sample surveys should be representative of at least 95% of the total area and land under that crop. Surveys on production or yields should be conducted using statistically recognized methods as regards quality, objectivity and reliability.

Up until now, FAO has not been in the position to ensure such quality requirements of the data submitted by countries. More information on metadata and certain validation procedures at country level are certainly needed.

Data Sources

Description:

The main source is official statistics from FAO member countries. Exceptionally, unofficial data are also used as well as estimated/imputed data. In both cases this is "flagged". Data are recorded as countries report them, except for eliminating obvious errors. The source data can originate from surveys, administrative data and estimates based on expert observations. Which type of source is used by countries affect significantly reliability and comparability of data.

Collection process:

Food Balance Sheets (FBS) are compiled every year by FAO, mainly with country-level data on the production and trade of food commodities. Sample surveys are generally used but there are also cases where administrative records are used, see further country specific metadata.

14 See FAO Statistics Quality Assurance Framework: <http://www.fao.org/docrep/019/i3664e/i3664e.pdf>

Data Availability

Description/Geographical coverage:

FAOSTAT includes the Food Balance Sheets of 184 countries: However, a substantial amount of data points has been imputed and estimated as several countries have not reported data on production and/or trade.

Time series:

Data are calculated annually with, for some countries and territories, time series dating back to 1961.

Calendar

Data collection:

Depends on availability of the Agricultural Production and Trade data.

Data release:

Data are disseminated once per year, through FAOSTAT website:

<http://www.fao.org/faostat/en/#data/FBS>

Dates for new data releases are pre-announced on the FAOSTAT website.

Data providers

The main source is official statistics from FAO member countries.

For production, the observation units are the agriculture holdings and/or food and agriculture enterprises. Trade data include all crops and livestock products registered by the custom office in the country. In case of non-custom trade data, the observation unit is the trade operator.

Data compilers

FAO, Statistics Division (ESS)

References

URL:

FAOSTAT Food Balance Sheets: <http://www.fao.org/faostat/en/#data/FBS>

References:

UNDESA. 2019. *Global forest goals and targets of the UN strategic plan for forests 2030*. United Nations, New York, April 2019. <https://www.un.org/esa/forests/wp-content/uploads/2019/04/Global-Forest-Goals-booklet-Apr-2019.pdf>

Related indicators

Indicator 14.4: Fruit consumption per capita.