Seventh International Conference on Agricultural Statistics

ICAS VII

2016 Rome, 26 | 28 October

Food and Agriculture Organization of the United Nations

Istat

The challenge of collecting and publishing data on organic agriculture worldwide

Helga Willer,[1] Julia Lernoud[1] and Raffaele Zanoli[2]
[1] Research Institute of Organic Agriculture FiBL
Ackerstrasse 113
5070 Frick, Switzerland
helga.willer@fibl.org
[2] Università Politecnica delle Marche
Via Brecce Bianche
60131 Ancona, Italy

ABSTRACT

Globally, organic farming continues to grow and, in many countries, has reached wide acceptance amongst farmers, consumers, market actors, policymakers, and the public. According to the latest available data (per 31.12.2014), 43.7 million hectares are under organic agricultural management, and this constitutes almost one percent of the global agricultural land; the global market is estimated to be 80 billion USD (Willer & Lernoud 2016). These data, which are mostly based on national data sources, are annually compiled by FiBL, which has been collecting and publishing data on organic agriculture worldwide since 2000. They are widely used and quoted by governments drawing up action plans for organic agriculture; researchers; market actors; market research companies, and the media.

However, with the collection of these data, there are challenges, including data gaps and incomplete data, issues related to definitions, classifications, data quality, and data access. Based on the work of the European research project OrganicDataNetwork, suggestions for the improvement of organic data at national level and in Europe have been made (Zanoli 2014). This paper highlights latest data and trends, illustrates current challenges and good examples, and makes recommendations related to data collection on organic agriculture based on the European experience.

Keywords: Organic agriculture, market data, data collection, data harmonisation

1. Introduction and background

Organic farming, which emerged in the first decades of the past century (Vogt 2000), continues to grow globally and has reached wide acceptance amongst farmers, consumers, market actors, policy makers and the public in many countries. Organic agriculture has garnered increasing official attention and support in the past few years, in particular since 2000. Among other reasons, governments support organic farming because it responds to consumer demand for high-quality food and environmentally friendly farming practices. The benefits of organic agriculture are documented in many peer-review scientific papers. Recent examples are publications on the positive effects on food quality (Branaski et al. 2014, Średnicka-Tober 2016 a,b), biodiversity and the environment (Schader et al. 2012), food security (Reganold & Wachter 2016), and climate change mitigation (Skinner et al. 2014), to name just a few. Organic agricultural land area and organic share of the total agricultural land is seen as an agri-environmental indicator by the OECD (2013), the European Environmental Agency (2015), and Eurostat (2015).

In many parts of the world, support is granted for organic agriculture in many ways; the most common is the establishment of organic regulations/laws, of which 87 exist today (Huber et al. 2016). Further support schemes include action plans e.g. in the European Union (European Commission 2014a) and many European countries (Sanders and Schmid 2014), institutional support for sector development, e.g. in Saudi Arabia (Hartmann and Bernet 2013), rural development support, e.g. in Brazil (Meireilles 2016), research support e.g. in Canada (Hammermeister 2016), support for export, e.g. Peru (Donahue et al. 2011), or an overall political commitment in Africa (African Union 2011). More information on the private-public collaboration in the field of organic agriculture is available from Bowen (2016).

However, a positive environment for organic sector development does not only require reliable policy support for farmers and food businesses but also a reliable information system (Stolze et al. 2016). Therefore, many governments have established collection systems for data on the organic sector. These are often linked to the establishment of regulations/laws about organic agriculture, such as the EU regulation on organic agriculture, which describes precisely what data should be provided (European Commission 2014b). Once such a regulation/law is established, there are rules about the registration of certifiers with a national authority, which opens up access to data from the certifiers. Public data collection systems mostly cover the organic area and operators and sometimes cover production and, rarely though, international trade data, but they mostly exclude data on the domestic market. There are some countries though, such as Denmark or Sweden, where the statistical offices (Statistics Denmark and SBC) collect retail sales data and, in the case of Denmark, also international trade data.

At the international level, the Research Institute of Organic Agriculture (FiBL) has been compiling and publishing data on organic agriculture since 2000 and continuously expanding the number of indicators on which data are collected. The data are published annually in a yearbook (Willer&Lernoud 2016) and online (FiBL 2016). Whereas in the beginnings of FiBL's data collection activities, only data on the organic area and the number of producers were collected, data collection has been expanded in the past few years, and today, data on all commodities/products and further indicators are collected, e.g., area, livestock numbers, retail sales, exports, and imports. Data collection is carried out in collaboration with many partners among a network of 200 data providers, including governments, private sector organisations, market research institutes, and certification bodies. The data is published together with the IFOAM – Organics International, the international umbrella of the organic sector. With the expansion of FiBL's global data collection, other activities

have emerged, such as the collection of data on Voluntary Sustainability Standards (VSS), e.g., Fairtrade International, UTZ Certified, Rainforest Alliance/SAN, and others (Lernoud et al. 2016). Also, FiBL's organic crop data are of particular interest and can be used for a detailed analysis of certain commodities (Granatstein et al. 2015).

FAOSTAT, too, publishes global organic surface area/land use data online, partly based on the annual FAO land use survey, partly on data from FiBL (FAOSTAT 2016).

In Europe, Eurostat publishes data annually, covering a wide range of indicators such as area, livestock numbers, production, operator types including processor by NACE code (Eurostat 2016). These data are complemented by retail sales and trade data compiled by the FiBL and partners (Willer and Schaack 2016).

2. Organic agriculture world-wide – latest trends

According to the latest FiBL survey on certified organic agriculture worldwide (Willer&Lernoud 2016) as of the end of 2014, data on organic agriculture was available from 172 countries (up from 170 in 2013). There were 43.7 million hectares of organic agricultural land in 2014, including in-conversion areas. The regions with the largest areas of organic agricultural land are Oceania (17.3 million hectares, 40 percent of the world's organic agricultural land) and Europe (11.6 million hectares, 27 percent). Latin America has 6.8 million hectares (15 percent), followed by Asia (3.6 million hectares, 8 percent), North America (3.1 million hectares, 7 percent) and Africa (1.3 million hectares, 3 percent). The countries with the most organic agricultural land are Australia (17.2 million hectares), Argentina (3.1 million hectares), and the United States (2.2 million hectares). For 2014, almost 500'000 more hectares of organic agricultural land were reported than for 2013; since 1999, the organic farmland has quadrupled (See Table 1).

Currently, one percent of the agricultural land in the countries covered by the annual survey is organic. By region, the highest organic shares of the total agricultural land are in Oceania (4.1percent) and in Europe (2.4 percent). In the European Union, 5.7 percent of the farmland is organic. However, some countries attain far higher shares: Falkland Islands (36.3 percent), Liechtenstein (30.9 percent), Austria (19.4) percent. In eleven countries, more than ten percent of the agricultural land is organic.

Forty percent of the world's organic producers (at least 2.3 million) are in Asia, followed by Africa (26 percent) and Latin America (17 percent). The countries with the most producers are India (650'000), Uganda (190'552), and Mexico (169'703).

Global retail sales of organic food and drink reached 80 billion US dollars in 2014 according to Organic Monitor (Sahota 2016). North America and Europe generate most of the sales of organic products, comprising approximately 90 percent of organic food and drink sales. Many of the organic crops grown in other regions, especially Asia, Latin America, and Africa, are destined for exports. The global market for organic food and drink has expanded over fivefold between 1999 and 2014, and Organic Monitor projects growth to continue. According to Willer & Lernoud (2016) in 2014, the countries with the largest organic markets were the United States (27.1 billion euros), Germany (7.9 billion euros), and France (4.8 billion euros). The largest single market was the United States (approximately 43 percent of the global market), followed by the European Union (23.9 billion euros, 38 percent) and China (3.7 billion euros, 6 percent). The highest per-capita consumption with more than 100 euros was found in Switzerland, Luxembourg, and Denmark. The highest organic market shares were reached in Denmark (7.6 percent), Switzerland (7.1 percent), and Austria (6.5 percent in 2011).

However, some challenges are associated with the collection of organic data, which include data gaps and incomplete data, issues related to definitions, classification, and quality and data access. Even in the European Union, despite the efforts of private organic sector institutions and the fact that EU organic farming legislation requires the collection of relevant statistical information as a tool for market operators and policymakers, organic market data is not nearly as detailed and reliable as general agricultural and food industry statistics (Stolze et al. 2016). Therefore, it is necessary that data suppliers, and in particular governments, pay more attention to the collection and dissemination of data on organic agriculture.

Table 1: *Organic Agriculture Worldwide: Key indicators 2014*

	World	**Leading region**	**Leading countries**
Organic agricultural land	43.7 million hectares	Oceania (17.3 million ha)	Australia (17.2 million ha), Argentina (3.1 million ha), USA (2.2 million ha)
Share of total agricultural land	0.9%	Oceania: 4.1%	Falkland Islands (Malvinas) 36.3%; Liechtenstein (30.9%), Austria (19.4%)
Organic retail sales	62.8 billion Euros	North America (29.6 billion euros)	USA 27.1 billion euros, Germany 7.9 billion euros; France 4.8 billion euros
Organic per capita consumption	8.3 euros	North America 82 euros	Switzerland 221 euros, Luxembourg 164 euros, Denmark 162 euros

Source: Willer & Lernoud 2016

Challenges

From the experience of FiBL's long-standing data collection, there are a number of challenges related to organic data collection that need to be tackled. These include (see also Willer & Schaack 2014):

- Lack of data and incomplete data: In most countries, only very basic data such as data on certified organic farms, land areas and livestock numbers are reported; in fact, for many countries only the total organic area is available without any further details. Currently, reliable, detailed market data, such as data on domestic markets, international trade, and consumer prices do not exist or exist only as rough estimates in most countries.
- Lack of common classifications/aggregation rules across countries: Countries use different definitions, nomenclature, and classifications; only a few use international classifications (exceptions: Denmark uses the UN's Standard International Trade Classification SITC for its organic trade data; the Czech Republic uses EUROSTAT's CPA codes for its import data). Therefore, country-to-country data comparisons are very difficult. Another problem is that data is often aggregated, and only incomplete breakdowns by crop or product are available, which may make data of little use for some purposes. What makes things worse is that there is no harmonized

way of aggregating these data. In addition, aggregation may change from one year to another even in one country, so that times-series comparison becomes impossible.

- Lack of common definitions: A good example is that of livestock data. The commonly used indicator (e.g., Eurostat and FAOSTAT) is "number of heads," which is interpreted in different countries as the "average stock per year" or "animals slaughtered." These differences in definition make country-to-country comparisons of livestock impossible.
- Inconsistent data: The plausibility checks carried out annually by FiBL (such as year-on-year comparisons and comparison with the overall total) show many inconsistent data sets, as simple quality checks are often not performed by the data providers, even though these basic plausibility checks often allow inconsistencies to be identified.

3. Recommendations

The European OrganicDataNetwork project, funded under the 7th Framework programme for research and technological development in the European Union, has developed recommendations from the project results on principles of desirable organic market data development, production, and dissemination (Zanoli 2014). These have been elaborated in the OrMaCode, the ORganic market data MAnual and CODE of Practice (Zanoli et al. 2014) based on the European Statistical Code of Practice (Eurostat, 2011).

Recommendation 1: Extend the mandate for statistical data collection

There is still a major lack of data on organic agriculture in many countries. Therefore, it would be beneficial if more governments set up data collection systems for organic data or expanded the scope of existing data collection efforts by increasing the number of indicators collected, in particular, related to volume and value of production, retail sales, and imports and exports by product or product groups. In addition, the collection of price data should be considered. In order to ease this process, countries could follow the example of the European Union, which makes the collection of basic data mandatory in the organic regulation (European Commission 2014). In addition to the authorities in charge of organic data and the supervision of the control system, it would be beneficial if this mandate could be expanded to other bodies such as statistical offices, customs authorities and, where relevant, individual companies. Better data availability at a country level could then lead to better data availability at a global level, for data currently provided by FiBL for area, area by crop, operators, and market data (FiBL 2016) and by FAO for area and land use data, partly based on the data from FiBL (FAOSTAT 2016).

Recommendation 2: Develop better statistical processes to increase accuracy of data collection on the organic market

There is a clear need for data providers, be they governmental or private, that develop improved statistical processes to increase the accuracy of data about the organic market, specifically by paying more attention to coverage and adopting improved sampling procedures in the case of data that are not based on a census (in particular, retail sales). In cases where only expert estimates are available, these need to be checked against other sources, and overall, it would be good if the principles as laid down in the OrganicDataNetwork's (2014) OrmaCode would be applied.

Recommendation 3: Harmonise the statistical processes for data collection on the organic market to increase coherence and comparability

National statistical institutes and national authorities should harmonise statistical processes for data collection on the organic market to increase coherence and comparability, specifically by harmonising the national definitions, nomenclature, and classification of statistical outputs to

international classifications and by harmonising aggregation rules. Following these rules would make international data sharing a lot easier, and it could be the task of international organisations to help national data collection efforts follow international standards.

Recommendation 4: Establish a system of routine quality checks

Data providers should establish a system of routine quality checks for organic market statistical data by balancing data accuracy versus timeliness in data publication and dissemination, by applying plausibility checks, and by comparing and cross-checking non-official statistical data from at least two independent sources to increase accuracy and consistency. Again, this needs to happen at a country level, but also, any transnational compilation of data at a global or regional level needs to apply quality checks.

Recommendation 5: Strengthen the institutional framework for statistical data collection on the organic market

Institutional support for statistical data collection on organic data should be strengthened, specifically by increased data collection efforts of FAOSTAT and national statistical offices, by establishing and funding permanent, long-term networks of data providers and users at the global, regional, and national levels, and by developing training initiatives to improve the quality of organic market data collection.

Outlook

The positive development of the organic sector, which has seen the continuous growth of the organic market and land under organic management, reflects the dynamic and innovative nature of organic food and farming in response to the expectations of policymakers and the demands of consumers for high-quality food production. On a global level, availability of data on organic agriculture has improved considerably in the past years, in particular for data on organic agricultural land. However, with the collection of these data, there are challenges, including data gaps and incomplete data, issues related to definitions, classifications, data quality, and data access. Therefore, data suppliers must pay more attention to data collection on organic agriculture in order to fill data gaps, harmonize data and improve data quality. Better support for data collection from governments and international institutions could help to improve the situation.

Acknowledgements

The authors gratefully acknowledge support for the data collection on organic agriculture worldwide from the Swiss State Secretariat for Economic Affairs (SECO), the International Trade Centre (ITC) and, in the framework of the OrganicDataNetwork project, the European Commission.

REFERENCES

African Union Commission (2011) Decision on organic farming EX.CL/Dec. 621 (XVIII). African Union Commission, Addis Ababa. Available at http://rea.au.int/en/content/decision-organic-farming.

Barański, M. et al. (2014) Higher antioxidant concentrations and less cadmium and pesticide residues in organically-grown crops: a systematic literature review and meta-analyses. British Journal of Nutrition, 2014 Sep 14; 112(5) 794–811. Published online 2014 Jul 15, doi: 10.1017/S0007114514001366.

Bowen, D. (2016) The Case for Private-Public Collaboration on Organic Agriculture. In: Willer, H., Lernoud, J. (Eds.) The World of Organic Agriculture. Statistics and Emerging Trends 2016. Frick and Bonn, pp 152-156.

Donahue, M.; Bailey, D.; Calderon-Castillo (2011) An Examination of Expanding Peru's Organic Banana Exports to the United States. Paper at 21st Annual International Food and Agribusiness Management World Symposium, June 20-21, 2011, Frankfurt, Germany. Available at http://www.ifama.org/files/conf/2011/Symposium%20Papers/257_Symposium%20Paper.pdf.

European Commission (2014a) Action Plan for the future of Organic Production in the European Union. European Commission, Brussel. Available at http://ec.europa.eu/agriculture/organic/documents/eu-policy/european-action-plan/act_en.pdf.

European Commission (2014b) Proposal for a Regulation of the European parliament and of the Council on organic production and labelling of organic products, amending Regulation (EU) No XXX/XXX of the European Parliament and of the Council [Official controls Regulation] and repealing Council Regulation (EC) No 834/2007: European Commission, Brussels. Available at http://ec.europa.eu/agriculture/organic/documents/eu-policy/policy-development/report-and-annexes/proposal_en.pdf.

European Environmental Agency (2015) Agriculture — organic farming. The Website of the European Environmental Agency (EEA), Copenhagen. Available at http://www.eea.europa.eu/soer-2015/countries-comparison/agriculture.

Eurostat (2011) European Statistics Code of Practice. Eurostat, Luxembourg. Available at: http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-32-11-955/EN/KS-32-11-955-EN.PDF

Eurostat (2015) [online] Agri-environmental indicators. The Eurostat website. Eurostat, Luxembourg. Accessed September 10, 2015. Available at http://ec.europa.eu/eurostat/statistics-explained/index.php/Agri-environmental_indicators.

Eurostat (2015) [online] Eurostat database on organic farming. The Eurostat website. Eurostat, Luxembourg. Available at http://ec.europa.eu/eurostat/web/organic-farming/data/database

FAOSTAT (2016) Inputs/Land: The FAOSTAT website of the Food and Agriculture Organisation FAO, Rome, Italy. Available at http://faostat3.fao.org/download/R/RL/E.

FiBL (2016a) Data on organic agriculture in Europe. The OrganicDataNetwork website, maintained by the Research Institute of Organic Agriculture (FiBL), Frick, Switzerland. Available at http://www.organicdatanetwork.net/odn-statistics/odn-statistics-data.html.

FiBL (2016b) Data tables and map on organic agriculture worldwide. The Organic-World.net website maintained by the Research Institute of Organic Agriculture (FiBL), Frick, Switzerland. Available at http://www.organic-world.net/statistics/statistics-data-tables.html.

Granatstein, D., Kirby, E., Ostenson, H., Willer, H. (2016) Global situation for organic tree fruits. Scientia Horticulturae. Available online 18 December 2015. doi:10.1016/j.scienta.2015.12.008.

Hammermeister, A. (2016) Organic Farming Research in Canada, In: Niggli, U. et al. (2016) A Global Vision and Strategy for Organic Farming Research. TIPI - Technology Innovation Platform of IFOAM - Organics International, c/o Research Institute of Organic Agriculture FiBL, Frick, Switzerland.

Hartmann, M.; Khalil, S; Bernet, T.; Ruhland, F.; Al Ghamd, A. (2012) Organic Agriculture in Saudi Arabia. Giz, Eschborn.

Huber, B., Schmid, O., Möller, C. (2016) Standards and Regulations. In: Willer, H., and Lernoud, J. (Eds.) The World of Organic Agriculture. Frick and Bonn, 140-146.

Lernoud, Julia, Jason Potts, Gregory Sampson, Vivek Voora, Helga Willer and Joseph Wozniak (2015), The State of Sustainable Markets – Statistics and Emerging Trends 2015. ITC, Geneva.

Meirelles, Laercio (2016) Brazil. Country Report. In: Willer, H., Lernoud, J. (Eds.) The World of Organic Agriculture. Statistics and Emerging Trends., Frick and Bonn, 240-241.

OECD (online) 2015 2013 Edition of the OECD Environmental Database. The OECD.stat website. OECD, Paris. Available at https://stats.oecd.org/Index.aspx?DataSetCode=TAD_ENVINDIC_2013.

OrganicDataNetwork (2014) D7.2 Code of Practice and Manual (OrMaCode). Università Politecnica delle Marche, Ancona, Italy.

OrganicDataNetwork (2015). Final Report Summary - ORGANICDATANETWORK (Data network for better European organic market information). The Cordis Homepage, European Commission, Brussels. Available at http://cordis.europa.eu/result/rcn/174323_en.html. Accessed April 24, 2016.

Reganold, J. and Wachter, J. (2016) Organic agriculture in the twenty-first century. Nature Plants, 2016; 2 (2) 15221 DOI: 10.1038/NPLANTS.2015.221.

Sahota, A. (2016) The Global Market for organic Food and Drink. In: Willer, H., and Lernoud, J. (Eds.) The World of Organic Agriculture. Statistics and Emerging Trends. Frick and Bonn, pp 134-138.

Sanders, J., O. Schmid (2014) Organic action plans. Mainstreaming organic farming in public policy. In: Meredith, S. and Willer, H. (Eds.) (2014) Organic in Europe - Prospects and Developments. IFOAM EU Group, Brussels, pp. 46-54.

Sanders, J.; Stolze, M. und Padel, S. (Eds.) (2011) Use and efficiency of public support measures addressing organic farming. Johann Heinrich von Thünen-Institut (vTI) - Federal Research Institute for Rural Areas, Forestry and Fisheries, Institute of Farm Economics, Braunschweig.

Schader, Christian; Stolze, Matthias und Gattinger, Andreas (2012) Environmental performance of organic farming. In: Boye, J. und Arcand, Y. (Eds.) Green Technologies in Food Production and Processing. Springer Science+Business Media, New York, USA, Chapter 8, S. 183-210.

Skinner, S., Gattinger, A.; Muller, A.; Mäder, P.; Fliessbach, A.; Stolze, M.; Ruser, R.; Niggli, U. (2014) Greenhouse gas fluxes from agricultural soils under organic and non-organic management — a global meta-analysis. Sci. Total Environ. 468–469, 553–563 (2014).

Średnicka-Tober, D. et al. (2016a) Composition differences between organic and conventional meat: a systematic literature review and meta-analysis. British Journal of Nutrition, page 1 of 18 doi:10.1017/S0007114515005073.

Średnicka-Tober, D. et al. (2016b) Higher PUFA and n-3 PUFA, CLA, α-tocopherol and iron, but lower iodine and selenium concentrations in organic milk: a systematic literature review and meta- and redundancy analyses. British Journal of Nutrition, page 1 of 18 doi:10.1017/S0007114516000349.

Stolze, M.; Zanoli, R.; Meredith, S. (2016) Organic in Europe. Expanding Beyond a Niche. In: Meredith, S. and Willer, H. (Eds.) Organic in Europe. Prospects and Developments 2016. IFOAM EU, Brussels.

Vogt, Gunter (2000) Entstehung und Entwicklung des ökologischen Landbaus. Stiftung Ökologie & Landbau. Bad Dürkheim.

Willer, H., Lernoud, J. (Eds.)(2016) The World of Organic Agriculture. Statistics and Emerging Trends. Research Institute of Organic Agriculture FiBL and IFOAM – Organics Interntional, Frick and Bonn.

Willer, H. and Schaack, D. (2014) D4.3 Final report on compilation of key organic market data. Research Institute of Organic Agriculture (FiBL), Frick, Switzerland.

Willer, H. and Schaack, D. (2016): Organic Farming and Market Development in Euope. In: Willer, H., Lernoud, J. (Eds.) (2016) The World of Organic Agriculture. Statistics and Emerging Trends. Research Institute of Organic Agriculture FiBL and IFOAM – Organics International, Frick and Bonn.

Zanoli, Raffaele (2014) Data Network for better European Organic Market Information - D7.1 Recommendations. Università Politecnica delle Marche, Ancona, Italy.

Zanoli, R., Vairo, D., Solfanelli, F., Padel, S., Gerrard, C., Lampkin, N., Willer, H., Stolze, M., Hamm, U., Feldmann, C., (Eds.) (2014). ORganic market data MAnual and CODE of Practice (Manual and Code of Practice for the initiation and maintenance of good organic market data collection and publication procedures, OrMaCode)). The Website of the OrganicDataNetwork, Università Politecnica delle Marche, Ancona (IT), and Research Institute of Organic Agriculture (FiBL), Frick (CH). Available online at: www.ormacode.organicdatanetwork.net