Food and Agriculture Organization
of the United Nations

ISSN 2709-006X [Print]
ISSN 2709-0078 [Online]

FAOSTAT ANALYTICAL BRIEF 29

Pesticides use, pesticides trade and pesticides indicators

1990–2019

>> FAO Statistics Division

HIGHLIGHTS

- → **Global pesticides use in agriculture remained stable in 2019 at 4.2 million tonnes, equivalent to 0.6 kg/person.**
- → **Pesticides use increased in the 2010s by more than 50 percent compared to the 1990s, with pesticides use per area of cropland increasing from 1.8 to 2.7 kg/ha.**
- → **Pesticides use in agriculture in Europe increased by just 3 percent between the 1990s and the 2010s.**
- → **Total pesticides trade reached approximately 5.6 million tonnes of formulated products in 2019, with a value of USD 35.5 billion.**
- → **Trade in hazardous pesticides decreased between 2007 and 2019. A detailed analysis on specific substances covered by the Rotterdam Convention is provided based on available data.**

BACKGROUND

When applied responsibly, pesticides can help to protect seeds and safeguard crops from unwanted plants, insects, bacteria, fungi, and rodents. At the same time, pesticides can have negative impacts on human health and on the environment through contamination of soil, water and non-target plants, decrease biodiversity and, in some cases, also reduce crop yield. Pesticides use in agriculture as an input and the agri-environmental indicator measuring use by cropland area serve to monitor the use of pesticides across the globe as well as at the regional and country levels. These two domains have been updated with figures through 2019. The 2021 update of the pesticides use domain features improved imputation methods for countries that have historically used imports as a proxy for use in the past.

Statistics of pesticides trade are relevant for monitoring of sustainable agriculture. In particular, they can help assess the global movement of pesticides and identify shortcomings in access to the global market of this agricultural input. The FAOSTAT Pesticides trade database contains data on internationally traded pesticides over the period 1961–2019. Data for 1961–1989 cover only monetary values, while data for 1990–2019 also include physical quantities. The 2021 update of the domain features data updates to 2019, while implementing improved imputation methods that include the use of mirror trade statistics, as well as of trade information to assess pesticide use at the national level.

Figures for pesticides trade can exceed those of pesticides use for a combination of the following reasons: non-agricultural uses for imported pesticides such as those in the public health sector, storage of pesticides that are imported for use in subsequent years, and the importation of pesticide formulations including adjuvants to increase efficacy and shelf-life.

This analytical brief includes a special analysis of trends in total trade of hazardous pesticides for which data are available in FAOSTAT. This includes examples of 12 hazardous pesticides listed under the Rotterdam Convention. The Rotterdam Convention on the Prior Informed Consent (PIC) Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (http://www.pic.int/) entered into force in 2004 and, as of July 2021, has 164 parties. It aims at protecting human health and the environment through shared responsibility and structured information exchange on safe use and risk management for hazardous chemicals under the scope of the Convention. As of July 2021, Annex III to the Convention lists 35 pesticides (including three severely hazardous pesticide formulations), 16 industrial chemicals, and 1 chemical listed in both categories (see Appendix I). Due to separate reporting chapters in COMTRADE, from which the trade information is sourced (see explanatory notes), it should be noted that traded quantities in total hazardous pesticides may not correspond to the sum of component substances. Furthermore, the 12 pesticides listed under the Rotterdam Convention, for which data were available and disseminated in FAOSTAT, were grouped for this analysis as follows (see Annex II for trade status of each):

- Group I – aggregated pesticides;
- Group II – pesticides with data available for 2007–2019; and
- Group III – pesticides with data covering shorter periods, either 2012–2019 or 2017–2019.

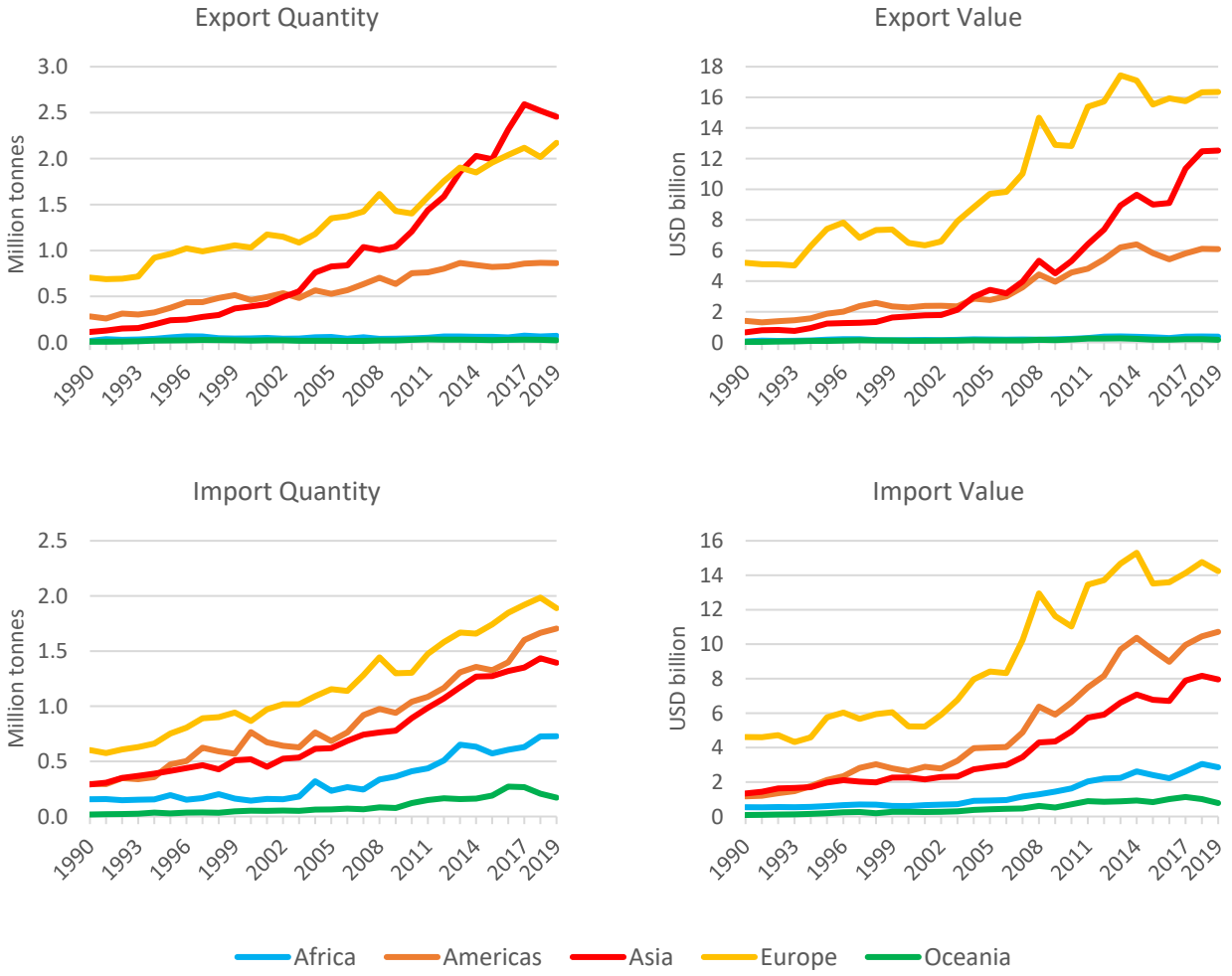
The aim of the additional analysis is for information purposes only. Current data coverage in FAOSTAT is rather incomplete, and not all countries covered in FAOSTAT are Parties to the Rotterdam Convention. The FAOSTAT data therefore do not allow currently for monitoring individual chemicals listed under the Convention.

GLOBAL

At the global level, total pesticides use in agriculture remained stable in 2019, at 4.2 million tonnes (Mt) of active ingredients. The worldwide application of pesticides per area of cropland was 2.7 kg/ha. Total pesticides trade reached approximately 5.6 Mt of formulated products in 2019, with a value of USD 35.5 billion.

Despite a plateau reached in recent years, total pesticides use increased in the 2010s by more than 50 percent compared to the 1990s, with pesticides use per area of cropland increasing from 1.8 to 2.7 kg/ha. The global application of pesticides increased across these two periods for herbicides, fungicides and bactericides, and insecticides, with increases in the share of herbicides (from 40 to 53 percent of total pesticides) and reductions in the shares of fungicides (from 25 to 22 percent) and insecticides (from 23 to 17 percent). Traded quantities of total pesticides tripled between the 1990s and the 2010s.

Figure 1: Total pesticides export and import quantities and values by region

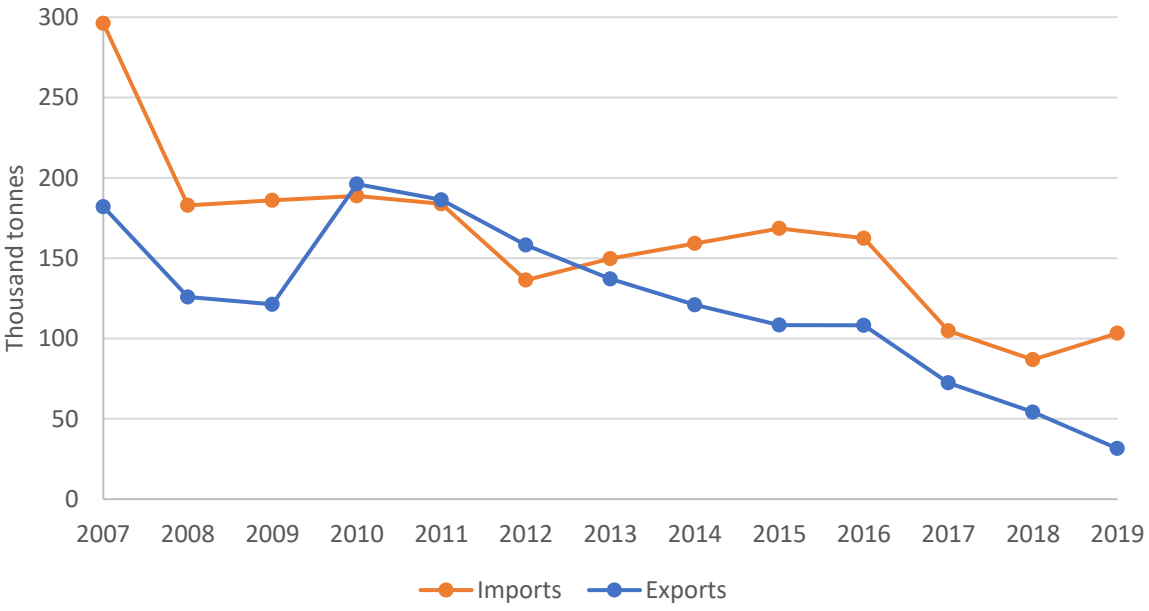


Source: FAO, 2021c.

GLOBAL TRENDS IN HAZARDOUS PESTICIDES

As displayed in Figure 2, the FAOSTAT data suggest a reduction in traded hazardous pesticides globally over the period 2007–2019, with imported quantities reduced from about 300 to 100 kilotonnes (kt). In terms of the 12 hazardous pesticides substances included in this analysis, and within the limitations of data quality mentioned earlier, there was seemingly a decrease in trade during the periods covered for each substance (Figures 3 to 5).

Figure 2: Global export and import quantities for hazardous pesticides

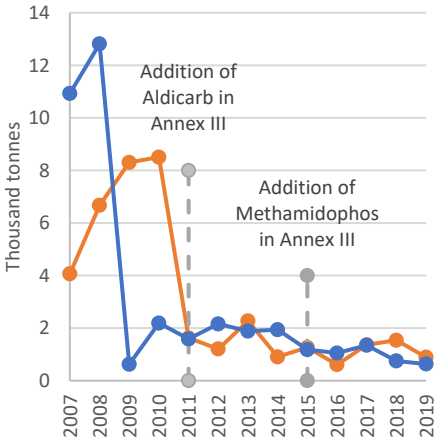


Source: FAO, 2021c.

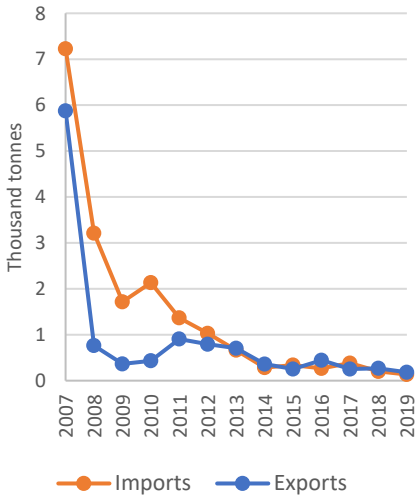
More specifically, for Group I (Figure 3), during the period 2007–2019, the aggregated data for aldicarb and methamidophos combined with captafol show an 80 percent decrease in import quantities, from 4.1 kt in 2007 to 0.9 kt in 2019. Export quantities decreased by more than 90 percent, from 10.9 kt to 0.6 kt in 2019. Trade in other Group I substances decreased by more than 95 percent.

Figure 3: World total import and export quantities of selected hazardous pesticides listed under the Rotterdam Convention – Group I

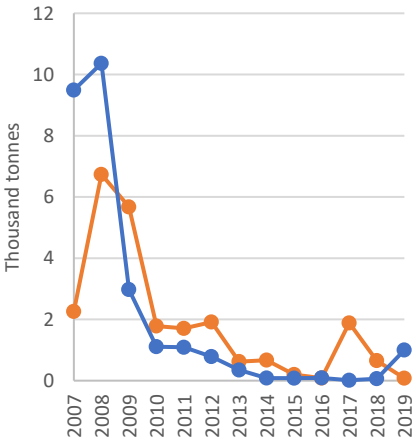
Aldicarb, captafol & methamidophos



Fluoroacetamide, monocrotophos & phosphamidon



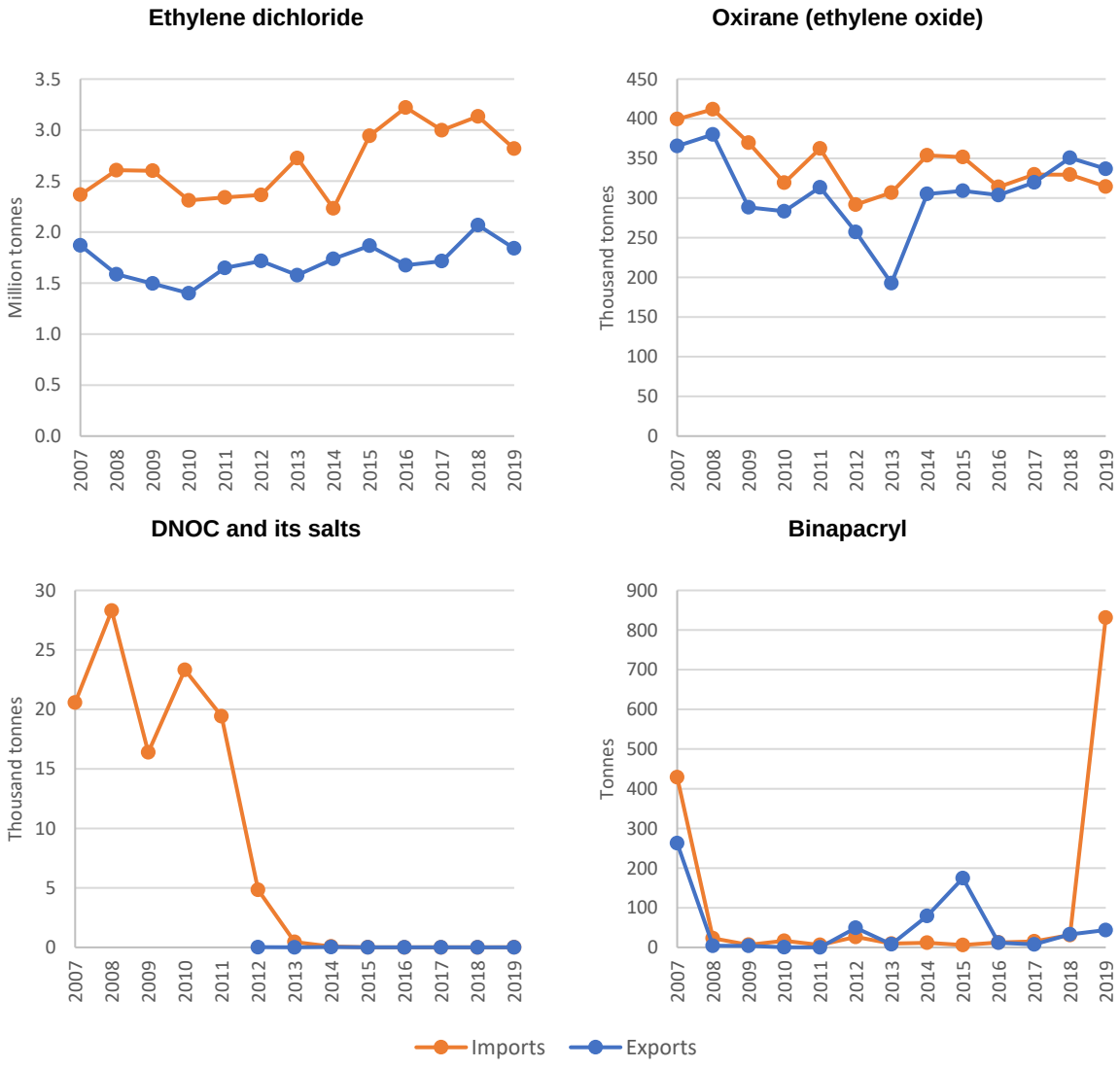
Parathion & parathion-methyl



Source: FAO, 2021c.

For Group II (Figure 4), imports for DNOC and its salts decreased by more than 95 percent from 2007 to 2019, from 20.6 kt to 0.01 kt. At the same time, export quantities of the same substance decreased by nearly 75 percent. The FAOSTAT data also show decreases in ethylene oxide during 2007–2019, by roughly 20 percent, whereas exports decreased by less than 10 percent. Imports of ethylene oxide decreased from nearly 400 kt to 315 kt. This substance is the only hazardous pesticide for which a third of the Parties to the Convention still allow imports (Appendix II). Ethylene dichloride and binapacryl were the two analysed traded hazardous pesticides with increased imports, respectively of about 20 percent, from 2.4 Mt to 2.8 Mt for the former, and of about 95 percent from 0.4 kt to 0.8 kt for the latter.

Figure 4: World total import and export quantities of selected hazardous pesticides listed under the Rotterdam Convention – Group II

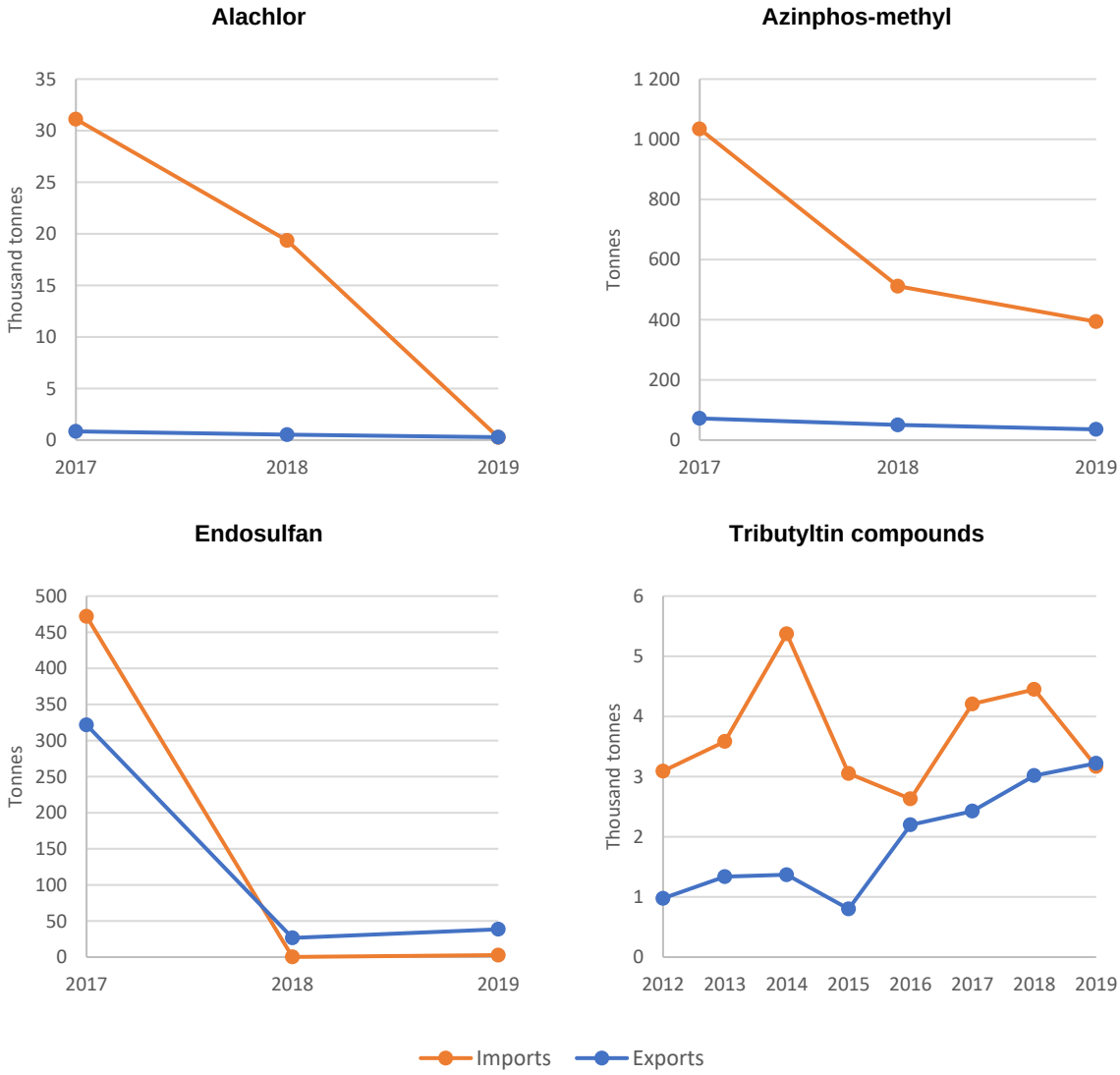


Source: FAO, 2021c.

Finally, Group III substances showed a similar overall declining trade pattern (Figure 5). This was apparent in data for alachlor, azinphos-methyl and endosulfan, although the period covered was very

limited (2017–2019). Conversely, exports of tributyltin compounds increased by almost 70 percent, from 976 to 3 221 tonnes over the period 2012–2019, whereas imports remained roughly at the same level.

Figure 5: World total import and export quantities of selected hazardous pesticides listed under the Rotterdam Convention – Group III



Source: FAO, 2021c.

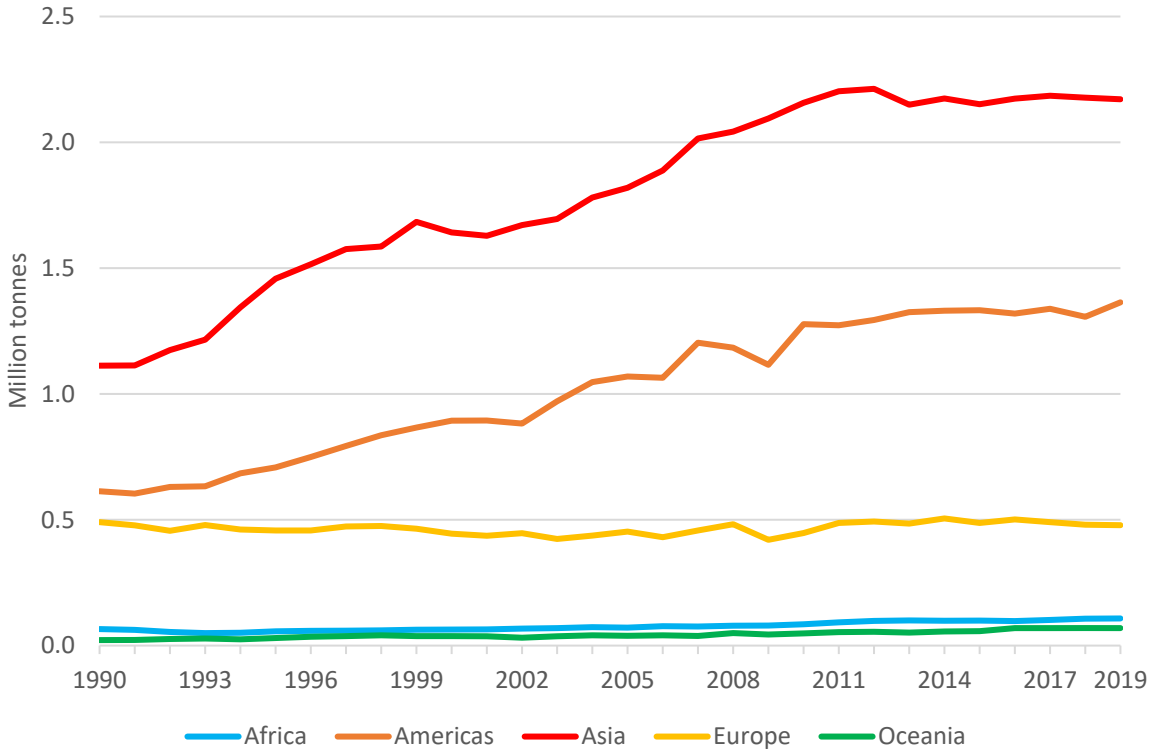
REGIONAL

It is important to highlight that the regional trade figures presented here include intra-regional trade – for example, the trade statistics for Europe include trade of European countries with other European countries as well as with countries outside of Europe. In 2019, Asia had the highest levels of pesticides exports (2.5 Mt at a value of USD 12.5 billion) and used the most pesticides in the agricultural sector (2.2 Mt), both in terms of totals and per ha of cropland (3.7 kg/ha). Figure 1 shows the regional import and export quantities and values for the period 1990–2019, and Figure 6 displays the regional total

pesticide use for the same period, in particular the recent stabilization in Asia. Pesticides exports from Asia decreased in the most recent years from 2.6 Mt in 2017 to 2.5 Mt in 2019. The region is responsible for about 60 percent of global insecticides use in the 2010s.

Pesticides use in agriculture in Europe increased by just 3 percent between the 1990s and the 2010s, most likely due to the stringent European Common Agricultural Policy put in place, which monitors and controls the use of pesticides. The region has the lowest proportion of pesticides use derived from insecticides (12 percent), as seen in Figure 8. European countries exported nearly 1.4 Mt of pesticides per year during the period 1990–2019, representing more than one-third of the global total. The region's pesticides use per area of cropland was approximately 1.7 kg/ha in 2019, below the world average.

Figure 6: Total pesticides use by region



Source: FAO, 2021a.

The Americas had a high growth rate of 80 percent in pesticides use from the 1990s to the 2010s. The