



## Global Pesticide Use and Trade Dynamics: Insights from FAO-STAT Data (1990-2021)

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Pesticides play a crucial role in modern agriculture by protecting crops from pests, diseases, and weeds. However, their use raises serious concerns about human health and environmental sustainability. This article explores global trends in pesticide consumption and trade from 1990 to 2021, using data from the FAO-STAT Pesticides Use and Trade databases. It highlights regional differences in pesticide use, with the Americas leading in consumption, followed by Asia, Europe, and Africa. The analysis shows a shift in pesticide types over time, particularly the growing reliance on herbicides, and examines how international trade patterns affect local farming practices. The findings emphasize the need for sustainable pest management strategies to reduce the negative effects of pesticide use while boosting global agricultural productivity.

### Introduction

Pesticides have become a cornerstone of modern agricultural practices, providing essential protection for crops against a wide range of pests, diseases, and invasive weeds. Their introduction and widespread use have been pivotal in increasing crop yields, ensuring more stable food supplies, and supporting the growing global population. In many regions, particularly those vulnerable to food insecurity, pesticides have played a key role in reducing crop losses and improving agricultural efficiency. As a result, they have contributed significantly to global food security, enabling farmers to meet rising demands for food, fibre, and other agricultural products. However, their extensive use raises serious concerns about human health risks and environmental damage, including biodiversity loss and ecosystem disruption. Given the complexities surrounding pesticide use, there is a growing recognition of the need for more sustainable pest management solutions. This includes the promotion of IPM strategies, which combine biological, cultural, and chemical control methods to minimize the reliance on pesticides. Additionally, advances in biotechnology, precision agriculture, and organic farming offer promising alternatives for reducing pesticide use while maintaining or even improving agricultural productivity. While pesticides have undeniably contributed to agricultural success and food security, their extensive use poses serious health and environmental risks. A deeper understanding of global pesticide consumption and trade patterns is key to addressing these challenges. By focusing on more sustainable pest management practices, the agricultural sector can move toward a future where productivity is balanced with the health of people and the planet.

### Global Trends in Pesticide Use

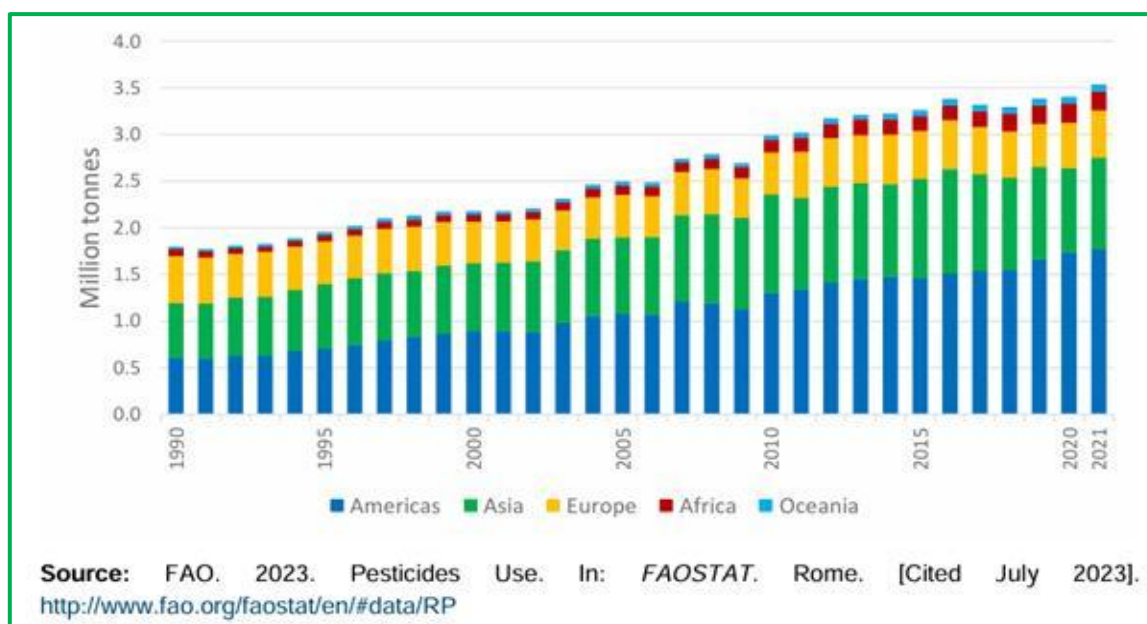
**Regional Overview:** Since the mid-1990s, the Americas have emerged as the leading consumers of pesticides, consistently surpassing other regions such as Asia, Europe, Africa and Oceania. In 2021, pesticide use in the Americas increased by 2%, reaching 1.78 million

metric tons, a significant rise from 1.74 million metric tons in 2020. This reflects a staggering 191% increase from 1990 levels. Notably, the most recent decade witnessed a 26% surge in pesticide consumption. Over this period, herbicides have dominated usage, rising from 50% to 64% of total pesticide application, while insecticides declined from 22% to 14%. In 2021, the Americas imported 1.2 million metric tons of formulated pesticides valued at USD 7.6 billion, indicating a robust demand for effective pest management solutions.

In Asia, pesticide use reached 980 thousand metric tons in 2021, marking an 8% increase from the previous year and a 67% rise since 1990. Asia is also the largest exporter of pesticides, with exports totalling 3.6 million metric tons valued at USD 17.3 billion. This region's average pesticide use per hectare stands at 1.52 Kg, lower than that of the Americas but indicative of a growing trend.

Europe's pesticide use increased slightly from 486 Kt in 2020 to 505 Kt in 2021. Growth in this region has been modest since 1990, with only a 1% increase overall. The stringent regulations of the Common Agricultural Policy have resulted in Europe maintaining the lowest proportion of insecticide use at 13%. In 2021, Europe's average pesticide application was 1.75 Kg per hectare, marginally above the global average.

Africa's pesticide consumption remains the lowest among the regions analysed. In 2021, usage rose slightly to 204 Kt, reflecting a 31% increase over the past decade. However, Africa accounts for only 5% of global pesticide use. The region has seen a rise in fungicide and herbicide usage but still grapples with challenges in accessing effective pest management solutions, (Fig.1).



**Fig.1 Total pesticides use by region**

**Trade Dynamics of Pesticides:** The FAO-STAT Pesticides Trade domain provides crucial insights into the international movement of pesticides. Between 1961 and 2021, trade patterns have highlighted significant flows both within and between regions. Intra-regional trade can sometimes surpass local pesticide usage figures due to various factors, including strategic storage and non-agricultural applications.

In 2021, Asia exported the largest quantities of pesticides globally, underscoring its role as a key player in the international pesticide market. The region's exports, particularly of formulated products, have substantial economic implications, reflecting a robust production capacity and demand for pesticides worldwide (Fig. 2).

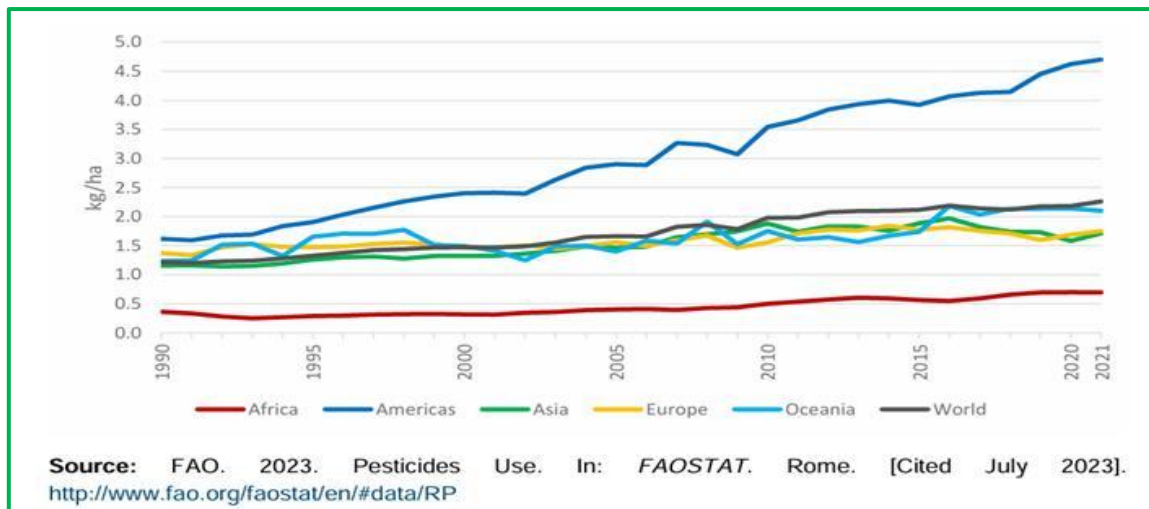


Fig. 2 Pesticides use per area of cropland by region

**Shifts in Pesticide Types:** The analysis reveals a significant shift in the types of pesticides used over the years. Herbicides have seen a dramatic increase in usage, from 50% of total pesticide use in the Americas in the 1990s to 64% in recent years. This shift highlights a growing focus on weed management, possibly reflecting changes in crop production practices and pest resistance issues. Conversely, insecticides have declined in both the Americas and Africa, indicating a potential shift towards integrated pest management strategies that may reduce reliance on chemical inputs (Fig. 3).

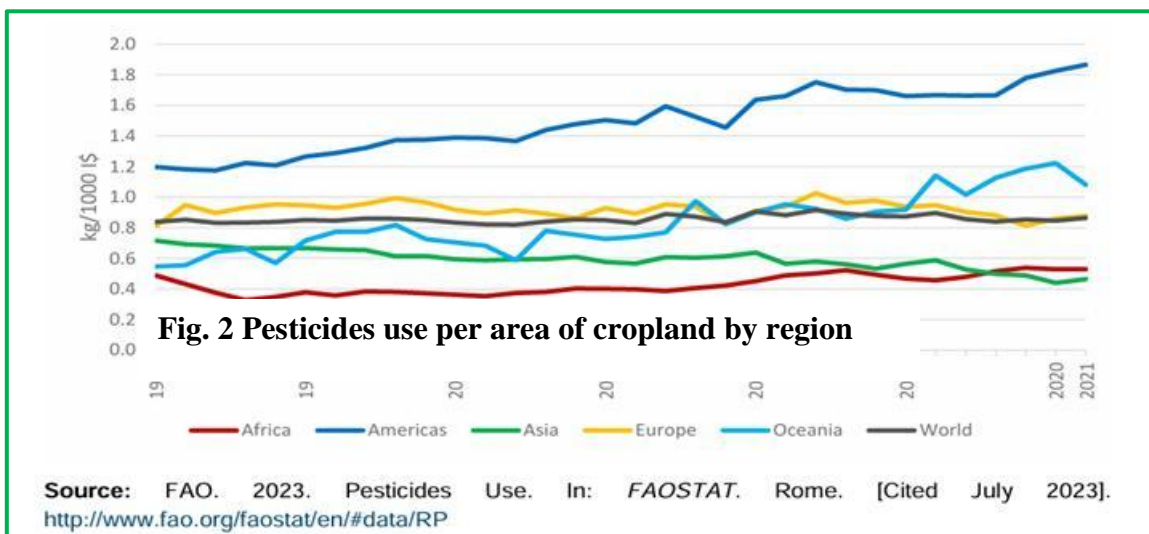


Fig. 3 Pesticides use per value of agricultural production by region

**Conclusion**

From 1990 to 2021, global pesticide trends highlight significant regional disparities, particularly in Africa, which saw a slight increase in usage from 203 Kt to 204 Kt in 2021. Despite a 31% rise over the past decade and a 175% increase since 1990, Africa’s contribution to global pesticide use remained minimal at 5%. Between 1990-1999 and 2012-2021, the share of fungicides and bactericides grew from 29% to 33%, while herbicides rose from 23% to 31%, and insecticides fell from 38% to 28%. Most pesticides are imported, with 781 kt valued at USD 3.3 million in 2021, primarily from other regions. In contrast, exports within Africa totalled 71 Kt, declining by 4% from 2020. Africa also recorded the lowest pesticide application rates per unit area, underscoring the need for sustainable pest management solutions to balance agricultural productivity with environmental health.