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Global trajectory of organic agriculture: Trends, challenges, and opportunities for a sustainable planet

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ABSTRACT

Organic agriculture has become a cornerstone of sustainable development, addressing climate change, biodiversity loss, and unsustainable farming practices. This paper depicts its remarkable growth trajectory as documented in the 25th edition of "The World of Organic Agriculture". During 2000-2022, global organic farmland expanded over 500% to 96.4 million hectares across 188 countries, driven by favourable policies, consumer awareness, and market demand. Oceania leads with 53.2 million hectares, while Europe and Latin America showcase policy-driven and export-oriented growth. Asia, led by India's 2.48 million organic producers, and Africa, aligning traditional practices with organic standards, demonstrate notable producer engagement. In 2022, the organic food and beverage market reached €135 billion, reflecting a 9.7% annual increase. Key markets like the United States, Germany, and China dominate sales, while Switzerland and Denmark lead in per capita consumption and market share. Challenges such as certification costs, geopolitical tensions, and infrastructure gaps hinder growth but are offset by emerging opportunities like technological integration, diversification beyond food products, and policy innovation. Study emphasizes the importance of cohesive global policies, research in climate-resilient farming practices, and strengthening market infrastructure to ensure equitable access for smallholders and scale organic farming as a transformative force. With its holistic approach, organic agriculture is poised to redefine global food systems, advancing environmental conservation, economic resilience, and social equity.

Key words: Certification, consumer demand, farmland, organic, policy innovation

INTRODUCTION

Organic agriculture serves as a dynamic response to the pressing challenges of climate change, biodiversity loss, and unsustainable farming practices (Lal et al., 2023; Richard, 2024; Verma et al*.,* 2025). By prioritizing ecosystem health and minimizing reliance on synthetic inputs, organic farming offers a holistic approach to agricultural productivity and environmental stewardship (Sailaja and Manohari, 2021; Tiwari, 2023). The 2024 FiBL survey presents a comprehensive overview of the state of organic agriculture in 2022 (McCosh, 2008), capturing its global trajectory and regional diversities (Willer et al*.,* 2024). The survey highlights organic agriculture's expansion across 188 countries, underscoring its

increasing significance in global food systems. With 96.4 million hectares of farmland under organic cultivation, the sector has witnessed unprecedented growth (FAO, 2024). Regions like Oceania, Europe, and Asia have emerged as leaders in this movement, driven by favourable policies, consumer awareness, and market demand. Oceania, particularly Australia, accounts for over half of the world's organic farmland, emphasizing the potential of vast rangelands (Shahbandeh, 2025). Europe and Latin America have also shown remarkable progress, leveraging policy support and export opportunities. Organic farming has proven vital for enhancing rural livelihoods, especially in developing countries (Gamage et al., 2023; Halberg and Muller, 2012). With over 4.5 million organic producers globally, the sector offers a pathway for smallholders to access premium markets and improve income stability. India, a global leader in organic farming, exemplifies this trend, with its vast network of 2.48 million certified organic farmers (PIB, 2020; Roy et al., 2024; NCOF, 2025). Similarly, African nations are increasingly adopting organic practices, reflecting their alignment with the sustainable development goals (RaM, 2022; Sithole and Olorunfemi, 2023; TBRC, 2023; Mkhize and Ellis, 2024). Consumer demand has been a significant driver of organic agriculture's growth (Oughton and Ritson, 2007; Reganold and Wachter, 2016; Kyrylov et al., 2018). The organic food and beverage market, valued at €135 billion in 2022, reflects growing preferences for health-conscious and environmentally friendly products (CMI, 2025). Markets in the United States, Germany, and China dominate global sales, while countries like Switzerland and Denmark lead in per capita consumption and market share, respectively. Despite its achievements, organic agriculture faces challenges, including geopolitical tensions, inflation, and certification inconsistencies (Halberg et al., 2006; Fouilleux and Loconto, 2017; Ivanov et al., 2024; Sushmita and Lal, 2025). These issues highlight the need for cohesive policies, robust research, and international collaboration. The FiBL survey of 2024 not only documented organic farming's progress but also provided actionable insights to address these challenges and harness emerging opportunities. As the world seeks sustainable solutions, organic agriculture stands out as a transformative force for environmental and economic resilience (Brodt et al., 2011; Gosnell et al., 2019; Kharel and Sahoo, 2023; Arya et al., 2024).

MATERIALS AND METHODS

The 2024 FiBL survey utilized a mixed-methods approach, combining quantitative data collection and qualitative analysis (Tram and Tuyen, 2025). Data sources included national organic movements, certification bodies, and government agencies from 188 countries. Quantitative metrics, such as organic farmland area, producer numbers, and market values, were analyzed to assess growth trends. Qualitative assessments explored challenges like geopolitical disruptions, certification inconsistencies, and consumer preferences. Regional and sectoral trends were examined to provide a holistic understanding of organic agriculture's global trajectory.

RESULTS AND DISCUSSION

Global organic farmland expansion

In 2022, global organic farmland increased by 26.6%, reaching 96.4 million hectares (Acharya et al., 2020; Baral et al., 2020; Ghimire, 2025). This growth highlights an accelerating global shift towards sustainable farming systems, driven by consumer demand, policy interventions, and environmental concerns (Yadav and Lal, 2022; Arya et al., 2024). Oceania continued to dominate, contributing 53.2 million hectares (55% of the global organic land) (Trávníček et el., 2024). While this is primarily attributed to extensive pastures in Australia, New Zealand, and Pacific Island Nations also showed notable contributions.

Europe accounted for 18.5 million hectares, with Spain (2.6 million ha), France (2.5 million ha), and Italy (2.2 million ha) as key contributors (Kobylińska, 2021). This growth was facilitated by the European Union's Common Agricultural Policy (CAP), which offered incentives for organic conversions and market development (Kobylińska, 2021; Vlăduț et al., 2024). Latin America followed

with 9.5 million hectares, led by Argentina (4.1 million ha), known for its organic grazing systems (Table 1).

Asia (8.8 million ha) and Africa (2.7 million ha) showcased smaller absolute areas but faster growth rates. India's organic land increased due to government initiatives like the Paramparagat Krishi Vikas Yojana (PKVY; Ghasal et al., 2024), while in Africa, countries such as Uganda and Ethiopia leveraged traditional low-input farming methods to align with organic standards (Akanmu et al., 2023).

Table 1. Organic farmland distribution by region (2022)

Region	Organic land (Mha)	Share (%)	Lead countries
Oceania	53.2	55.0	Australia, New Zealand
Europe	18.5	19.0	Spain, France, Italy
Latin America	9.5	10.0	Argentina, Uruguay, Brazil
Asia	8.8	9.2	India, China, Kazakhstan
North America	3.6	3.8	United States, Canada
Africa	2.7	2.8	Uganda, Tunisia, Ethiopia

Growth in organic producers

The global organic producer count in rose to 4.5 million in 2022 marking a 25.6% increase, with Asia accounting for 61% of these producers (Chakraborty et al., 2024). India alone contributed 2.48 million organic farmers, the largest globally, due to smallholder adoption and supportive government schemes (Table 3). African producers, representing 22% of the global total (Schader et al., 2021), grew due to the alignment of organic practices with traditional farming, minimizing the need for synthetic inputs (Table 2).

Latin America saw moderate growth in producer numbers, focusing on exporting high-demand organic commodities like coffee, bananas, and quinoa. Europe and North America exhibited lower numbers of producers but concentrated on large-scale, high-productivity operations to meet domestic and export market demands.

Table 2. Distribution of organic producers by region (2022)

Region	No. of producers (millions)	Share (%)	Lead countries
Asia	2.74	61.0	India, China, Indonesia
Africa	0.99	22.0	Uganda, Ethiopia, Kenya
Latin America	0.32	7.0	Mexico, Peru, Argentina
Europe	0.25	5.6	Italy, Spain, France
North America	0.14	3.1	United States, Canada
Oceania	0.06	1.3	Australia, New Zealand

Table 3. Organic cultivated area and the share in total agricultural land in India

Financial Year	Organic cultivated area in India (million hectare)	Share in total agricultural land in India (%)
2010	0.8	0.4
2015	1.2	0.7
2020	2.3	1.5
2021	2.7	1.5
2022	4.7	2.6
2023	5.4	3.0
2024	4.5	2.5

Source: Sharma et al. (2024); Willer et al. (2024)

Organic food market growth

The organic food and beverage market reached €135 billion in 2022, a 9.7% increase over the previous year (Willer et al., 2024). The United States remained the largest market (Chakraborty et al., 2024), contributing €57 billion (42% of the global total), followed by Germany (€16.9 billion) and China (€12.5 billion). Switzerland continued to lead in per capita organic consumption (€437), while Denmark retained its position as the country with the highest organic market share, which is 12% (Table 4).

Key product segments

Fresh produce: Fruits and vegetables remained the most popular organic products globally, driven by consumer focus on health and sustainability.

Dairy products: Organic milk, cheese, and yogurt saw strong demand, particularly in Europe and North America.

Packaged foods and beverages: Organic snacks, baby food, and juices gained significant attraction in both developed and emerging markets.

Table 4. Key organic food market metrics (2022)

Market Metrics	Value
Total global market value	€135 billion
Largest market	United States (€57 billion)
Per capita consumption	Switzerland (€437)
Highest market share	Denmark (12%)
Fastest growth	China, India

Regional insights

Oceania

Oceania leads in farmland but lacks strong domestic markets. Exports, particularly from Australia and New Zealand, drive revenue.

Europe

Europe is home to the most mature organic markets. Countries like Germany, France, and Denmark combine strong domestic consumption with export opportunities.

Asia

Asia dominates in producer numbers, with India leading globally. Organic tea, spices, and basmati rice are major exports.

Latin America

Latin America focuses on export-oriented production, particularly organic coffee, cocoa, and bananas.

North America

North America is characterized by high consumer spending on organic products. Retail channels and e-commerce play a significant role.

Africa

Africa is growth-driven by low-cost traditional farming, aligning with organic principles. Export demand for products like coffee and cocoa is rising.

Factors driving growth

Several key drivers have catalysed the growth of organic agriculture, with significant regional and global implications.

Economic and environmental awareness

The escalating climate crisis has spotlighted organic farming's potential to mitigate environmental damage. Organic systems promote soil health, reduce greenhouse gas emissions, and support biodiversity conservation. For instance, the widespread adoption of agroecological practices in Latin America has significantly improved soil carbon sequestration rates.

Market opportunities

The organic food market, valued at €135 billion in 2022, reflects growing consumer trust and demand. North America alone contributed significantly, driven by its robust retail networks and consumer awareness campaigns. Innovations in e-commerce platforms have further expanded accessibility to organic products.

Increased certification accessibility

Participatory guarantee systems (PGS) provide an alternative to traditional certification models, allowing communities to self-verify compliance with organic standards. This approach has empowered smallholder farmers in regions like Africa and Asia, reducing costs and fostering inclusivity.

Collaborative networks

Cross-border partnerships between governments, NGOs, and the private sector have strengthened organic agriculture globally. For instance, knowledge-sharing initiatives in the EU and the Pacific Islands enhance technical expertise and improve market linkages.

Notable increases in organic land (2000-2022)

From 2000 to 2022, the global area of organic agricultural land experienced unprecedented growth (Fig. 1), expanding over 500% to reach approximately ninety-six million hectares (Kobylińska, 2021; Sharma et al., 2024). Key regions contributing to this surge include:

Europe

Strong policy support and consumer demand drove significant increases, with countries like France, Italy and Germany.

Oceania

Dominating global organic land area, Australia accounts for the majority due to extensive rangeland conversions.

Latin America

Rising export opportunities and certifications spurred growth, notably in Argentina and Uruguay. This period reflects rising global recognition of organic farming's ecological and economic benefits (Willer et al., 2024).

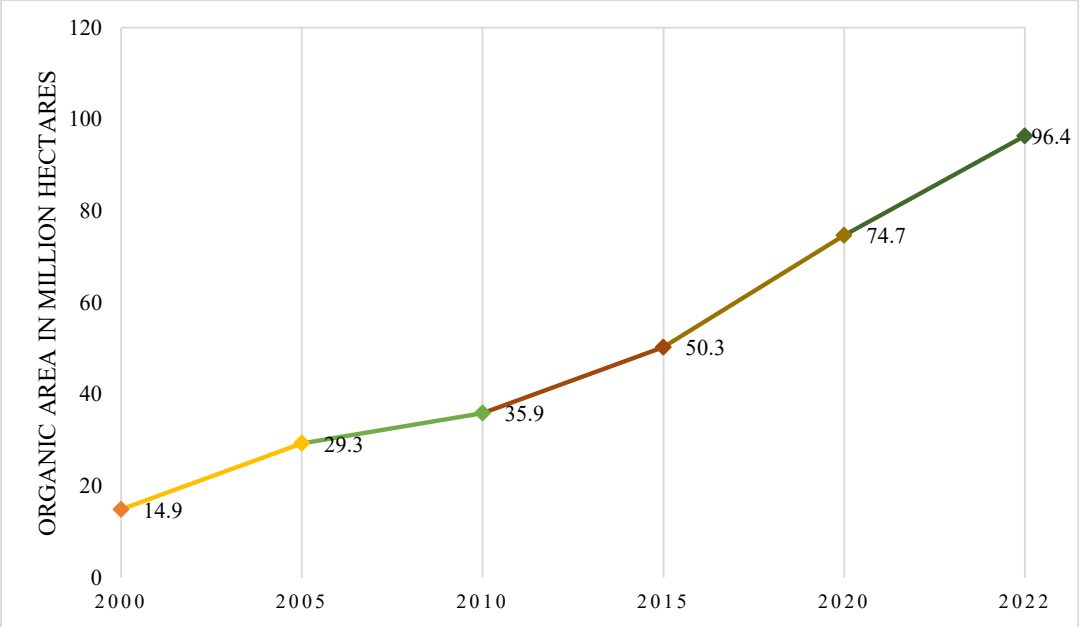

Fig. 1. Increase in organic agricultural land at global level

Challenges impacting growth

Organic agriculture faces significant hurdles globally, varying by region due to socio-economic, political, and environmental factors.

Policy and regulation gaps

Despite organic agriculture's prominence in sustainability dialogues, inconsistent policy frameworks remain a barrier. Many developing countries lack comprehensive policies to encourage organic farming. For instance, while Europe has embraced regulatory frameworks like the EU's farm to fork strategy, regions such as Africa and parts of Asia face fragmented approaches (Judijanto and Silamat, 2024), delaying certification processes and market integration. Harmonization of global standards remains an elusive goal.

Economic pressures

High certification costs, particularly for smallholders, inhibit widespread adoption. Organic certification often demands rigorous compliance with international standards, requiring investments in both time and resources. These challenges are exacerbated in low-income regions, where farmers struggle to bear the upfront costs of transitioning from conventional to organic methods. Moreover, economic instability, inflation, and fluctuating

consumer spending, such as observed in Europe during 2022, can create demand uncertainty.

Infrastructure deficits

Efficient supply chains are crucial for linking producers to markets. However, in countries with nascent organic sectors, inadequate infrastructure for storage, transportation, and distribution limits market access. For instance, African countries with potential for organic exports face hurdles due to poor cold chain systems, resulting in post-harvest losses.

Climate vulnerability

While organic farming practices prioritize ecological balance, they are susceptible to climate-induced challenges. Erratic rainfall patterns, prolonged droughts, and increasing temperatures have threatened crop yields in various regions. Farmers in Oceania and Africa, where climatic extremes are common, face additional pressures to sustain organic production.

Consumer awareness and market constraints

Consumer awareness, though growing, remains limited in certain markets, particularly in emerging economies. Misconceptions about organic products being overpriced or offering limited nutritional advantages hinder demand. Additionally, the stagnation of markets in economically developed regions, such as Western Europe, indicates market saturation in mature organic sectors.

Emerging trends and opportunities

Amid these challenges, the organic agriculture sector is witnessing transformative trends and opportunities that promise sustained growth.

Rising demand for organic products

The global shift towards healthier lifestyles has catalysed demand for organic products (Ghorbani et al., 2010). In North America and Asia, increasing disposable incomes coupled with a preference for sustainably sourced food have resulted in expanded retail markets. Organic beverages, snacks, and baby foods represent burgeoning segments that attract a new generation of health-conscious consumers.

Technological integration

Digitalization is reshaping organic agriculture, enabling smarter decision-making and enhanced traceability. Blockchain technologies are being deployed to ensure transparency in supply chains, allowing consumers to verify product origins and authenticity. Precision agriculture tools, such as drones and Internet of Things (IoT) sensors (Lal et al., 2023; Yadav and Sidana, 2023; Sharma and Shivandu, 2024; Singh and Sharma, 2024), are increasingly being adopted for efficient water use, pest management, and soil monitoring, particularly in high-potential markets like India and the US (Chouhan et al., 2024; Mishra and Mishra, 2025).

Expansion into emerging markets

Africa and Latin America have emerged as key regions for organic agriculture expansion. These areas, endowed with favourable climatic conditions and untapped arable land, hold immense potential. Collaborative efforts by organizations such as the International Federation of Organic Agriculture Movements (IFOAM) and the African Organic Network (AfrONet) aim to boost capacity-building programs, ensuring that smallholders can access international markets (McCosh, 2008).

Policy and institutional innovations

Governments and international bodies are championing organic agriculture as a critical component of sustainable development. Subsidies, tax incentives, and educational campaigns in countries like India and China are driving growth. In Europe, policy frameworks integrate organic farming into climate action and biodiversity preservation strategies.

Diversification beyond food

Organic products now encompass textiles, cosmetics, and personal care items, diversifying revenue streams. Organic cotton, for instance, has seen a surge in demand as sustainability becomes a priority in the fashion industry.

CHALLENGES AND STRATEGIC INTERVENTIONS

To capitalize on these opportunities and address existing challenges, strategic interventions are essential.

Policy recommendations

Governments must prioritize harmonizing certification standards to facilitate international trade. Expanding subsidies for organic inputs and offering tax breaks to certified producers can create a conducive environment for growth (Lal and Yadav, 2025). Additionally, national action plans should integrate organic farming into broader sustainable development strategies.

Promoting research and innovation

Investing in research to develop climate-resilient crops and organic pest control methods is critical. Partnerships with academic institutions and private entities can foster innovation, ensuring that farmers have access to innovative technologies.

Empowering stakeholders

Capacity building through farmer training programs, consumer awareness campaigns, and institutional collaborations would play a pivotal role. Such programs in India, which promote knowledge exchange among organic farmers, can serve as global benchmarks.

Adapting to climate change

Agroforestry, crop diversification, and regenerative practices must be scaled to enhance resilience. Integrating renewable energy sources in organic operations can further reduce carbon footprints, aligning with global climate targets.

Strengthening market infrastructure

Developing efficient storage, transport, and processing facilities will improve product quality and reduce post-harvest losses. Initiatives to establish farmer cooperatives and connect them with global supply chains can ensure equitable market access.

CONCLUSION

Organic agriculture is more than a farming practice; it is a beacon of hope for building resilient and sustainable food systems. With the sector growing to over €135 billion in sales globally and covering millions of hectares, it signifies an increasing global commitment to health, sustainability, and environmental stewardship. However, realizing its full potential requires addressing structural barriers such as policy fragmentation, certification costs, and supply chain inefficiencies. The trends identified-rising consumer awareness, technological innovation, and expanded market access-showcase the immense opportunities available. Governments, businesses, and civil societies have begun integrating organic agriculture into climate resilience strategies, biodiversity preservation, and nutrition security initiatives. For instance, Africa and Latin America are poised to become new epicentres of organic production, highlighting the role of emerging markets in driving global transformation. In conclusion, organic agriculture stands at a pivotal crossroads. Its potential to reshape global food systems is immense, yet it demands unwavering commitment, innovation, and collaboration. As the world embraces organic farming as a solution for the future, it will redefine our relationship with the planet and ensure the well-being of future generations.

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Obituary

Professor James France, Professor Emeritus at the University of Guelph (Canada), passed away on December 22, 2024. His contributions to mathematical modelling in agricultural sciences is unparallel. He is survived by his wife Judith, three sons and four grandchildren.

In Loving Memory
of
Prof. James France

Born on October 30, 1949, in Haverfordwest, Pembrokeshire, UK, Jim obtained his BSc (honours) in Mathematics at Cardiff University and PhD at the University of Hull. He began his career as a specialist in mathematical modelling of all aspects of animal physiology, with a focus on rumen function, digesta passage and dairy cow nutrition. Together with John H.M. Thornley, published the classic book Mathematical Models in Agriculture. Their works on mathematical modelling is serving as foundation for understanding and predicting the behaviour of agricultural and ecological systems through quantitative methods. He worked on a dynamic simulation model of rumen function with colleagues from Wageningen University. In University of Guelph, he founded and led the Centre for Nutrition Modelling. He was one of the pioneers on modelling nutrient digestion and utilisation in farm animals. Dr France was an accomplished researcher who published 10 books and about 865 research articles which have been cited more than 31,900 times. He was a visiting professor at the University of California – Davis, Wageningen University, University of León and Newcastle University.

Prof. France has enormously contributed to the 'e-planet' journal as Chief International Editor & Reviewer since 2012 and published several papers in the said journal. We are deeply saddned to hear about the untimely passing of Prof. James France. The e-planet family will miss him and his contributions to science in future.