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# RESEARCH TRENDS IN INSTITUTIONAL PROMOTION OF ORGANIC FARMING FOR NATURAL RESOURCE MANAGEMENT: A BIBLIOMETRIC AND SYSTEMATIC REVIEW

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**ABSTRACT**
Organic farming is a vital approach to sustainable agriculture and natural resource management, but its implementation is still limited by fragmented institutional support, inconsistent policies, limited financial resources, and poor extension support. It is therefore crucial to understand the role of institutional mechanisms in shaping the adoption of organic agriculture and their contribution to natural resource management, if efficient policies and governance are to be designed and implemented for sustainable transformation in agriculture. The current study aims to propose a systematic literature review combined with a bibliometric analysis to synthesise the current evidence on institutional mechanisms, research trends and natural resource management outcomes in the context of organic farming. In line with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework, 158 peer-reviewed articles in the Scopus database were selected and analysed. The publication trends, country-wise scientific production, word cloud analysis, thematic mapping, keyword co-occurrence and conceptual research networks were analysed with bibliometric techniques, and thematic analysis was used to synthesise the institutional mechanisms, natural resource management outcomes and research gaps. The results show that research on institutional support for organic agri-food systems has grown significantly over the years, especially since 2016, reflecting the growing interest in sustainable agriculture and environmental governance globally. The largest contributors were Germany, Spain, Switzerland, China and India, and the main research themes were organic farming, conservation of natural resources, environmental protection, sustainability, and agriculture. The word cloud analysis highlighted the presence of the words "organic farming", "agriculture", "conservation of natural resources", "environmental protection", and "organic agriculture", indicating a clear focus on sustainable resource management and protecting the environment. The thematic map also highlighted the ongoing influence of sustainability and climate change on future research, in addition to agriculture, conservation of natural resources and environmental protection as well-developed motor themes. Extension services were found to be one critical pathway in enhancing farmers' ecological awareness, knowledge, and innovation uptake among these. Despite these advantages, there remain several institutional, technical and socio-economic factors that are hindering the broader use of organic farming, especially on small farms. Regardless of regional context, high conversion costs, temporary production loss during the transition period, nutrient deficiencies, certification costs, poor extension services, lack of access to organic inputs, market volatility and weak institutional coordination are recurring issues. This review gives a comprehensive synthesis of the institutional dimensions of organic farming and their links with sustainable natural resource management overall. They offer useful insights for policymakers, extension services, research institutions and development practitioners who are interested in building capacities of organic agriculture institutions and enhancing environmental results. An integrated institutional system that integrates policy support, certification, extension services, financial assistance, research, digital advisory systems and market development, but also considers their long-term environmental, economic and social impacts, in different agroecological and socio-economic contexts, requires future research. These are integrated approaches that will play a critical role in enhancing farmer resilience, ensuring natural resource conservation and promoting sustainable agricultural development.

**KEYWORDS:** Organic farming; Institutional mechanisms; Sustainable agriculture; Natural resource management; Agricultural extension; PRISMA

## INTRODUCTION

The literature presents organic farming as a credible natural resource management option, but its success is attributable not only to certification processes but also to interactions among institutions in policy, extension, markets, training, and locally adapted ecological practices. A good review can be based on both the impact of organic farming on the environment and the institutional mechanisms that ensure that organic farming is both sustainable and efficient. Even though they tend to be more profitable and environmentally friendly, and to provide more ecosystem services, these systems are less productive due to conflict. (Reganold & Wachter, 2016). Organic farming is considered a farming system that uses cultural, biological and mechanical practices to manage the cycles of resources, ecological balance, and to maintain biodiversity and minimise the use of synthetic inputs. (Panday et al., 2024). Organic agriculture has shifted to sustainable agriculture, which excludes synthetic fertilisers and chemical pesticides, enhancing environmental sustainability. The literature states that organic farming occupies a land area of approximately 1.6% (75 million hectares). (Lambert et al., 2025)

Institutional promotion is more extensive than subsidies. This literature features regulations, certification systems, extension, farmer associations, public procurement, research assistance, digital advisory, market building, and multi-stakeholder governance arrangements. (Sapbamrer & Thammachai, 2021). This paper reviews the current research trends in studying institutional contexts and processes that influence the development and diffusion of organic farming for natural resource management, and how this diffusion impacts natural resource sustainability, soil health, water, and biodiversity. The field has shifted from considering organic farming as a marginal paradigm of production toward considering it as a governance problem, i.e., what policy mixes, certification schemes, advisory services and market institutions actually support organic farming on a larger scale. Organic farming is presented as a production system which does not use synthetic components, and it is purely based on ecological processes and produces public goods (e.g. biodiversity, landscape quality, clean water, healthy soils). (Łuczka, 2021)

Modern-conventional agriculture, based on the use of synthetic fertilisers and pesticides, has dramatically increased the production of food in the world, at a high price in terms of degradation of soil, biodiversity and pollution of groundwater. There is also some literature on why this subject is relevant to natural resource management. Organic systems are always associated with lower use of synthetic fertilisers and pesticides, increased soil organic matter, increased microbial activity, increased biodiversity and decreased soil and water contamination risks. (Gamage et al., 2023). Organic farming has therefore developed into an important sustainable strategy which – at least in principle – avoids all artificial inputs and relies instead on ecological processes, biodiversity and locally adapted cycles to maximise the health of soil, plants and humans (Blockeel et al., 2023). The adoption of organic systems is a matter that is largely dependent on the role played by the government and institutional promotion due to the high learning curve and important risks associated with the transition. (Dobrovolska & Manuel Recio Espejo, 2019). Its primary natural resource management benefits have been highlighted across the literature as improved soil health, enhanced nutrient cycling, reduced pollution pressure, increased biodiversity, and increased ecological resilience, while yield gaps, nutrient constraints, and labour demands have been common constraints. It should also retain a comparative perspective, with the EU, the US, India, Bhutan, and other developing country contexts, as the literature demonstrates that institutional pathways are highly context-sensitive.

The literature also reveals that research has been moving away from the question of whether organic farming is environmentally preferred to which institutions address sustainable environmental results from soil, water, biodiversity and climate mitigation. Meanwhile, it is undeniable that environmental benefits do not necessarily imply a spread of adoption since transition costs, certification requirements, input availability, poor farmer advisory services, and market uncertainty are the factors that hinder adoption. (Meshram et al., 2026). Organic agriculture is the most important driving factor that drives ecosystem balance, greenhouse gas emission reduction, and soil and water conservation. (M. Tahat et al., 2020)

On the one hand, a useful review should link three strands: the natural resource justifications for organic agriculture, the institutional arrangements through which it is promoted, and the circumstances in which these arrangements benefit natural resources outcomes above and beyond certified area. The scope should clearly embed policy and governance in soil, water, biodiversity, nutrient cycling and ecosystem services, as these are all integral aspects of sustainability transition and should not be split. (Ondrasek et al., 2023)

The following objectives are used to guide this review:

- To analyse research trends in institutional support for organic farming.
- To evaluate institutional mechanisms for promoting organic farming and natural resource management outcomes.
- To identify barriers and future research priorities.

## METHODOLOGY

This study adopts an integrated framework of bibliometric analysis and systematic literature review to examine the institutional mechanisms for organic farming for better natural resource management. The literature in this study was identified from the Scopus database, which is widely used for bibliometric analysis and literature

review. PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) was used for data representation. Data visualisation was done by R studio and VOSviewer.
The search strings were combined as a strategy to collect the literature related to institutional mechanisms for organic production and natural resource management. Boolean operators were used between the search strings to get accurate lists of literature. Specific inclusion and exclusion criteria were used, such as language, publication stage, article type, etc. Then duplicate articles were removed. At first search, 768 articles were identified. Then, after applying inclusion and exclusion criteria, 593 articles were excluded. Following 11 articles were removed by screening the title and abstract. Finally, 158 articles were included for the further review process.

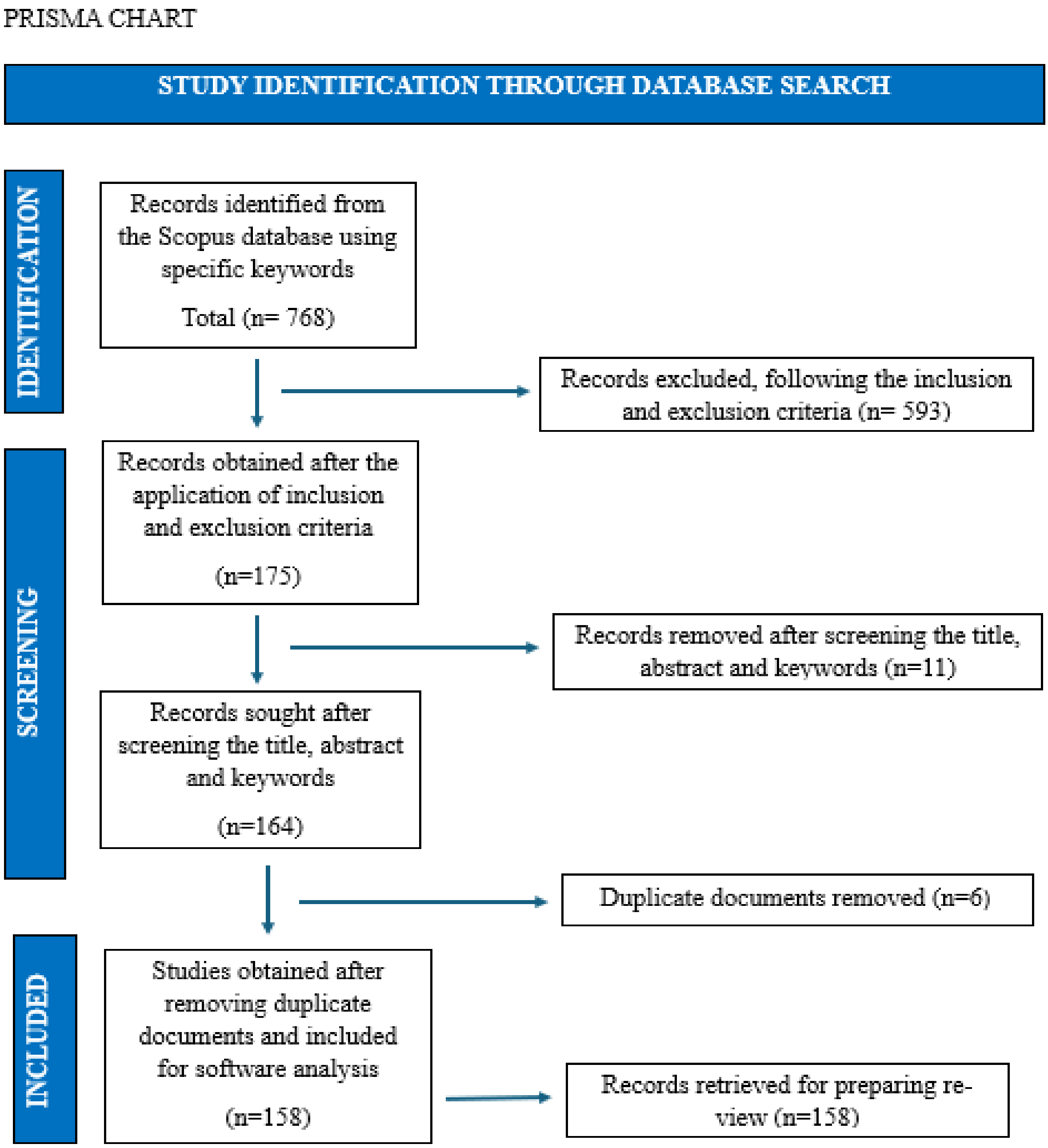


**Figure 1**. PRISMA Flow Diagram**:** showing: Identification (768 records) → Screening (158 after duplicates removed) → Eligibility (158 full-text assessed) → Included (158 studies in synthesis)

**Bibliometric analysis**

- **Country's Scientific Production**

Country's scientific production reveals a diverse distribution pattern. Germany contributes the largest share (18%), underscoring its major role in promoting organic farming through various institutions. Spain (14%) indicates strong engagement in policy recommendations that ensure sustainability. Switzerland (11%) and China (10%) focus on biodiversity conservation and natural resource management, which enhance organic farming production.

India and Italy (9%) each form the next tier, as emerging contributors of sustainable agriculture through extension frameworks and different institutional approaches. USA and France (8%) each represent the worldwide recognition of organic farming as one of the important factors of natural resource management. UK (7%) and Brazil (6%) are the niche contributors that focus on context-specific innovations. European nations are adapted to organic farming, evidenced through strong policy recommendations and institutional support. Whereas Asian and South American countries have a growing commitment to natural resource management and sustainable agriculture.

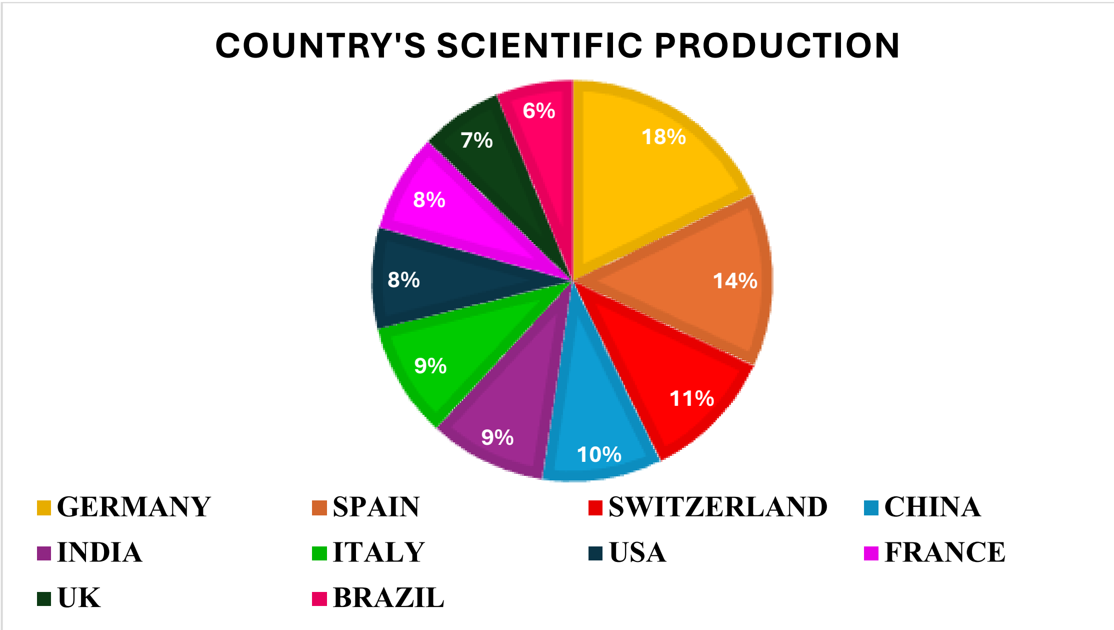


**Figure 2.** Countries' Scientific Production Distribution: (Bar chart showing: Germany 18%, Spain 14%, Switzerland 11%, China 10%, India 9%, Italy 9%, USA 8%, France 8%, UK 7%, Brazil 6%)

➢ **Word cloud**

The Word cloud emphasises overviews of dominant research themes. In the analysed literature, ‘Organic farming’ (129 occurrences) indicates the dominant factor of natural resource management, leading to improved soil health and also enhancing biodiversity conservation. High frequencies of ‘Agriculture’ (51occurrences) come under the primary sector of the nation, which should achieve long-term sustainability through region-specific climate-resilient practices. ‘Conservation of natural resources’ (50 occurrences), ‘environmental protection’ (50 occurrences) and ‘Organic agriculture’ (45 occurrences) focus on natural resource management that enhances climate resilience and reduces environmental degradation. ‘Agricultural management’ (11 occurrences) has the fewest occurrences, but it acts as the basic element of sustainable agriculture.


**Figure 3.** Word Cloud and Most Relevant Keywords: [Word cloud with 'Organic Farming' as largest (129), followed by 'Agriculture' (51), ‘Conservation of natural resources’ (50), ‘environmental protection’ (50), ‘Organic agriculture’ (45) and other related terms in decreasing sizes]

- **Thematic Map**

The thematic map positions research topics by centrality (field relevance) and density (internal development), revealing structural organisation. In the basic themes quadrant (high centrality, low-to-moderate density), sustainability, climate change, and sustainable development appear together as foundational, widely connected topics. In the motor themes quadrant (high centrality, high density), 'agriculture', 'conservation of natural resources', and 'environmental protection' demonstrate both strong connectivity and internal specialisation, indicating well-developed research on strengthening skills, institutions, and decision-making. Niche zone terms including 'organic farming', 'soil conservation', and 'soil' represent more specialised or methodological strands contributing depth to specific aspects. The emerging zone includes ‘land use’, ‘fertiliser’, and ‘pesticide’ as basic elements for natural resource management. Node size variations show 'organic farming' (129 occurrences, red node) as dominant; 'agriculture' (51 occurrences, blue node) as significant in management-focused decisions; 'sustainability' (45 occurrences, green node) reflecting growing organisational competency focus and linking resources and climate change.

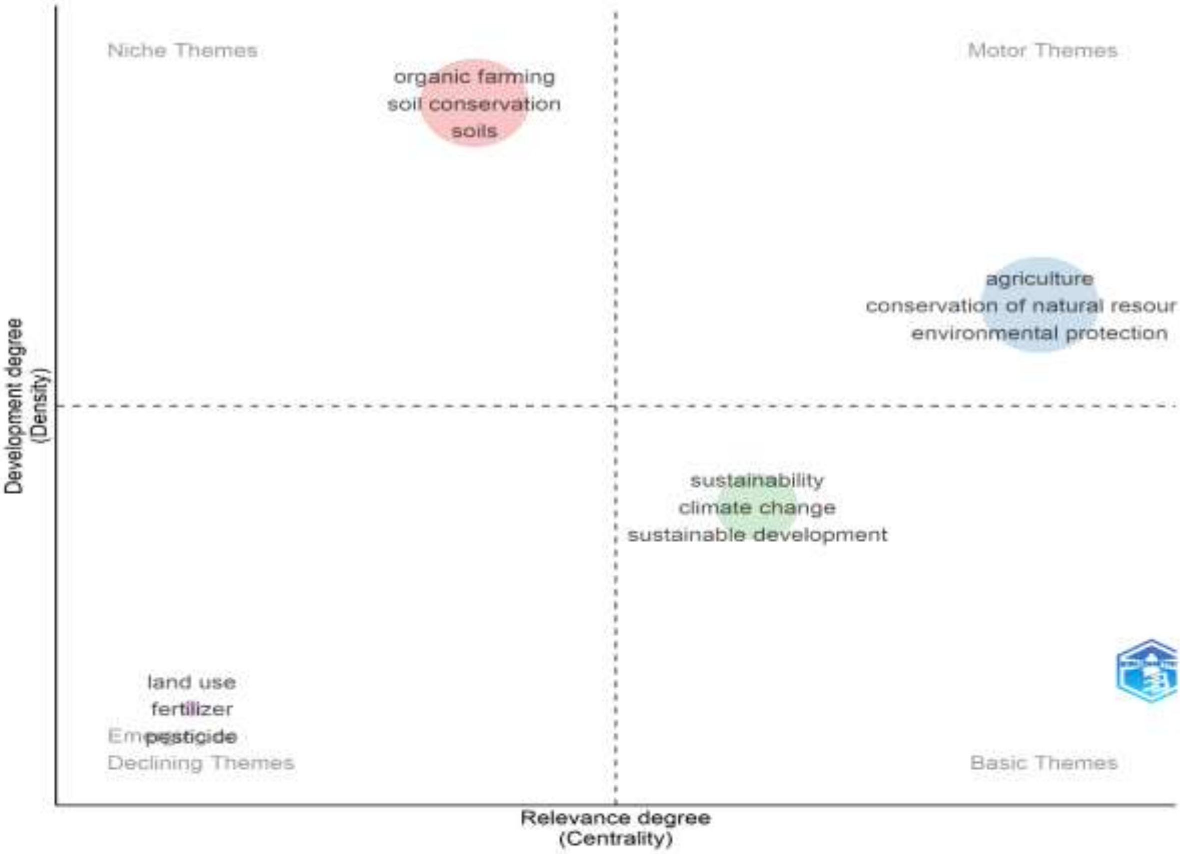


**Figure 4.** Thematic Map: Four Quadrant Analysis: [Four-quadrant diagram: Basic Themes (high centrality, low density): Sustainability; Motor Themes (high centrality, high density): Agriculture; Niche Themes (low centrality, high density): Organic farming; Emerging Themes (low centrality, low density): specialised interventions]

- **Country production over time**

Rapid research expansion from 2003 – 2012 gives specific growth curves. Germany started growth from 2007 and has a steep rise after 2016, reaching approximately 81 papers in 2026, establishing leadership in this field. Spain has shown steady growth since 2011, and it has accelerated after 2017, attaining a peak of reaching a maximum publication of 64 papers in 2026, which shows sustained publication growth. Switzerland displays a straight, earlier growth pattern with no publication from the mid-2000s, peaking around 49 articles by 2026, implying steady engagement through long-running programmes on natural resource governance and organic farming. China remains nearly absent until 2011, then rises gradually to 44 papers in 2026, and India starts growing from 2006 and grows gradually, reaching its peak at 43 articles in 2026, indicating late but steady-emerging research in contexts linked to resilience, livelihood adaptation, and capacity-building initiatives.

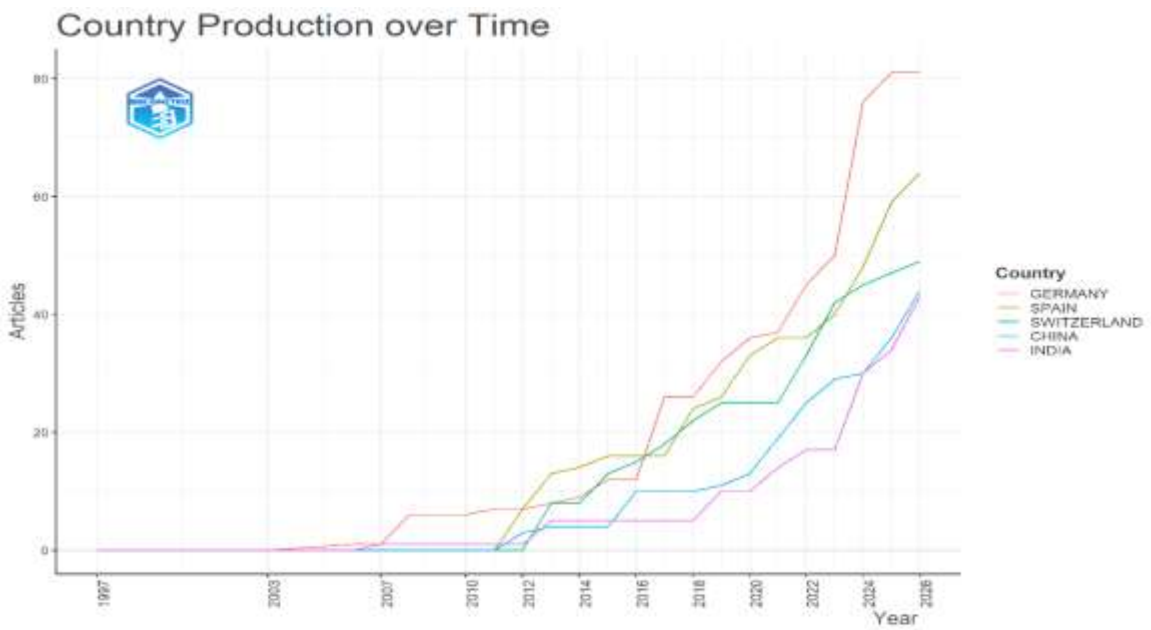


**Figure 5.** Country Production Over Time (2003-2026): [Multi-line temporal chart showing publication trajectories: Germany (steepest rise post-2026 to 81), Spain (steady growth to 64), Switzerland (acceleration post-2026 to 49), China (gradual rise to 44), India (rapid emergence post-2026 to 43)]

➢ **Co-occurrence network**

The co-occurrence network provides the conceptual framework of major themes identified in the literature. The largest node, 'organic farming', occupies a central position with extensive links to 'agriculture', 'environmental protection', 'conservation of natural resources', 'soil conservation', and 'sustainability', showing most studies frame farmer livelihoods and factors of natural resource management primarily as organic farming and soil and water conservation practices. Green nodes ‘agriculture', 'environmental protection', 'conservation of natural resources', 'productivity', and 'ecosystem'—cluster together, indicating governance and management of land and water resources form major thematic areas. Red nodes around 'organic farming', 'soil conservation', 'crop rotation', 'soil management', and 'carbon sequestration' point to practice-oriented clusters emphasising farm-level technologies, local knowledge systems, and livelihood outcomes. Blue nodes linked to 'sustainability', 'climate change', 'agroecology', and 'food security' reflect broader environmental governance. Yellow nodes—'humans', 'animalia', and 'animal husbandry '- depict human and animal dimensions, along with integrated management approaches that bridge climate, resource governance, and livelihood outcomes.

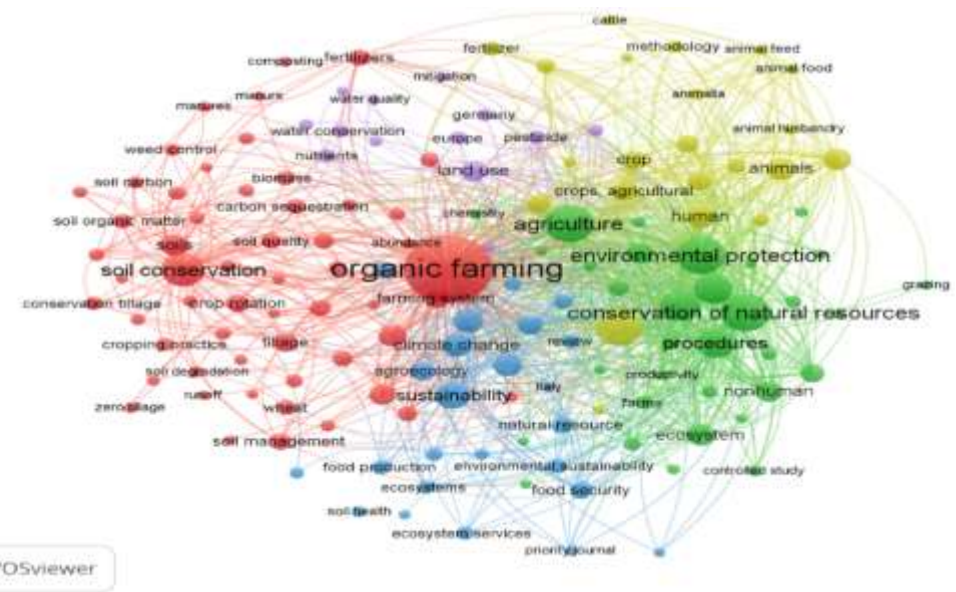


**Figure 6.** Co-occurrence Network of Keywords: [Network visualisation showing: Central hub 'Organic farming' with multiple radiating connections; Green cluster (Conservation of natural resources); Red cluster (Soil conservation); Blue cluster (Sustainability); Yellow bridging nodes (Human, Animals)]

## RESULTS AND DISCUSSION

### Institutional Mechanisms

Government policy is the most important institutional mechanism that promotes organic farming. There are some dominant tools for the promotion of organic farming, such as subsidies, financial assistance, rules and regulations and programmes. It also protects the environment and helps with rural development. (Barbosa, 2024). EU evidence shows that there is an increase in the area of organic farming, but payments, sectoral development and environmental performance are not linked properly. (Łuczka, 2021). Certification is the most important factor; there is a certification system called Participatory Guarantee Systems, which supports smallholders in the context of inclusion and market access. Yet high certification costs, complex standards, and poor alignment between domestic and international standards also reduce the scope of organic farming, as shown in Thailand. (Babajani et al., 2023). Extension frameworks are the core factor of organic certification. The literature shows that training, extension contact, technology support, farmer associations, and information dissemination are the most supportive factors of organic farming adoption. (Sapbamrer & Thammachai, 2021)

In China, the extension framework and the institutional approaches are the driving factor that emphasizes the importance of ecological balance, and digital extension increases the willingness of farmers towards the adoption of organic farming. The extension framework widened its channels, and it provides low-cost advisory services, which encourage farmers to adopt organic farming. (Qiao et al., 2022). The literature shows that peer farmers' networks, supporting organisations, non-governmental organisations, cooperatives, educational institutions, and public-private partnerships help farmers gain practical knowledge of organic farming and build trust in organic agriculture. (Kumar et al., 2023) Modern digital agricultural extension platforms provide extension services and technical guidance is cost-efficient and time-efficient. It focuses on ecological literacy and livelihood enhancement through organic production. (Li et al., 2024). Public institutions should stimulate as mandatory to purchase organic products. Political interference should ensure the uptake of organic food policies and programmes and increase organic expenditure per capita. (Lindström et al., 2022). Private consultancies, farmer-producer organisations, and farmer discussion groups are crucial intermediaries that promote Organic Farming Innovations (OFIs) through knowledge exchange, training, and collaborative marketing. (Wiseman et al., 2022)

Legal rules and regulations are the only driving factor that drives the shift of organic agriculture from a social movement into a recognised policy domain. (Łuczka, 2021) Certification is the mechanism by which it enhances the market value and ensures quality, so it is promoted voluntarily to yield consumer trust and export access. This is why several institutional frameworks like advisory services, educational institutions, farmers' discussion groups and research organisations play a major role in promoting organic production.(Hroma, 2024). Financial support is the most expected instrument; it includes subsidies, programs, regulations, and financial assistance to support organic production. Most of the literature emphasises that financial support is inadequate without informational, educational, infrastructural and market institutions. (Barbosa, 2024). Adoption depends only on collective organisations like training, extension contacts, farmers' associations and technology support, which predicts adoption. (Sapbamrer & Thammachai, 2021)

### Institutional Effectiveness and Gaps

Institutional effectiveness is mixed rather than positive. It only supports organic production, but it is not the only factor for sectoral development. In the EU, growth has been slowed and discontinued because of insufficient financial services. It is not directed to the long run. (Simin et al., 2023). More environmentally efficient mechanisms are encouraged rather than maximising the area for better adoption of organic agriculture. So, priority should be given to targeted mechanisms. (Rey Vicario et al., 2025).

In organic production, there are issues other than initial investment; transition costs are a conversion risk period of 2-3 years, yield gaps, and nutrient constraints. In Bhutan, conversion occurred with 18-45% of yield gaps, nitrogen deficiency, and research shortfalls. In highly productive regions, the dominant bottleneck is often the lack of alternative nutrient resources and agroecological solutions, with downstream agronomic and socio-economic constraints that current area payments do not fully offset. (Meshram et al., 2026)

In Thailand, the government proposed a project, the "one million-rai" organic rice cultivation, which struggled due to "certification nationalism" promoting a domestic certification standard that did not align with international market requirements, which ultimately frustrated farmers aiming for export markets. (Baird, 2024). Small- scale farmers who practice agroecological farming do not have confidence in government policies, schemes and programmes related to organic agriculture. The programmes and policies should support local farmers, sustainable agriculture, and ensure food security. (Simón-Rojo et al., 2020)

### Natural Resource Management Outcomes

Soil is an environmental asset, which can be improved in the context of organic farming through crop rotation, composting, green manuring, cover crops, and biological nutrient management. It enhances the soil nutrient status, organic content, and microbial population. It supports carbon sequestration and climate-resilient natural resource management. (Jetawat et al., 2025).

Comparative studies show that organic systems have greater biodiversity than conventional systems, and more diverse landscapes, smaller fields, and habitat can amplify these gains beyond farm-level certification alone. (Tscharntke et al., 2021)
Water pollution is another major theme that should be rectified by replacing chemical fertilisers with bio-fertilisers, which ensures a lower risk of soil and groundwater contamination and protects biodiversity. (Bhatt & John, 2023)
Nutrient management is the core concept, focusing more on organic or bio-fertilisers, as their nutrient release is slower and it can vary in nature of organic matter and the timing of application. So better research, extension, and precision tools should be provided. (Liao et al., 2025). Soil fertility is based not only on applying nutrients as supplements but also on applying soil microbes. By increasing soil microbial activity, soil nutrient status will increase, and it also enhances soil fertility. It includes arbuscular mycorrhizal fungi (AMF), cyanobacteria, and beneficial nematodes. (M. Tahat et al., 2020); (Varma et al., 2024). The outcomes of such practices help both individual farmers, as it increases their income and livelihood and also help to enhance environmental sustainability. (Rejesus et al., 2021).

**Regional Trends and Case Studies**
The main trend in Europe shifted from area-based towards targeted approaches. It is not based on how much land area a farmer converted to organic farming. It is purely based on outcomes. Farmers receive incentives based on environmental benefits, such as greenhouse gas emissions reductions and biodiversity protection. Simply increasing the area does not produce agricultural outcomes. (Rey Vicario et al., 2025)
In Poland and Italy, government support is based on different stages and conditions. Stages refer to the shift of farming from conventional to organic production. The next stage is to help the farmers who continue organic farming after certification. (Casolani et al., 2021)
South Asian countries follow a top-down approach. Sikkim, Bhutan, and Sri Lanka need strong political and Government interference for establishing any agricultural initiatives. It is suggested that farmers should not stop using fertilisers all of a sudden. Also, organic certification should be affordable. (Babajani et al., 2023). Farmers are to be provided with proper, effective extension advisory services, organic input supply, and ease of market access. (Tshotsho et al., 2024)
African countries show mixed research outcomes on organic production. It requires government and institutional support for greater adoption of organic farming, which is more useful than older adoption theoretical models based on attitude and knowledge. Ghana and Kenya adopted organic farming, which has greater environmental benefits than economic and social outcomes. (Blockeel et al., 2023).
Uganda and Benin follow the adoption of organic agriculture but in a different pathway depending on the government and institutional policies. Countries with strong policies and programmes will make greater progress. (Bendjebbar & Fouilleux, 2022)

**Implications and Recommendations**
Institutions should focus on research outcomes, not on certified area. Organic farming can improve the ecosystem and biodiversity, reduce pollution, enhance carbon sequestration, and enhance soil and water conservation, which are the key aspects of natural resource management. Because soil, water, and biodiversity benefits are contingent on sustained organic management (Wittwer et al., 2021)
Policymakers should make decisions on policies based on a framework that blends both conventional and organic systems, which enhances environmental sustainability. It should be blended by loosening the organic input bans, simultaneously also tightening the conventional farming rules, which ensures ecological balance. (Stubenrauch et al., 2021). Equal allocation of funds globally can achieve environmental targets and also ensure economic stability. (Springmann & Freund, 2022). Recent multifunctionality evidence indicating that high yields and biodiversity outcomes can be jointly optimised weakens the traditional ‘yield versus environment’ framing that has historically constrained NRM-oriented institutional support for organic conversion. Use mixed policy mechanisms like extension services, certification, subsidies, and market access. Framing organic promotion around resource and health co-benefits can strengthen political commitment beyond purely agronomic arguments. (Dobrovolska & Manuel Recio Espejo, 2019).
Educational institutions should include organic agriculture in an academic curriculum, and hands-on practices should be given that increase entrepreneurial skills and ensure sustainable food security. (Padath, 2025).
The key point is to prioritise farm and research outcomes, rather than maximising the organic-certified area. Strengthen the research and advisory services on organic agricultural practices like nutrient recommendations, organic inputs, etc. The pairing of organic-conversion schemes with irrigation-efficiency programmes illustrates jointly targeting production transition and resource conservation. (Dougill et al., 2017)

**Barriers and Future Research**
The most consistent barrier is that institutions planned to increase organic production area, which does not enhance environmental outcomes. This leads to lower crop yield than conventional farming, especially during the conversion period. (Mazurek-Kusiak et al., 2021) Nutrient deficiency is also a major problem during the transition.

So, crop diversification, alternate nutrient supply, and multidisciplinary research are more viable factors than area expansion. (Smith et al., 2026)

An integrated framework is promoted for enhancing organic production, which includes policies, programmes, institutions, and extension services. (Putivskaya et al., 2021). It includes combining legal, informational, infrastructural, and financial support, with stronger involvement from research bodies, advisory services, producer groups, and local government. (Dobrovolska & Manuel Recio Espejo, 2019)

## CONCLUSION

In this systematic review, we synthesised the existing knowledge, complemented with a comprehensive bibliometric analysis, about the institutional mechanisms supporting organic agriculture and how these mechanisms contribute to natural resource management. The analysis of 158 peer-reviewed publications shows that the research on organic farming has grown significantly over the last 2 decades, especially since 2016, indicating that organic farming is a strategy of sustainable agriculture, environmental conservation and climate resilience. Bibliometric results show that the countries Germany, Spain, Switzerland, China and India are top contributors, and thematic and keyword analysis indicates the main research themes are organic farming, agriculture, conservation of natural resources, environmental protection, sustainability and soil conservation. The thematic map also presents agriculture as a motor theme and conservation of natural resources or environmental protection as a motor theme; sustainability and climate change as basic research topics. The review highlights that integrated institutional support is needed for success in promoting organic farming, not single policy measures. Extension services have a crucial part to play in enhancing farmers' knowledge, innovation uptake and access to information, and when supported by effective governance and low-cost compliance activities, certification systems can boost the credibility of products to support market access. The evidence is unambiguous in terms of the positive effects of organic farming on soil fertility, biodiversity, nutrient cycling, carbon sequestration, environmental pollution, and also the resilience of the ecosystems. However, these benefits are not just realised by having the certification or expanding organic area, but also because of continuing institutional support. Many obstacles remain, especially for smallholder farmers, such as high conversion costs, temporary yield reductions, nutrient limitations, certification costs, weak extension systems and market uncertainty. The fragmented policies and poor collaboration of institutions are also reflected in the countries' experience, which impacts the effectiveness of organic farming initiatives. The need for future research is to focus on institutional combinations of policy support, extension services, certification, research units, financial support and market development and enhance digital advisory systems and regional governance models. Overall, this review has highlighted that for the long-term success of organic farming it is necessary to have coordinated institutional approaches that could combine ecological sustainability, farmer livelihoods and effective governance. Such outcome-based approaches are crucial for promoting resilient agricultural systems and sustainable natural resource management.

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**Declaration of competing interests**

The authors have no conflicts of interest to disclose.

**Data availability**

Data will be available from the corresponding author upon reasonable request.

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