Review

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# How Agroecological Transition Frameworks Are Reshaping Agroecology: A Review

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*Review*

# How Agroecological Transition Frameworks Are Reshaping Agroecology: A Review

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**Abstract:** The "agroecological transition" has emerged as a framework that aims to explain the complex changes taking place in agrifood systems. This study offers a mapping of the emergence of this framework, and aims to demonstrate that the "agroecological transition" can refer to different perspectives beyond the simple combination of two concepts. We carried out a bibliometric analysis of 298 articles (2012 - 2023), searched under the command "agroecologic* transition*". We used *VOSviewer* software, which is able to reveal clusters of co-citations of the most cited authors and articles. This result, in turn, indicates the existence of different perspectives on the use of "agroecological transitions". Four clusters were found: "Techniques and Practices", represented by articles that document the agroecological transition as an expression of specific agricultural techniques and practices; "Transition Theory", which employs the emerging theory and its conceptual contributions; "Transition Criteria", which involves the use of criteria to monitor the transition; "Political and Social", made up of articles that explore the political and social movement dimension of agroecology. Each of these clusters, and their approaches, contribute different interpretations of agroecology itself, indicating the emergence of a new framework capable of attributing new meanings to it.

**Keywords:** agroecology; transition; agroecological transition; transition theory; bibliometric review

## 1. Introduction

Nowadays, many efforts have been made to find alternatives that allow for more sustainable agrifood systems. In order to build such systems, there may be changes in agriculture as well as in the distribution, processing, and consumption of food in an attempt to make foodstuffs more equal, fairer, and safer and capable of promoting rural development while mitigating environmental degradation [1–4]. In this context, among many proposals, agroecology appears to be able to address the implications of sustainability of the current agrifood systems [5–9].

Scientific literature acknowledges agroecology as an approach that can combine science, movement (social and political), and practice [10]. It emerged in the beginning of the 1900s from the combination of the principles and methods of the agronomy subject with those of ecology. As a result, it has become a suitable means to understand traditional agricultural systems ecological tenets [11,12]. However, overtime it has developed into a more comprehensive alternative that would include managing entire agrifood systems [13–17].

More recently, it has been observed that the scientific community has been resorting to the concept of agroecology in association with a 'transition' terminology in bibliographical references and publications, providing a conceptual framework for the 'agroecological transition'. 'Transition', from the Latin *transire*, means cross over. Dictionaries describe it as going from one shape, state, style, or place to another [18]. Ergo, it refers to a change, a process that may imply different stages over time. Rotmans et al. (2000) [19], consider transitions to be gradual and continuous processes of change

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that can affect large parts of society over one or more generations. These processes have been looked into by a theory that carries the same name – Transition Theory – developed by such authors as Rip and Kemp (1998) [20], Smith (2003) [21], Moors, Rip and Wiskerke [22], and Seyfang [23].

Meanwhile, scientific literature shows that the use of the 'agroecological transition' conceptual framework may take on several meanings that go well beyond merely combining the concepts of agroecology and transition. For example, it may refer to the notion of path or trajectory linking two stages: the initial stage of a conventional, intensive, specialised, and industrial agriculture [24]; and the final stage of an agroecological agriculture, more sustainable and less demanding in terms of industrialised inputs [25,26]. On the other hand, it may also refer to the transition that occurs in agriculture regarding both the practices and the agroecological knowledge that emerge from the farmers' own knowledge acquired from managing their farms and the agrarian system [24,27]; or, on a larger scale, it may contemplate the changes in the whole agrifood system [10,28].

The contexts surrounding 'agroecological transitions' and the way they are used justify mapping the emergence and development of this conceptual framework. Thus, it is the purpose of this article to identify when it first appeared, the scenes in which it has been applied, in which perspective, and the main approaches currently defining it. In other words, this article seeks to understand the major contributions of the 'transition' to 'agroecological' principles and whether, associated with other concepts, it has helped redefine agroecology.

A bibliometric analysis of a scientific article database on the subject has been conducted using a specific software, the *VOSviewer*. This resource allows one to visualise different data related to the publishing universe, like where the studies originate from, the most commonly used descriptors, the main publications on the topic, and the authors and articles most referred to. Based on this analysis, it was possible to observe what theoretical and conceptual bases are more often employed and what contents associated with them are more relevant, thus providing information on how the most sought-after publications have evolved.

This article is organised as follows: after the introduction, section 2 describes the methodology used following a selection of articles and the construction of a database to support the bibliometric analysis (Materials and Methods). Section 3 presents the 'Results and Discussion', taking into consideration the articles selected and the analyses done. Finally, section 4 presents the final remarks based on the interpretation of the relationships between the published materials' theoretical and conceptual references.

## 2. Materials and Methods

Bibliometric analysis is a tool to sistematically review the literature, which includes a set of mathematical and statistical methods that can evaluate bibliometric data. It is widely used to study and examine great volumes of scientific data. As a resource of a quantitative nature, it offers several tools that allow for the identification of the main scientific sources of a given topic [29], such as the most relevant descriptors, authors, and publications, as well as the main countries where studies originate from. This way, it is possible to systematise the 'state of the art' of a given topic [30] and trace its evolution over time [31]. The 16.9 version of *VOSviewer* software uses the systematisation of publications and shows them through several bibliometric maps [32,33].

The first step is to define the bases for material research. In this case, the choice fell on *Scopus*® and *Web of Science*™ since they allow systematic research of articles reviewed by peers. Then, keywords, terminologies, and indexation expressions of interest are selected.

The 298 publications were subject to a bibliometric analysis highlighting such details as the year of publication, its geographic location, keywords more oftenly used, the main periodicals publishing on the topic, and the authors more frequently cited. Note that, as regards keywords, the criterium used was that of co-occurence, by which we selected only words that appeared at least five times, while for authors we used the co-citation criterium, selecting those who were referred to 10 or more times. Regarding the scientific journals, we chose those that registered at least 25 cocitations within the 298 publication universe. The analysis was intended to extract the theoretical and conceptual influences from agroecological transitions in order to identify likely redefinitions of agroecology.

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## 3. Results and Discussion

In this section, for the sake of clarity, we present the results of the afore mentioned analyses and discuss them at the same time.

First of all, it is important to remark how topical this subject is in today's scientific communications: the first articles to ever use the expression 'agroecological transition' date back from 2012 [34–36]. Only in 2018 did the issue become relevant upon the publication of 20 documents. 2022 registers the highest number of publications on agroecological transition with 74 articles.

Another aspect to consider regards the origin of the most frequently cited publications. Figure 1 highlights the continents and countries where the most representative studies have emerged, showing, therefore, where the references on the subject more often used originate from.

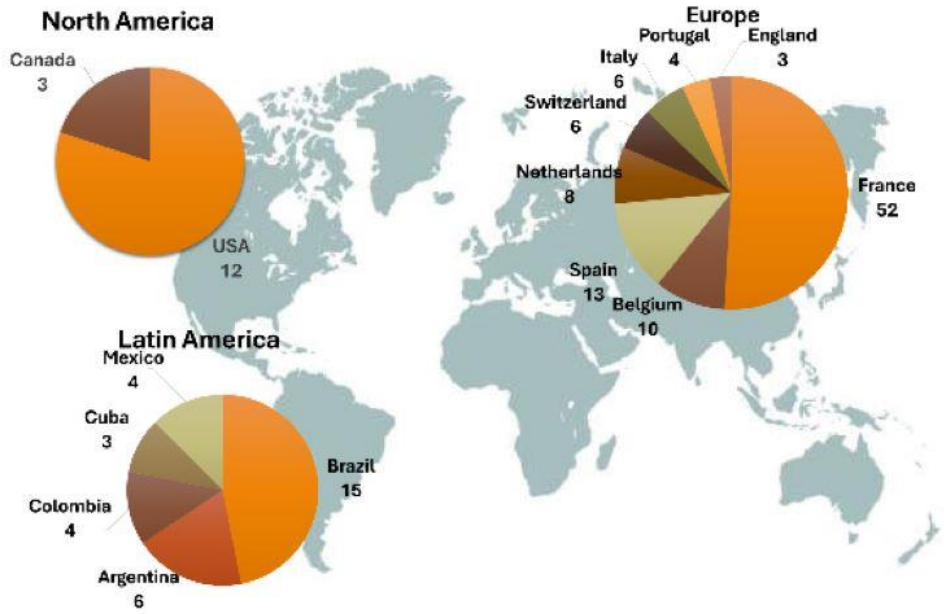


**Figure 1.** Continents and countries where the most cited studies originate from.

Source: Authors' own findings based on the *VOSviewer* software results.

The subject started in Europe, especially in France, and in American countries, namely Latin American ones, particularly in Brazil, setting the tone for the type of reflections that have shaped the 'agroecological transition' theoretical and conceptual references.

The keywords more frequently used in the publication universe up to the fifth occurrence are presented in Figure 2.

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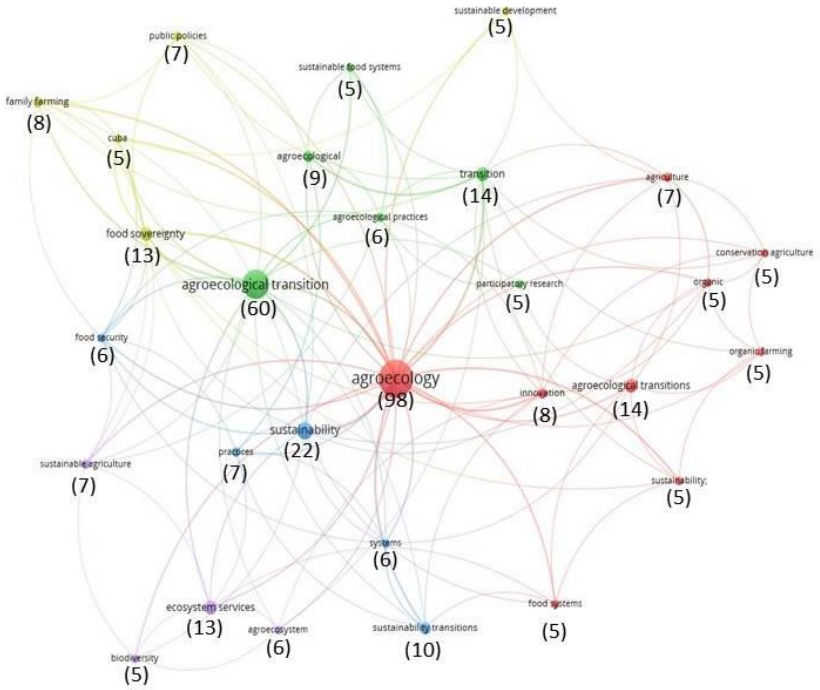


**Figure 2.** Network of keywords and their respective occurrence numbers.

Source: Elaborated by the authors based on *VOSviewer* software.

Figure 2 also reveals the connection between keywords since the articles in which they appear are also interlinked by cocitations. On the other hand, the number of occurrences points to the descriptors with which scientific communications have been building the 'agroecological' theoretical and conceptual framework. Keywords make up 5 groups, or clusters, also linked by the co-occurrence criterium. Each cluster, represented by a colour, rests on a set of ideas and concepts related to the 'agroecological transition'. Table 1 signals which contents are considered more relevant to agroecological transitions, departing from the keywords and naming each cluster.

**Table 1.** Agroecological transition-related contents obtained from keywords more frequently employed in each cluster.

| Cluster and its denomination | Description of the main contents obtained from more frequently used keywords |
|---|---|
| **Agroecology** (red color cluster) | Agroecology is the main descriptor of the documents (98 appearances). It has related to the innovation topic (8) and organic farming and conservation agriculture (organic farming - 5, conservation agriculture - 5). |
| **Sustainability** (blue color cluster) | The articles mobilise sustainability (22) together with concepts like practices (7), systems (6), and food safety (6). |
| **Transition** (green color cluster) | It groups publications that focus on agroecological transition as a main descriptor (60), which, in turn, relates to agroecological practices (6), participative research (5), and the sustainability of the whole food system (5). |
| **Ecosytemic services** (purple cluster) | It mobilises concepts pertaining to ecosystemic services (13), the agroecosystem (6), and biodiversity (5). |
| **Food sovereignty** (yelow cluster) | The main descriptor in this cluster is food sovereignty (13). The subject is connected with family farming (8) and public policies (7). |

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The analysis of the most frequently employed keywords shows that, despite agroecological transition's growing visibility in scientific communication, most publications' conceptual kern is still agroecology, followed by sustainability. In a first assessment, this network seems to mobilise a week association of descriptors, given that it lacks density and variety. On the other hand, there are connections to wider concepts, such as 'innovations', 'sustainable agriculture', 'sustainable food systems', 'sustainable development', and 'organic farming', to mention but a few. Moreover, there are descriptors that may oppose each other in a theoretical and practical sense, like 'agroecological practices', 'conservation agricultural', 'practices', 'food sovereignty', 'food security', and 'transitions'. This points to a relationship between agroecology and multiple societal questions, as well as a set of empirical means to promote it besides the theoretical contributions that explain 'agroecological transitions'. It is worth mentioning that this subject of transition has linked agroecology to the innovation terminology. It has also repositioned agroecological practices' and family farming's role, allowing for a systemic and scale view of agroecology since it has added a dimensional analysis into agroecological studies by incorporating the whole agrifood system into them. Besides, it is also connected to 'ecosystemic services', 'sustainability', 'organic farming', and 'food sovereignty'.

The map of the most frequently co-cited publications, which, therefore, have become a reference for this subject, points to some trends in the contents associated with 'agroecological transitions'. Figure 3 lists those publications and shows how they link to each other in a network over the 25th occurrence.

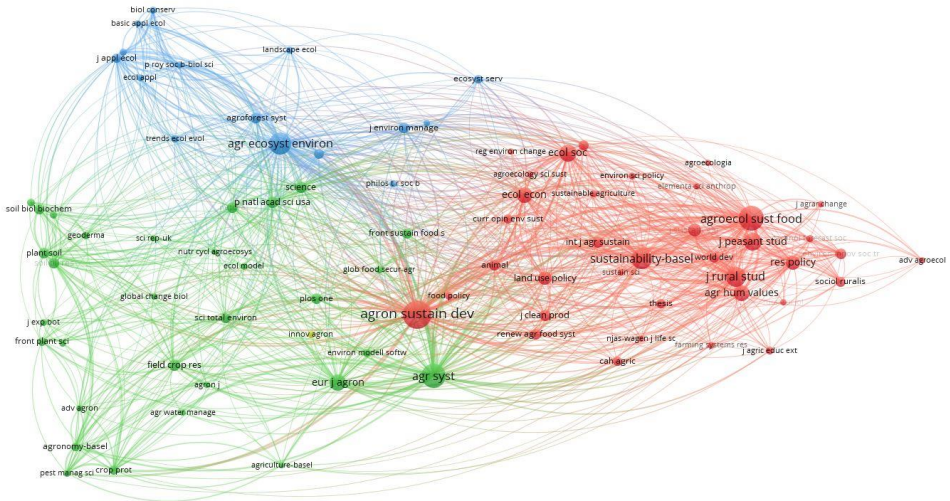


**Figure 3.** Map of the most frequently co-cited publications in the co-citation network, over the 25th occurrence.

Details on the composition of this image may be found in the Supplementary Material – Appendix A – Most co-cited journals equal to or more than the 25th occurrence.

Source: Elaborated by the authors based on *VOSviewer* software.

The analysis of the image shows that there are 84 publications on the subject, forming 4 clusters of associated contents. The red cluster, denser (it groups 37 publications), covers several topics from sustainability, farming and food systems to development and rural sociology, politics and economy, innovations, socioeconomic transitions, and global change. Due to the wide and multiple nature of the bibliographies connected in this cluster, we decided to designate it as 'Transdisciplinary'. The green cluster has an intermediate density (31 publications) and includes publications that deal with more specific subjects, like biology, agronomic sciences, soil sciences, and plant sciences. We named it 'Agroeconomic'. With a lower density, the blue cluster is even more specific (15 publications). It gathers literature on ecology, conservation, environmental systems management, and ecosystemic services. For this reason, we called it 'Ecological'. The smallest cluster is the yellow one, represented

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by a single publication, and is designated as 'Agronomic Innovations'. This cluster and its content are an indication of the general way in which 'agroecological transitions' are addressed, emphasising transdiciplinary contents rather than more technical ones referring to innovations and management practices as well as specific agroecological systems. At the same time, they highlight the multi-transdisciplinary origin of agroecology itself, on which 'agroecological transitions' still rest, as shown by the keywords (see Figure 2).

Another resource we have exploited was the map of most cited authors and articles in a co-citation network presented in Figure 4. In this map, it is possible to identify both the authors and their articles that have been most cited within the database universe listed by date of publication up to the tenth occurrence, visualising how these articles connect to each other in a co-citation network.

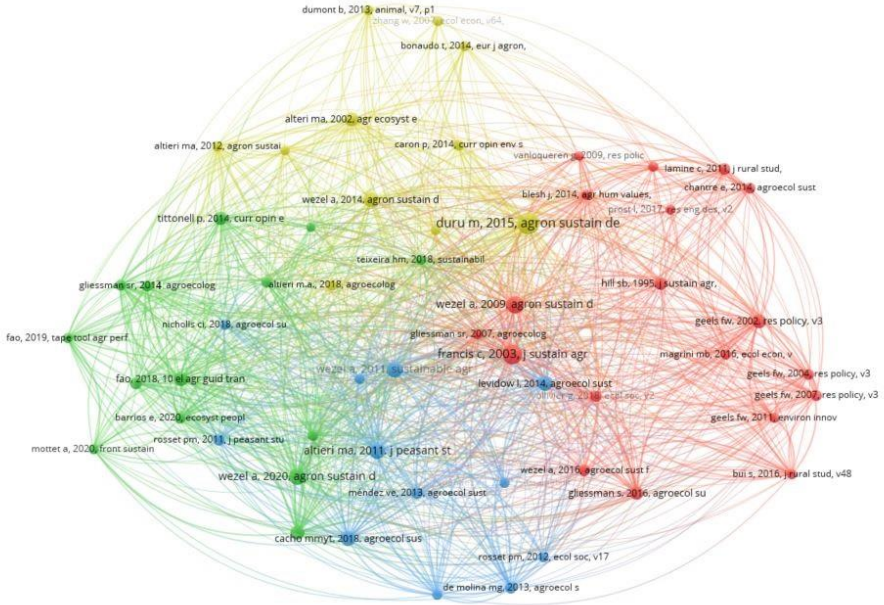


**Figure 4.** Map of the most cited authors and articles in a co-citation network.

Details on the composition of this image may be found in the Supplementary Material – Appendix B – Most co-cited authors and articles until the 10th occurrence.

Source: Elaborated by the authors based o software *VOSviewer* software.

Figure 4 represents a network in which the most cited authors within the databases consulted connect themselves. It consists of 56 documents, published between 1995 and 2020, which compose the prevailing theoretical framework of the consulted database (from 2012 up to 2023). Since the authors are mentioned together with their respective dates of publication, it is possible to extract each document that represents the network points. Each set of documents, displayed in clusters of different colours, and their respective positions within the network are supposed to indicate the reinforcement or opposition of the theoretical and conceptual frameworks used. After the documents have been identified and looked into on the whole, it is possible to evaluate these theoretical and conceptual frame works.

In other words, the 'map of most cited authors and articles in a co-citation network' allows for two analytical perspectives. The first, temporal, singles out the articles that appeared first and have later fuelled other articles. The second, regarding the content, reveals the connection between publications from the theoretical and conceptual bases that so far have guided the building of the 'agroecological transition'. The displaying of the clusters also expresses the reinforcement and opposition relationship between the works and their respective approaches. In order to better present the discussions, we will first look into each cluster and then comment on the connection and antagonism their content may show.

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The publications included in the red cluster, designated as 'Transition Theory', are the precursors of the whole network, besides being more referred to, with 308 citations. It comprises 19 documents, and the first publication, by Hill and MacRae, dates from 1996 and is entitled 'Conceptual framework for the transition from conventional to sustainable agriculture' [37]. It contains materials that initially focussed primarily on the 'agroecology' concept and its transdisciplinarity. After 2002, the documents that were produced began to draw on Geels' (2002, 2004) [38,39] and Geels and Schot's (2007) [40] works, which brought 'Transition Theory ' into the spotlight. Therefore, in more recent publications, the articles developed a connectivity approach between agronomy and innovation sociology. The ties between agroecology and transition theory allowed the scientific production to diverse into an agroecological transition seen as 'the transition of the whole agrifood system', thus uncovering integrated transition systems at various levels.

This connectivity also enabled the combination of agroecology with the analytical tools associated with transition theory – the Multi-level Perspective (MLP) – and its levels of associated sociotechnical systems: niches, regimes, and landscapes [38]. Hence, agroecology became embued with the touch of innovation, and it was possible to observe agroecological transition within the dynamics of sociotechnical systems. By relating agroecology to innovation and connecting it with MLP, it was possible to view it in its conception and testing environment (conceptually treated as a sociotechnical niche); in its validation and acceptance space and in its production and consumption *status quo* (which corresponds to the sociotechnical regime); and under the influence of the environment from which macroinfluent phenomena emerge that affect innovations at the other two levels (conceptually designed as sociotechnical landscape). In other words, the MLP draws attention to the possibility of addressing agroecology in a more dynamic way since it allows one to capture innovation trajectories in and between analytuical levels due to a time variable [41,42].

Additionally, by fostering a more intimate connection between agroecology and the 'regime', this theoretical and conceptual framework also relates the former to other aspects that compose the latter. These aspects are of a very diverse nature, like culture, infrastructures, politics, markets, uses and practices, industrial and corporate networks, technology, and knowledge [38,43]. In so doing, hindrances and supports to agroecology developemental processes emerged and became visible.

The second cluster is the yellow one, which we referred to as ' Techniques and Practices'. It became known in 2007 after the publication of Zhang, Ricketts, and Kremen's 'Ecosystem services and dis-services to agriculture' [44]. This cluster results from the combination of contents that relate agroecological practices, such as ecological intensification [45], crop-livestock integration [46], temperate agriculture practices [47], or diversified farming systems [48], with indicators that help monitor and assess the performance of such practices. These indicators may undergo several treatments of different magnitudes, like agroecology optimising principles (biodiversity, pollution decrease, and production factors) [49]; resilience, self-sufficiency, productivity, and efficiency [46]; environmental, social, and economic performance [49]; supply of critical inputs to agriculture (namely fertility, pollination, pest control) [48].

The publications grouped will explore ecosystemic services-related issues, agroecological practices, and indicators that allow for the monotoring and assessment of the said practices. This is a cluster that associates publications of empirical studies, which confirms that the techniques and practices at the basis of the agroecology conception were indeed important references to the 'agroecological transition'. It is also the cluster with the least number of citations (190) and documents (11), and its composition and formatting are more dispersed than those of the other clusters. This seems to indicate there is room for further research that leads to the systematisation and dissemination of specific agroecological systems management techniques and practices in a transition context.

The third cluster, the blue cluster, was designated as 'Political and Social.' The documents that compose it (12) are cited 202 times. It began to take shape after 2011 thanks to three publications: 'Agroecology as a science, a movement and a practice' (2011) by Wezel, Bellon, and Doré [50]; 'The agroecological revolution in Latin America: rescuing nature, ensuring food sovereignty and empowering peasants' (2011) by Altieri and Toledo [51]; and 'The Campesino-to-Campesino

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agroecology movement of ANAP in Cuba: social process methodology in the construction of sustainable peasant agriculture and food sovereignty' (2011) by Rosset, Machín Sosa, and Roque Jaime [52].

It is quite a varied cluster as regards its influences and carries contributions from various approaches, like innovation [51], agroecology [10,52], participatory action [53,54], sociotechnical systems [55], political ecology [56,57], peasant farming and civil society movements, and CAC methodology (Campesino-a-Campesino) [58–61].

It also links publications that acknowledge agroecology as a practice [60], besides documenting experiences in countries where it goes beyond 'the ecology of farming systems.' That is to say, they explore agroecology's important role as the expression of a political and social movement that would even be considered to be part of agroecology itself [57]. They also address the issue of agroecological approach and agroecology expansion scales, assuming that it can be viewed from a mere agricultural plot to the whole agrifood system [55,60]. The question of agroecology's territorial scale is also recognised as a function of ecological policies [56,57]. References take on an ideological character and assign an important social role to agroecology by associating it with poverty mitigation, food safety, and an alternative to agricultural sustainability.

The last cluster to emerge on the time line is the green cluster, 'Transition Criteria'. With 14 documentos, it is the second largest in terms of citations, totalling 209. It began in 2012, after Seufert, Ramankutty, and Foley's 'Comparing the yields of organic and conventional agriculture' was published [62]. It combines materials that explore the development of food systems' 'transition criteria' into more sustainable frameworks (involving such parameters as biodiversity, circular and solidary economy, knowledge co-creation and sharing, responsible governance, access to natural ecosystems, culture, networks, discourse, gender, equity, labour tax justice, characteristics of farming families, production strategies, land use, participation in public policies, extension services, and economic metrics). These criteria usually relate to the sustainable development goals defined by FAO [6,63] in 'The 10 Elements of Agroecology Guiding the Transition to Sustainable Food and Agricultural Systems' and 'TAPE: Tool for Agroecology Performance Evaluation'.

Figure 5 illustrates and sums up the possibilities of analysing the clusters regarding their spatiality, showing their proximity or opposition to each other and, therefore, the connections and oppositions between 'agroecological transitions' theoretical and conceptual frameworks. It is built on the interpretation of Figure 4.

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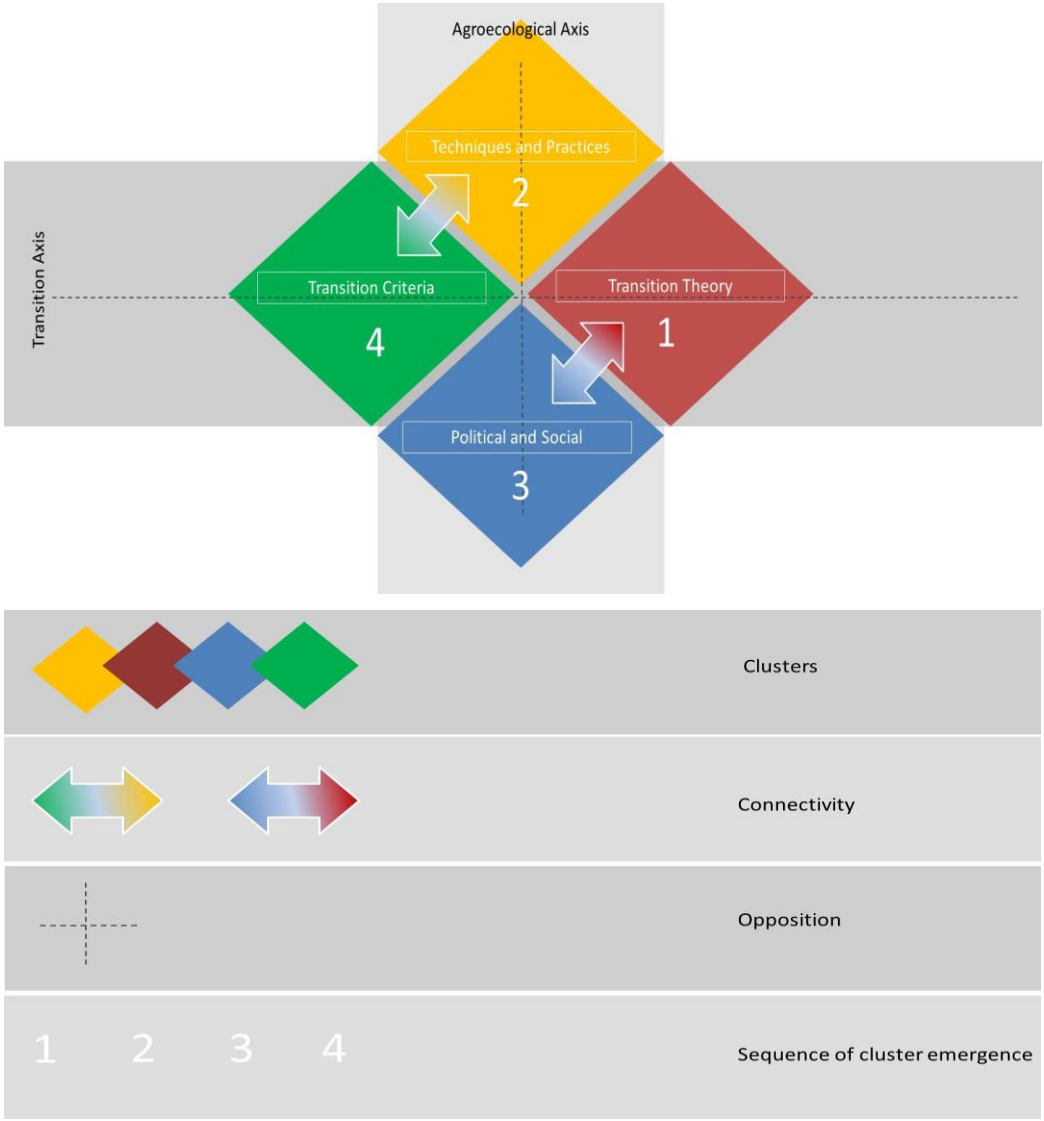


**Figure 5.** Illustration and synthesis of the connections and oppositions between 'agroecological transitions' theoretical and conceptual frameworks.

Source: Elaborated by the authors based on the interpretation of the data in Figure 3.

A more attentive look into the cluster layout also reveals the various analysis possibilities. We first highlight the proximities between the clusters referred to as 'Techniques and Practices' and 'Transition Criteria'. Both include publications dedicated to agroecological practices that also concern themselves with relating those practices to transition indicators and criteria, although the former's are more diversified than the latter's, namely those proposed by FAO. The two clusters, with a more programmatic content, point to the need for quantifying the results of agroecological practices so that they justify transition efforts and provide them with normative and political guidance. Similarly, there is a proximity between the 'Transition Theory' and 'Political and Social' clusters. Although the former assigns an important role to theory in explaining transition processes and the latter is more focused on agroecology's political and social dimension, both are oriented to transition's more qualitative aspects.

As concerns spatial opposition, note the horizontality between the clusters 'Transition Theory' and 'Transition Criteria.' While the former develops an agroecological perspective through the contribution of innovation sociology and sociotechnical systems, the latter proposes developing evaluations of how much an agrifood system has already 'transitioned' into sustainability. The same occurs with vertical opposition. While the 'Political and Social' cluster's content is marked by a

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sociopolitical bias, the 'Techniques and Practices' cluster focuses on agroecological empirical aspects, too.

Overall, one can say that the articles in clusters 'Techniques and Practices' and 'Political and Social', respectively, have maintained the publications' agroecological references and supported the relationship between the agroecological transition bibliographies and the practices, the social movements, and agroecological-related policies. The articles are mentioned together 392 times, forming an axis in Figure 5 we named 'Agroecology Axis', whose publications kept faithful to agroecological practices and principles.

The clusters 'Transition Theory' and 'Transition Criteria', in turn, illustrate the kind of novelty transition has incorporated into the subject, either by looking into agroecology from a qualitative perspective, placing it in multi-level sociotechnical systems, or quantifying agroecological techniques and practices by developing evaluation systems to assess agrifood systems' transition into sustainability. In total, the documents that compose this cluster are mentioned 517 times, showing how the new 'agroecological transition' approaches have been gaining expression in bibliographies. Both clusters form an axis in Figure 5 designated as 'Transition Axis.' Of a more diversified nature, it groups references that express the belief in agroecology's possibilities to transition into agrifood systems, among others.

These results confirm the notion that the agroecological transition is not only transdisciplinary, as it has been observed previously, but is also linked to two different frameworks. The first relates to agroecology and its pure conceptual states as a scientific discipline, an agricultural practice, and social movement, or a combination of these [10]. The second is linked to the development of guidelines and norms to help transitions into agroecology, such as the guidelines issued by FAO [5] or the HLPE agroecological principles [64].

According to Gliessman (2024) [65], the first framework depended on the pressure exerted by civil society—citizens, farmers, and scientists—for a transition of agricultural systems into agroecology. On the other hand, despite civil society's strong influence on how agrifood systems are reconfigured, one has to take into account the repercussions of norms and policies. And these era correlated to the second possible framework for agroecological transitions.

In the European continent, where, in fact, the largest number of references to the subject stem from (see Figure 1), the 'Farm to Fork Strategy' (European Commission, 2020) [66], the main tool of the 'The European Green Deal' (European Commission, 2019) [67], wishes not only to create a more sustainable food system in the European Union but also to legitimise its transformation globally. Both guidelines aim to consolidate agrifood systems' sustainability by means that are not necessarily agroecological—such as diet changes, reducing food waste and external inputs, valuing ecosystem resources, reducing greenhouse gas emissions, optimising the use of resources, and cooperative innovations, among other things[68–70].

Whether it is an effective agroecological transition or a sustainable transition of agrifood systems, these two frameworks underlie the formation of scientific reference clusters that we have found, which clearly points to there being different trends regarding the approaches to agroecological transition. One of those trends, more faithful to agroecology, establishes tenets and practices that become the guidelines to agrifood system transitions (thus validating the existence of publications on the subjects pertaining to clusters 'Agronomic' and 'Ecological' as seen in Figure 3). The other, more diversified, admits agroecology as part of a wider process of agrifood and sociotechnical systems transitions (which is corroborated by the 'Transdisciplinary' cluster, simply the largest cluster of publications on this subject according to Figure 3).

## 4. Conclusions

The subject of 'agroecological transitions' is quite new and is still being developed, judging by the recent dates of the publications and the nature of bibliometric networks, which have little density and are not much varied, whether in terms of keywords associated and the studies' origin or the authors cited—whose works support 'agroecological transition's' theoretical and conceptual framework. On the other hand, much because of the multidisciplinarity and transdisciplinarity that

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limited the agroecology's very grounds, it is complex to outline a single approach to 'agroecological transition' that is capable of incorporating all the implications deriving from its science and practice.

Looking into the set of data extracted, it is easy to perceive that a new agroecological conception has been being steadly reconfigured through the development of the agroecological transition's theoretical and conceptual framework. Although agroecology and its original assumptions regarding agroecological practices and political and social movements are still in place and remain valid as shown by the keywords, the combination of 'transition' with the possibility of creating transition criteria has made room for new analyses and interpretations.

Although 'agroecological transition' has only recently entered the scientific vocabulary, it already manages to convey the notion that agroecological conversion entails a process, a change, and a transformation path made of innovations not only in farmers' practices but in other aspects as well. In other words, transition is also linked to the amplification of agroecology itself by stressing the need for other systems upstream and downstream of agriculture to restructure themselves if they are to uphold it. By acknowledging the need for restructuring the whole of agrifood systems, agroecological transition adds other levels and scales to the sustainability process.

In this sense, the connection to the Transition Theory was an important milestone in the evolution of publications and studies, besides directly influencing the outlining of the 'agroecological transition'. Both its conceptual and analytical framework and the MLP and its sociotechnical levels provided the agroecological transition with a multilevel approach that linked it to chain transition processes of agriculture and agrifood systems. They also positioned agriculture in dynamic contexts, granting it an evolutionary perspective insofar as MLP inserts a time variable into the analyses.

In fact, the 'agroecological transition' brought a scale approach to agroecology that the latter not only incorporates but also expands beyond farm holdings. Given the agricultural focus and looking at farm holdings, one may conclude that agroecological transition is a transformation process, path, or trajectory that leads to converting conventional agriculture into agroecology [25,26,71]. Bearing in mind the agrifood system, the agroecological transition requires multiple influences [72] from other correlated systems. This notion has expanded the agroecological transition framework, allowing it to focus on the changes of combined systems and their redifinitions in more sustainable frameworks [55,73]. The 'agroecological transition' becomes, then, a suitable framework to provide the answers agroecology needs when dealing with complex social contexts as well as a solution to ensure agrifood systems' sustainability.

Obviously, there are still some gaps in need of addressing by research, especially as regards the intersection of agroecology with the approaches suggested by the Transition Theory and its operationalisation in the MLP's analytical-level scheme of sociotechnical systems. In this context, there are some components of the regime that may benefit from further scrutiny. Examples of what has just been said above are the cultural issues related to farmers, consummers, and other stakeholders who may influence agroecological transition processes, besides the new technologies, economic aspects, and others that regard the markets, which, despite being associated with agroecological transitions, have not yet been evidenced by any analysis or study. The most recently developed 'agroecological transition' criteria may encourage further research that can bring more credibility to findings in the field of transition economy. The latter may, in turn, fuel more appropriate policies for the development and implementation of such processes.

**Supplementary Materials:** Appendix A – Most co-cited journals equal to or more than the 25$^{th}$ occurrence; Appendix B – Most co-cited authors and papers until the 10th occurrence.

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