

Review

Knowledge Mapping Analysis of Transnational Agricultural Land Investment Research

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Abstract: With the expansion of the global transnational agricultural planting scale, research on transnational agricultural land investment is growing. In order to analyze the development context and basic characteristics of this research, and to discover the research hotspots and frontiers, this study used documentation and bibliometric methods to examine the achievements of it. The results show the following: (1) Transnational agricultural land investment research is mainly focused on the social sciences, development studies, economics, environmental sciences and geography. (2) The concentration of researchers in this research field is not high, and there is still a lack of authoritative researchers with high influence. The cooperation network has been initially formed between research institutions. Among them, universities and research institutes are the main institutions of transnational agricultural land investment research, but the degree of integration among the research teams is not high. (3) The evolution of the research theme of the field has experienced three stages—an embryonic stage, growth stage and stable stage—and the research content shows a trend of continuous divergence and deepening. (4) From 2005 to 2019, the research hotspots of the research focused on “Land Grabbing, Global Land, Africa, Investment”. At present, the emerging frontier research topics are “Indonesia, Livelihood, Trajectory and Sustainability”. With many years of development, the research has become an obvious “land” attribute, independent from traditional agricultural economic research, and the research topics are becoming more and more mature, refined and diversified. Transnational agricultural land investment research is attracting continuous attention from scholars in multiple disciplines and fields.

Keywords: transnational agricultural land investment; foreign investment in agriculture; overseas farmland investment; land grab; large-scale land acquisitions



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1. Introduction

Since the 21st century, due to the rapid growth of the global population, the improvement of the dietary structure in developing regions and the development of the bio-energy industry, global food demand has continued to rise, and the pressure on the supply and demand of water and agricultural land has continued to increase. In 2018, the Food and Agriculture Organization of the United Nations (FAO) predicted in its publication “Future of Food and Agriculture-Variety Pathways to Achieve the 2050 Goals” that, to meet the crop needs of population growth and economic development in 2050, the global demand for farmland will increase from 1.567 billion hectares in 2012 to 1.732 billion hectares [1]. In order to solve the issue of future food insecurity and improve the efficiency of farmland use, the FAO, World Bank Group (WB) and Consultative Group on International Agricultural Research (CGIAR) advocated for solving the problem by transnational agricultural investment [2]. Transnational agricultural land investment (TALI) has become an important phenomenon in the field of transnational agricultural investment in the 21st century, and the investors’ activities have shown their great interest in agricultural land. Therefore,

through the study of farmland and the stakeholders, TALI issues have become notable features. The TALI research is mainly expressed as “Large-scale Land Acquisitions (LSLAs), Overseas Farmland Investment, Global Land Acquisition, Global Investments in Agricultural Land, Land Deal, Land Grab, Land Rush, International Farmland Deals, Foreign Investment in Land”, etc. [3–7]. According to Land Matrix, an online public database of global land transactions, as of May 2020, 1781 TALI projects had been completed around the world, with a transaction area of 51.65 million hectares.

Due to the involvement of the sensitive topic of food security, the TALI activity is in a complex value-judging environment from the very beginning. Borras analyzed TALI from the perspective of farmland control, believing that it is an act to deal with the food crisis, financial crisis and climate change mitigation by controlling farmland and other natural resources [8]. Schoneveld believed that TALI can improve the level of agricultural production technology by increasing the input of production factors and help to solve the poverty issue in rural areas [9,10]. On the other hand, some studies believed that large-scale agricultural land acquisition is essentially a land grabbing behavior, which will have a negative impact on food security and the livelihoods of local residents in the host country [11,12]. Raoul showed that the scarcity of land and water resources would not only lead to resource conflicts, but also cause damage to the natural environment [13]. Therefore, some studies have argued that large-scale land acquisition is a kind of neocolonialism [14–16].

The sufficient and efficient use of agricultural land resources is an important material support to ensure global food security, which is an important strategic issue related to the host country’s economic development, social stability and national self-reliance [17]. Currently, there are several problems that need to be solved urgently in TALI, including how to regulate the activities of enterprises in TALI, prevent them from harming the livelihoods of locals in the host country, and improve the efficiency of agricultural land utilization in developing regions, as well as enhance the level of food security in the host country and increase the global agricultural products’ supply [18]. TALI research will help provide comprehensive information for investment enterprise decision makers, which will also help some food-scarce governments in the development of investment and food security policies. The practical significance of TALI research is that it contributes to the coordination of global and regional food security and sustainable agricultural development. In recent years, the research papers concerning TALI have shown a significant interdisciplinary nature. Research on TALI has covered a number of different disciplines, including food security, ecological degradation, sustainable development, land system building in developing countries, farmers’ livelihoods, women’s rights protection, climate change, etc. Moreover, the research hotspots of different disciplines have changed and adjusted significantly over time. Although the publications on TALI show a rapid growth trend, as the researchers studying TALI come from several widely varying disciplines, the comprehensive and systematic bibliometric analysis is still insufficient. In addition, the previous bibliometric analyses of TALI often used qualitative research methods; relevant researchers have not yet noticed the advantages of information analysis methods in bibliometric analysis. We note that a piece of software called Citespace based on the information analysis method has excellent properties for analyzing interdisciplinary issues. Different from the traditional qualitative research method, Citespace provides a bibliometric analysis method based on literature characteristics statistics. The software mainly uses the statistical information of the authors, research institutions, disciplines, research topics and keywords of the literature, to identify the research hotspots, key literature and research trends of the research objects [19]. Therefore, it presents another viewpoint on the characteristics of topic distribution and changes of research hotspots in TALI research more clearly. Meanwhile, to provide researchers with a comprehensive understanding of the current state of TALI issues, it is necessary to clarify the research focus of different periods, disciplines and the network relations of the hot topics. The following questions should be answered:

- (1) Which journals and disciplines focus on TALI research?
- (2) What are the major researchers and institutions of TALI research?

- (3) What is the general trend of TALI research?
- (4) What are the hot topics, keywords and development paths of TALI research?
- (5) What are the challenges and frontiers of TALI research?

2. Methods and Data

This study analyzed TALI research knowledge mapping using the Citespace software. The Citespace software is a mainstream literature data mining tool developed by Professor Chen of Drexel University based on the Java language. The software can show the development trend of a discipline or knowledge field in a certain period through the convergences of relevant information and reveals the development status of scientific knowledge in the research field [20]. It is widely used in information science, economics, sociology and many other fields [21,22]. As a relatively new research topic, TALI has been focused on by research institutions and scholars in the field of transnational agricultural investment in recent years and has produced a large number of publications, which means this topic has a database for bibliometric analysis using Citespace.

This study used the methods of keywords sequence evolution, keyword co-occurrence analysis and the hot words emergence of Citespace to study the topic of TALI. Among them, keywords sequence evolution was used to explore research topics within a specified time interval; keywords co-occurrence analysis was used to visually present the important keywords in the research field by aggregating multiple keywords together, and combining the intermediary centrality, frequency and other indicators to provide a basis for clarifying the research hotspots and evolutionary paths in TALI research; hot words emergence was used to reveal the research hotspots and evolutionary trends of TALI research topics in different periods, and then explore the research frontier dynamics of the topic.

The literature data in this study came from the core collection of the Web of Science database (<http://www.lib.scut.edu.cn/2016/1012/c8742a124541/page.htm>, accessed on 10 September 2021). Web of Science is an important database for obtaining global academic research papers. The fields it covers include natural science, engineering technology, biomedical science, social science, art and humanities, with data dating back to 1900. This study's literature takes Large-scale Land Acquisitions, Overseas Farmland Investment, Global Land Acquisition, Global Investments in Agricultural Land, Land Deal, Land Grab, Land Rush, International Farmland Deals, Foreign Investment in Land and other subject words as search topics. The search period ranged from 2005 to 2019, and more than 2000 articles were obtained. In order to ensure the accuracy, interpretability, authenticity and credibility of the analyzed data, this study repeatedly screened and sorted the search results, and deleted the weak research items, such as conference notices, conference drafts, newspaper reports, result introductions and book reviews, and finally obtained 717 valid sample documents, each of which contained information such as author, institution, keywords, abstract and publication date.

3. Literature Characteristics of TALI Research

3.1. Major Journals and Disciplines

The bibliometric results show that 717 papers on TALI research were distributed in 308 journals between 2005 and 2019. The statistical results of the number of journals published show that the top 20 journals in terms of the total number of publications account for 43.93% of the total literature, which is almost half of the total number of research papers on TALI issues. Therefore, these journals can also be considered as the nucleus of this topic (Figure 1). Among them, the Journal of Peasant Studies, Land Use Policy, Canadian Journal of Development Studies and Globalizations have published 80, 37, 26 and 24 papers, respectively. In particular, the two journals, Journal of Peasant Studies and Land Use Policy, not only have a high volume of publications, but also have an impact factor of 4.553 and 3.573 in related disciplines, respectively, which means that they can be considered as the core journals in the field of current TALI research.

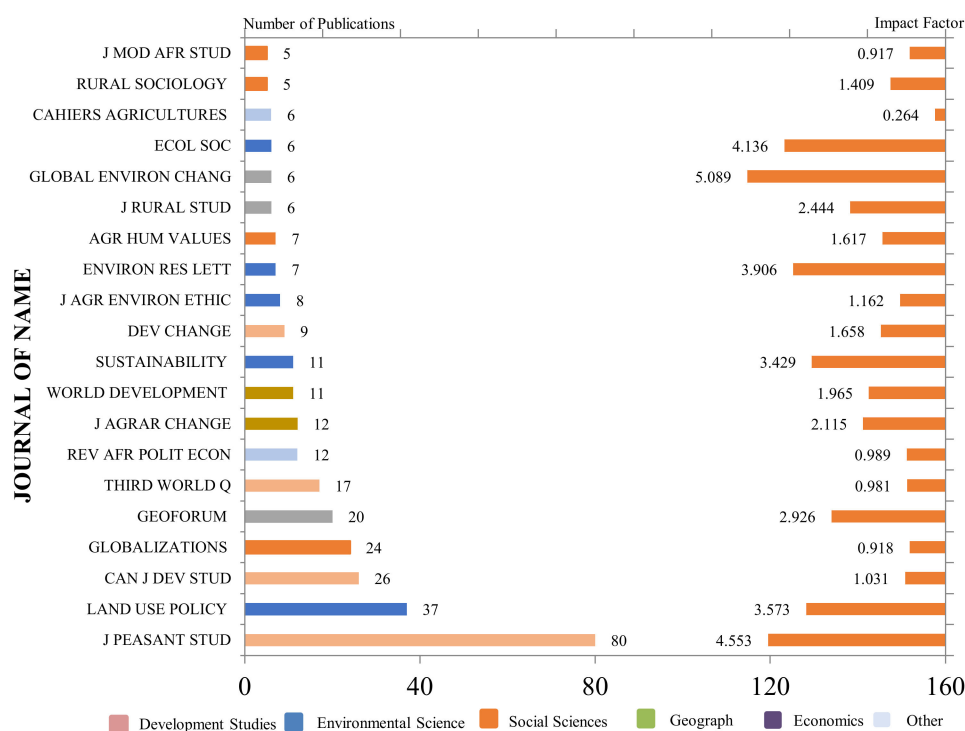


Figure 1. Distribution of journals and disciplines on TALI research.

According to the discipline classification standard of JCR by the Web of Science database, the top 20 journals with the most published in TALI research can be divided into the following five disciplines: Environmental Science, Social Science, Economics, Geography and Development Studies. Among the above disciplines, the journals of the Development Studies discipline have the most volumes of publications, with a total of 132 articles published in four journals. Then, Environmental Science has 58 articles in five journals, Social Science is 41 articles in four journals, Geography is 32 articles in two journals, and Economics has 23 articles in two journals. It can be found that the highest number of articles on TALI are published in Development Studies disciplinary journals, indicating that the TALI research topic is a hot issue in the Development Studies discipline. In particular, the Journal of Peasant Studies, with strong influence and high quality, is especially worthy of attention. In addition, a large number of articles have been published in journals from the Environmental Sciences, Social Sciences, Geographic Sciences and Economics, such as Land Use Policy, Globalizations and Journal of Agrarian Change. Therefore, the TALI research involving multiple disciplines and fields is an interdisciplinary research topic.

3.2. Researchers and Institutions

Citespace reflects the collaboration between authors in terms of the number of nodes and the thickness of the lines between nodes [23]. The number and size of nodes indicate the co-occurrence frequency of the core author group, and the number and thickness of lines reflect the cooperation relationship and cooperation intensity between authors. Together they constitute a knowledge graph of the author cooperation network. The knowledge mapping analysis of TALI shows that the relationship between researchers has a total of 454 nodes, 442 links and a network density of 0.0043 on the knowledge graph. In general, some scholars in this field cooperate closely, but the overall cooperation is relatively less, and most of the scholars' research is relatively independent (Figure 2). In terms of co-occurrence frequency, scholars such as Borrás SM, D'Odorico P and Rulli MC have larger network nodes, indicating that the literature published by these scholars is cited more frequently. From the perspective of the cooperation network, TALI research

teams show a small concentration and large fragmentation of cooperation. TALI research has formed several core research teams, but the strength of the horizontal ties among the teams is very weak. From the results of the knowledge graph analysis, we can roughly see that there are nine relatively concentrated research teams, mainly with scholars such as Borrass SM, D'Odorico P, Scoones I, Messerli P, Deininger K and other scholars as the core members of these research teams. The above research teams have close cooperation, more research results and greater academic influence. Generally speaking, the number of research teams on TALI is small, and there are few teams with the participation of Chinese scholars. Researchers and teams need to pay attention to this issue.

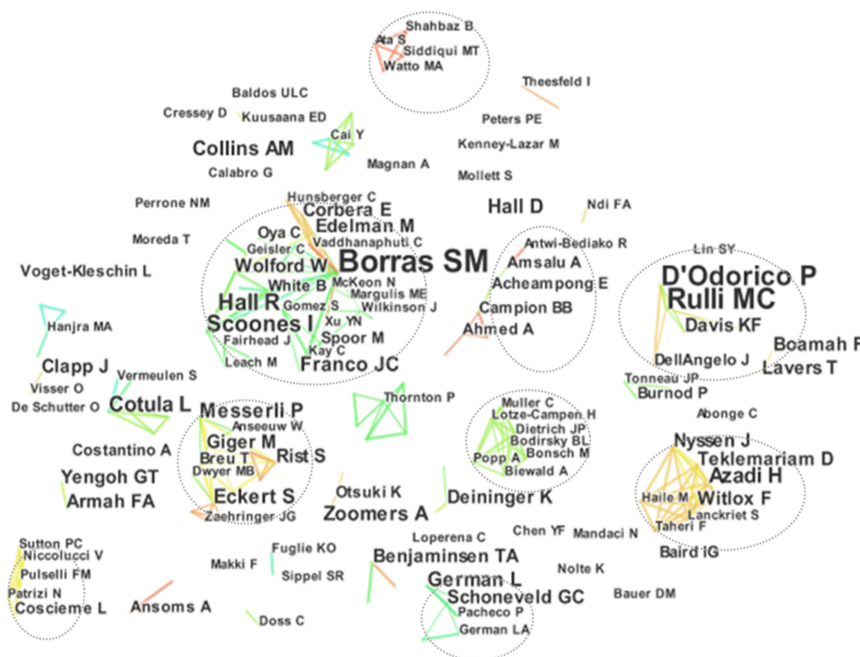


Figure 2. Cooperation network of high yield authors in TALI research from 2005 to 2019.

In terms of the number of publications, the top 15 researchers in the field of TALI research published a total of 103 articles, accounting for 14.37% of the total number of articles analyzed (Table 1). Among them, the top three scholars in the number of publications are Borrass SM from the Netherlands, Rulli MC from Italy and D'Odorico P from the United States, who published 18, 12 and 11 articles in the field of TALI, respectively. In addition, 12 authors have produced more than five publications, and the total number of their publications only accounts for 11.30% of the total analyzed documents, which shows that, at present, a core research group has not yet been formed in the field of TALI research, and there is a lack of authoritative researchers with high influence in this research field. In terms of the year of publication, a group of early TALI research scholars, such as Borrass, Deininger and Cotula, published in this field before 2010, and have made outstanding contributions to the development of the research topics, while Rulli, D'Odorico and Eckert are high-yield authors of research on TALI in recent years, who have further deepened the research topic.

Table 1. High yield researchers and their institutions of TALI research from 2005 to 2019.

Number	Publications	Author	Institution	Year of Earliest Publication
1	18	Borras SM.	Erasmus University Rotterdam	2007
2	12	Rulli MC	Polytechnic University of Milan	2013
3	11	D’Odorico P	University of California, Institute of Development Studies	2013
4	7	Scoones I	University of the Western Cape	2010
5	7	Hall R	International Institute for Environment and Development	2011
6	6	Cotula L	Universität of Bern	2009
7	5	Eckert S	Utrecht of University	2014
8	5	Zoomers A	Universität of Bern	2010
9	5	Messerli P	University of Waterloo	2013
10	5	Collins AM	University of Wilfrid Laurier	2013
11	5	Hall D	Center for International Forestry Research	2011
12	5	German L	World Bank	2011
13	4	Deininger K	Center for International Forestry Research	2006
14	4	Schoneveld G.C.	Cornell University	2011
15	4	Wolford W.	Cornell University	2013

The knowledge mapping analysis of institutions shows that in the research of TALI issues, some institutions have established obvious cooperation links and initially formed some backbone research cooperation networks (Figure 3). Currently, there are the following three representative institutional cooperation networks: (1) Cornell University—International Institution of Social Studies—University of the Western Cape—University of Toronto—Erasmus University Rotterdam—University of Waterloo—China Agricultural University; (2) University of Bern—Vrije University Amsterdam—University of Calif Berkeley—University of Virginia—Polytechnic University of Milan—University of London; (3) Stanford University—Catholic University of Leuven—University of Copenhagen—Humboldt University of Berlin—Boston University—Clark University.

The results of analyzing the occurrence frequency of the researchers’ institutions shows that there are 15 research institutions with more than six publications, among which the University of Bern in Switzerland leads with 22, followed by Cornell University in the United States with 17 and again from the Erasmus University in the Netherlands, as well as the International Institution of Social Studies and University of Utrecht, with 13, which can be regarded as institutions with strong research capabilities in the field of TALI (Table 2). In addition, there are three research institutions that have published articles more than 10 times, namely, the Polytechnic University of Milan in Italy, the University of Toronto in Canada, and China Agricultural University in China. Overall, it seems that the number of articles issued by research institutions with a frequency of more than 10 times accounts for 55.5% of the total number of articles issued by the top 15 institutions, which reflects the concentration of TALI research institutions and the large differences in research capacity among them. An analysis of the attributes of research institutions shows that the main institutions of TALI research are universities, followed by research institutes. The betweenness centrality is an index to measure the importance of nodes in a network, which represents the key hub connecting two different domains; it is also known as a Turn Point. In particular, nodes with a centrality greater than 0.1 should receive more attention. According to the results of the betweenness centrality of research institutions, there is no research institution with a betweenness centrality exceeding 0.1, indicating that a research

institution with a leading role in linkage has not been formed in the field of TALI research, and the cooperation of relevant research institutions needs to be further strengthened. The reason may be that TALI has a strong interdisciplinary nature, complex driving mechanism, many interest groups and extensive geographical coverage. Research institutions need to strengthen contacts and cooperate closely for the research topic to be fully formed.

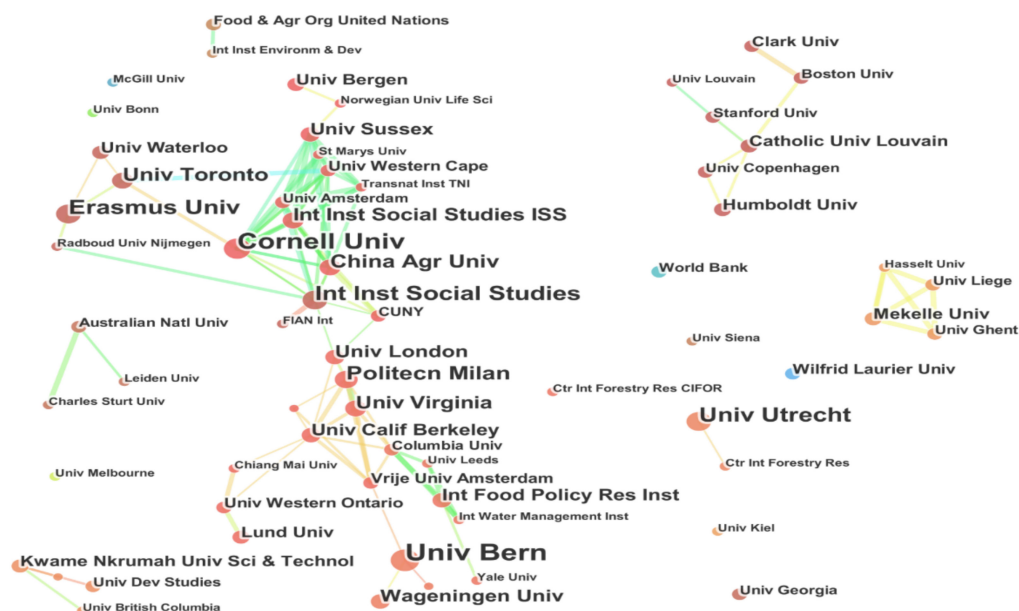


Figure 3. Map of TALI research institutions from 2005 to 2019.

Table 2. Research institutions of TALI from 2005 to 2019.

Number	Publications	Betweenness Centrality	Institution	Country
1	22	0.03	University of Bern	Switzerland
2	17	0.02	Cornell University	American
3	13	0.00	Erasmus University	Switzerland
4	13	0.07	International Institution of Social Studies	Switzerland
5	13	0.00	University Utrecht	Switzerland
6	12	0.04	Polytechnic University of Milan	Italy
7	10	0.02	University of Toronto	Canada
8	10	0.00	China Agricultural University	China
9	9	0.00	University of Virginia	American
10	8	0.01	Wageningen University	Switzerland
11	8	0.08	University of London	Britain
12	7	0.02	University of Sussex	Britain
13	7	0.06	University of Calif Berkeley	American
14	7	0.05	International Food Policy Research Institute	American
15	6	0.00	University of Waterloo	Canada

4. Research Trends of TALI

4.1. The Evolution of Research Topics

The time-series change analysis of keywords clustering by Citespace shows the evolution of research topics in a certain field. The study used Citespace to perform keyword clustering to generate Timezone map hotspots analysis. The results show that TALI's research keywords clustering obtains a network evaluation index modularity value of 0.5253, and the average network homogeneity Silhouette is 0.6392; the former is greater

than 0.3, and the latter is greater than 0.5, which reflects that the keywords clustering effect of TALI research is good and the homogeneity is high. Therefore, Timezone mapping has a strong rationality (Figure 4).

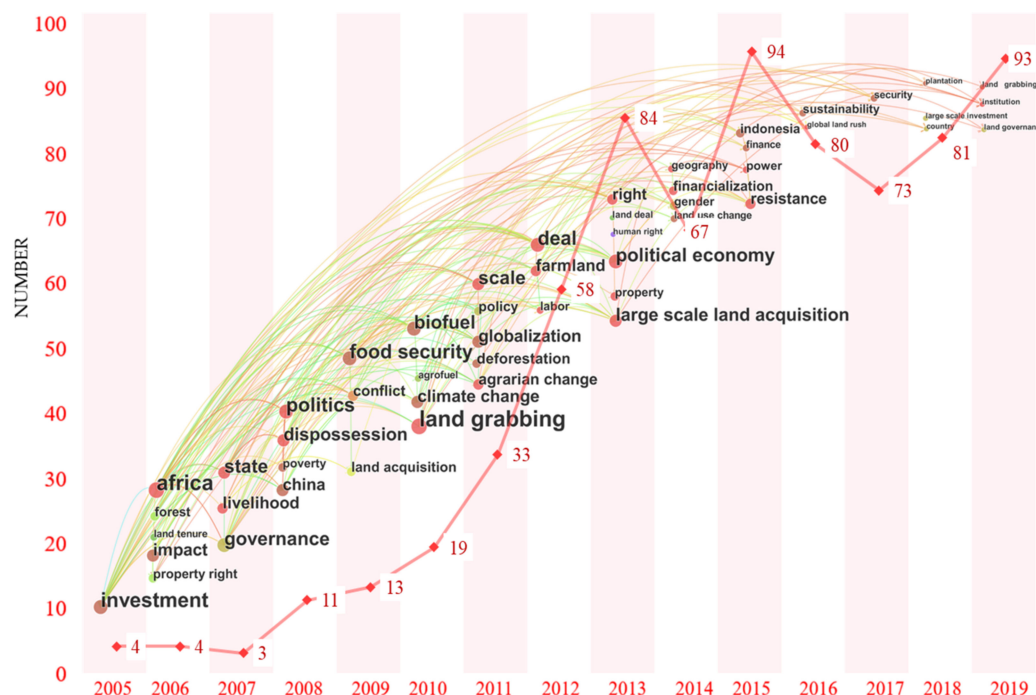


Figure 4. Time chart of keywords and number of documents issued of TALI research.

According to the year of occurrence of high-frequency keywords, and the time-series distribution of clustering and publication volume, the evolution process of research topics on TALI can be roughly divided into the following three stages.

- (1) The embryonic stage (2005–2007)—a period of slow increase in the research results of TALI, with a total of 11 journal articles, accounting for about 2% of the total analyzed literature. At this stage, the total number of journal articles was small, and TALI was not studied enough. The research topics mainly focused on investment, impact, governance, livelihoods, etc. In addition, the research topics such as land property rights, forests, property rights and farmers were evolved. The research topics of TALI mainly focused on transnational agricultural investment and agricultural outward investment. The main findings of the relevant studies are on the impact of TALI for the agricultural environment, farmers in the host country, agricultural growth in developing countries and anti-poverty. However, land property rights and land systems issues became an important basis for topic development [24–29].
- (2) The growth stage (2008–2013)—a period of rapid growth in TALI research, with a total of 218 journal articles, accounting for 30.4% of the total analyzed literature. Research topics at this stage began to spread to food security, political economy, land grabbing and bioenergy, and evolved into topics such as land acquisition, climate change, forest land degradation and large-scale land acquisitions. In fact, influenced by the global food crisis in 2007–2008, some major food importing countries, financial institutions and transnational agricultural investment companies had an increased investment in transnational agricultural land, leading to an explosive growth in both the scale and the research results of TALI during this period. During this period, TALI attracted the attention of researchers in many fields, and relevant research topics gradually extended to land systems, agricultural development, farmers' rights, biofuel industry

development, market speculation, natural resource control and food consumption in emerging economies, etc. [30–34].

- (3) The stable stage (2014–2019)—a period of steady development for the research of TALI. There was a total of 488 journal articles, accounting for about 68.1% of the total analyzed literature, but the fluctuations and growth rates of the total annual publications were not high. At this stage, the research topics focused on women's rights, land financialization and governance, and found new topics such as land governance, sustainability and security. During this period, the threat of the global food crisis diminished, and the global economy gradually emerged from the financial crisis, the fervor of TALI and the speculative investment of financial institutions decreased at the same time. In order to guide TALI research to focus on land system construction, some international organizations, investor country's governments and host country's governments issued a series of guidelines to regulate TALI. The topics covered the regulation of corporate investment behavior, smallholder livelihoods, ecological environmental protection, etc. [35–40].

4.2. Research Hotspots

4.2.1. High-Frequency Keywords

The investigation of high-frequency keywords can show the focus and development trend of the research field and judge the research characteristics of related hotspots in different periods that are mainly combined with frequency, betweenness centrality and other measurement indicators. Among them, Citespace analyzed the 20 keywords with the highest frequency in TALI research and found that "Land Grabbing" had the highest frequency at 118 times, followed by "Global Land", "Africa", "Land Grab", "Investment", etc. (Table 3).

Table 3. High-frequency keywords of TALI research from 2005 to 2019.

Number	Frequency	Keywords	Year of Occurrence	Betweenness Centrality
1	118	Land Grabbing	2010	0.11
2	101	Global Land	2013	0.05
3	98	Africa	2008	0.51
4	91	Land Grab	2010	0.06
5	85	Investment	2005	0.39
6	75	Agriculture	2010	0.06
7	70	Politics	2011	0.04
8	65	Deal	2013	0.04
9	65	Food Security	2009	0.05
10	64	Land	2011	0.01
11	59	Biofuel	2009	0.02
12	57	Governance	2011	0.15
13	55	Political Economy	2013	0.02
14	55	Rush	2013	0.02
15	54	Scale	2011	0.15
16	51	Dispossession	2011	0.04
17	50	State	2011	0.04
18	47	Grab	2013	0.07
19	44	Large-scale Land Acquisition	2013	0.05
20	37	Globalization	2011	0.03

After 2000, with the continuous increase in the TALI transaction area and the number of projects, controversies regarding the activity's impact on the host country's governance, land systems and farmers' livelihoods became increasingly prominent, drawing widespread attention to the term "Land Grabbing". According to the calculation results of the betweenness centrality of high-frequency keywords, the betweenness centrality values of the five keywords, "Africa", "Investment", "Government", "Scale" and "Land

Grabbing", all exceed 0.1. Among them, "Africa" has the highest betweenness centrality value of 0.51, and it appeared earlier. This is because Africa, an important region for the development of TALI, is rapidly becoming an important region of scholarly interest due to the large number of conflicts arising from low levels of governance. The betweenness centrality value of investment is the second, 0.39, and it appears earlier too, mainly influenced by the investment attributes of TALI. It is worth noting that the betweenness centrality value of "Governance" is also high, but it appeared relatively late, mainly because after the food crisis between 2007 and 2008, relevant countries began to strengthen the management of TALI, such as Germany and Saudi Arabia in the investing countries and Ethiopia and Cambodia in the host countries. In addition, the Committee on World Food Security issued the Principles for Responsible Investment in Agriculture and Food Systems in 2014, which had an important impact on the development of TALI. It is also worth noting that the top 20 high-frequency keywords appeared between 2005 and 2013, while keywords such as "Global Land", "Politics", "Deal", "Rush" and "Large-scale Land Acquisition" appeared later, which shows that the content pointed to by the above keywords is the focus of current researchers.

4.2.2. Keywords Development Path

According to the keywords co-occurrence network map generated by Citespace, the keywords researched in the field of TALI can be grouped into seven major development paths (Figure 5). (1) Politics—China—Power—Right—Property—Resistance. The research hotspots of this development path mainly focus on the impact of agricultural policy uncertainty and investment incentives in the process of TALI, as well as the role of the land construction and land property rights situation in host countries in TALI. (2) Agrarian Change—Political Economy—Rush—Large-scale Land Acquisition. The research hotspots of this development path mainly focus on issues such as the economic cost of land acquisition and related investment stakeholders in the process of TALI, with emphasis on the analysis of TALI in the background and the development process of global agricultural financialization. (3) Climate Change—Environment—Water—Emission. The research hotspot of this development path takes climate change as the theme, focusing on the impact of TALI on carbon emissions, carbon trading and the development of the bio-energy industry in the context of climate change, and analyzing the effect of the environment on the regional transfer of agricultural production. (4) Land Tenure—Agricultural Investment—Ethiopia—Property Rights—Gender—Poverty—Impact. This development path focuses on the impact of land acquisition in TALI on local farmers' land rights and women's rights. The main concerns are the transparency of land transactions, transaction patterns and the rights of local residents. (5) Globalization—Grab—Livelihood—Growth—Latin America—Resistance—Agrarian Change—Political Economy. This development path is based on the perspective of political economy to examine the impact of TALI on macro issues such as agricultural growth, food security, farmers' livelihoods and agricultural change. (6) Farmland—Challenge—Financialization—Labor—Deforestation—Capitalism—State—Governance—Land—Ghana—Biofuel—Policy—Dispossession. The focus of the research on this development path is to explore the drivers of TALI and their effect on production factors such as labor resources, land resources and capital in host countries. (7) Land Grabbing—Developing Country—Africa—Food Security—Investment—Deal—Acquisition—Global Land. This development path has the largest keyword node and mainly focuses on the impact of TALI on Africa's food security, land use status and agricultural development, which can be considered as the key direction of TALI research.

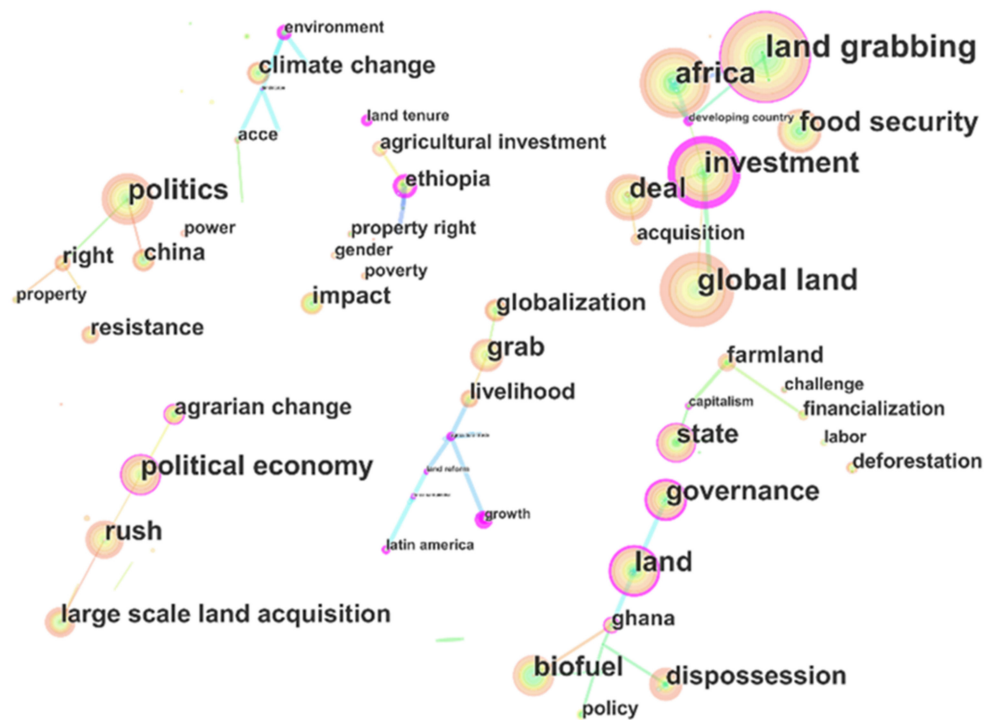


Figure 5. The keywords co-occurrence network map of TALI.

4.3. Research Frontier Identification

The study used the burst terms detection algorithm of Citespace to identify research frontiers in the field of TALI. The burst terms refer to the high-frequency keywords that suddenly increase or their frequency of use increases in a certain period of time. The analysis of burst terms reflects research hotspots and predicts research trends. Firstly, the burst terms of the research results in the field of TALI from 2005 to 2019 were identified; secondly, the period of each burst term was sorted; finally, the burstiness of each burst term was calculated, and the degree of research on hotspots in a certain time period were obtained by analyzing the strength of the burst terms (Table 4). According to the calculation results, the burst terms in the research on TALI from 2005 to 2019 can be divided into the following three categories:

Table 4. Burst terms in TALI research from 2005 to 2019.

Number	Burst Terms	Period	Burstiness
1	Forest	2006–2015	2.7133
2	Biofuel	2010–2012	5.4584
3	Reform	2011–2013	4.7414
4	Market	2011–2015	2.7849
5	Policy	2011–2016	2.8932
6	Land Grab	2012–2014	2.7491
7	Capitalism	2012–2014	2.6061
8	Accumulation	2013–2016	3.1216
9	Land Acquisition	2013–2016	4.6951
10	Land Use Change	2014–2016	2.5261
11	Finance	2015–2017	2.8395
12	Indonesia	2015–2019	3.1348
13	Livelihood	2015–2019	2.5674
14	Trajectory	2016–2019	2.6464
15	Sustainability	2016–2019	3.3117

(1) Burst terms with the longest duration. The burst term “Forest” began to appear in 2006 and lasted until 2015, with a duration of 10 years, which is the longest burst term. This is because the issue of TALI and forest land degradation has been a concern of many stakeholders, such as the reduction in forest land in the host countries, land use changes caused by forest land degradation, forest land reduction and investment in paper industry, carbon sink issues, etc. [41–45]. (2) Burst terms with the strongest citation bursts. “Biofuel” has the highest burstiness, and the main emergence time was from 2012 to 2014, because the interaction between TALI and the development of bioenergy industry was focused on during this period. In addition, there are also terms such as “Reform”, “Land Acquisition” and “Sustainability” with high burstiness, mainly because the issues of land reform, land acquisition and sustainable land use were noticed [46–51]. (3) “Indonesia”, “Livelihood”, “Trajectory” and “Sustainability” are the current hot burst terms, reflecting the hot issues in the field of TALI research at this stage. “Indonesia” has become a hotspot for TALI in recent years due to the good condition of light and heat and excellent palm oil production environment; the “Livelihoods” of farmers in TALI and their potential threats are of current concern. After a long period of development, the summary of the development “Trajectory” of TALI projects has also attracted attention in recent years. Under the constraints of relevant international regulations, how TALI can be “Sustainable” in the environmental and social fields in host countries is also a hot topic [52–55]. Generally speaking, in the research process of TALI, academics have paid attention to themes such as “Forest”, “Policy”, “Market”, “Agrofuel” and “Accumulation” as high-frequency burst terms. “Indonesia”, “Livelihood”, “Trajectory” and “Sustainability” are high-frequency emergent words of concern to academics, which can be considered as the frontier issues in current TALI research.

5. Conclusions

With many years of development, TALI has become a research direction with obvious “land” attributes and has been independent of traditional agricultural economic research. TALI-related topics are attracting continuous attention from scholars in multiple disciplines and fields. This study used articles on TALI research in Web of Science core database journals from 2005 to 2019 as the data source and used the information visualization software Citespace as a research tool to conduct knowledge mapping analysis in terms of journals and disciplines, researchers and institutions, research themes, research hotspots and research frontiers. Based on the information analysis method, and with the help of Citespace, we summarized the literature characteristics and research trajectory of TALI research from 2005 to 2019. This study provides a different perspective for researchers from different disciplines to better understand the current state of TALI research. Different from the previous qualitative research of TALI research reviews, this study analyzed the quantitative characteristics of the distribution of journals and disciplines on TALI research, the cooperation network of high-yield authors and their institutions, and the keyword annual variation characteristics, and calculated the betweenness centrality of keywords and the burstiness of burst terms, to present the evolutionary features of TALI research. Therefore, it can help researchers to deepen their understanding of the research dynamics of TALI topics from a statistical perspective, as well as achieving a research consensus.

Specifically, the research demonstrated the following:

- (1) From the perspective of journal and discipline characteristics, more articles relating to TALI research have been published and TALI research has a relatively higher influence in the Journal of Peasant Studies and Land Use Policy than other journals, and these can be considered to be the core journals in the field of current TALI research. In addition, related results are also published in high volume in journals related to the following five disciplines: “Social Sciences”, “Development Studies”, “Economics”, “Environmental Sciences” and “Geography”, especially in journals on “Development Studies”. Therefore, TALI research is an interdisciplinary topic.

- (2) In terms of high-yield scholars and institutions on TALI research and their publications, Borrás has the highest number of publications, followed by Rulli, D’Odorico and Scoones, who are core authors in the field of TALI research. In terms of cooperation network, the research on TALI presents the characteristics of partial concentration and overall dispersion. That is, TALI research has formed several core research teams, but the connection strength is very weak and the degree of integration between the teams is not high. Research institutions are mainly concentrated in universities, followed by research institutes. The degree of connection and cooperation among institutions is low, and academic exchanges need to be strengthened.
- (3) In terms of research themes, the evolution of the research theme of TALI has roughly experienced the following three stages: the embryonic stage, the growth stage and the stable stage. The research topics are gradually enriched, and the research content also shows a trend of continuous divergence and deepening.
- (4) In terms of research hotspots, “Land Grabbing”, “Global Land”, “Africa” and “Investment” have been the research hotspots in TALI research in recent years. The co-occurrence map of keywords in the research of TALI roughly develops along seven directions, and the research perspectives tend to be diversified and show the trend of interdisciplinary nature.
- (5) In terms of research frontiers, the burst terms’ analysis revealed that “Indonesia”, “Livelihood”, “Trajectory” and “Sustainability” are hot research topics in the field of TALI research at present.

Our study found that, in the last decade or so, the study of TALI has become a comprehensive topic involving topics such as agriculture, land systems, energy, finance, environmental protection and sustainable development. Powerful transnational and national economic actors from corporations to national governments and private equity funds have already become actively involved. At the same time, the resulting set of hot topics about TALI has also received the attention of researchers from different disciplines. Although current academic attention to TALI varies, even the evaluation of this activity has emerged with diametrically opposed voices. However, influenced by the globalization of the economy, the growth of the global population and the increase in demand for agricultural products, TALI activities are bound to continue to expand in the future. Therefore, how to comprehensively deepen the understanding of TALI issues and formulate more realistic guidelines and policies from both investors and host countries in order to further strengthen the governance of TALI activities and protect the rights and interests of local farmers are core issues that need to be urgently addressed in the future of TALI research. In addition, due to the limitations of the research tools, data and depth of topic cognition, the research results still suffer from a lack of in-depth exploration of the research lineage and focus of different fields, and the interpretation of the map is not systematic enough. However, the research results and conclusions may provide reference for relevant researchers to systematically understand the research status in this field and deepen relevant research topics.

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References

- Food and Agriculture Organization (FAO). *The Future of Food and Agriculture-Alternative Pathways to 2050s*; Food and Agriculture Organization: Rome, Italy, 2018.
- Food and Agriculture Organization (FAO). *Principles for Responsible Investment in Agriculture and Food Systems*; Food and Agriculture Organization: Rome, Italy, 2014.
- Schutter, O.D. How not to think of land-grabbing: Three critiques of large-scale investments in farmland. *J. Peasant. Stud.* **2011**, *38*, 249–279. [\[CrossRef\]](#)
- Fairhead, J.; Leach, M.; Scoones, I. Green grabbing: A new appropriation of nature? *J. Peasant. Stud.* **2012**, *39*, 237–261. [\[CrossRef\]](#)
- Anseeuw, W.; Lay, J.; Messerli, P.; Giger, M.; Taylor, M. Creating a public tool to assess and promote transparency in global. *J. Peasant. Stud.* **2013**, *40*, 521–530. [\[CrossRef\]](#)
- Han, J.; Chen, Z.; Lu, X. Spatiotemporal change of China's overseas investment in farmlands and influencing factors. *Resour. Sci.* **2020**, *42*, 1715–1727. [\[CrossRef\]](#)
- Han, J.; Lu, X.; Kuang, B. Analysis of the spatial distribution and geo-relationship factors influencing paths of host countries for China's overseas farmland investment. *China Land Sci.* **2020**, *34*, 79–88.
- Lu, X.; Han, J. Review of studies on overseas farmland investment. *China Land Sci.* **2014**, *28*, 88–96.
- Borras, S.M.; Kay, C.G.; Sergio, W.J. Land grabbing and global capitalist accumulation: Key features in Latin America. *Revue Canadienne D'études Du Développement* **2012**, *33*, 402–416. [\[CrossRef\]](#)
- Schoneveld, G.C. Host country governance and the African land rush: 7 reasons why large-scale farmland investments fail to contribute to sustainable development. *Geoforum* **2017**, *83*, 119–132. [\[CrossRef\]](#)
- Zoomers, A.; Otsuki, K. Addressing the impacts of large-scale land investments: Re-engaging with livelihood research. *Geoforum* **2017**, *83*, 164–171. [\[CrossRef\]](#)
- Holmes, G. What is a land grab? Exploring green grabs, conservation, and private protected areas in southern Chile. *J. Peasant. Stud.* **2014**, *41*, 547–567. [\[CrossRef\]](#)
- Siciliano, G.; Rulli, M.C.; D'odorico, P. European large-scale farmland investments and the land-water-energy-food nexus. *Adv. Water Resour.* **2017**, *110*, 579–590. [\[CrossRef\]](#)
- Herrmann, R.T. Large-scale agricultural investments and smallholder welfare: A comparison of wage labor and outgrowth channels in Tanzania. *World Dev.* **2016**, *90*, 294–310. [\[CrossRef\]](#)
- Balestri, S.; Maggioni, M.A. This land is my land! Large-scale land acquisitions and conflict events in Sub-Saharan Africa. *Defence Peace. Econ.* **2021**, *32*, 427–450. [\[CrossRef\]](#)
- Kariuki, F.; Ng'Etich, R. Land grabbing, tenure security and livelihoods in Kenya. *SSRN Electron. J.* **2016**, *2*, 79–99. [\[CrossRef\]](#)
- Vijayabaskar, M.; Menon, A. Dispossession by neglect: Agricultural land sales in Southern Indian. *J. Agrar. Chang.* **2018**, *3*, 571–587. [\[CrossRef\]](#)
- Lu, X.; Li, Y.; Ke, S. Spatial distribution pattern and its optimization strategy of China's overseas farmland investments. *Land Use Policy* **2019**, *91*, 104355. [\[CrossRef\]](#)
- Chen, Y.; Chen, C.; Liu, Z.; Hu, Z.; Wang, X. The methodology function of citespace mapping knowledge domains. *Stud. Sci. Sci.* **2015**, *33*, 242–253.
- Long, H.; Zhang, Y.; Ma, L.; Tu, S. Land use transitions: Progress, challenges and prospects. *Land* **2021**, *10*, 903. [\[CrossRef\]](#)
- Ding, X.; Yang, Z. Mapping of platform research: A visual analysis using VOS viewer and CiteSpace. *Electron. Commer. Res.* **2020**, *1*–23.
- Jia, G.; Ma, R.; Hu, Z. Review of urban transportation network design problems based on citespace. *Math. Probl. Eng.* **2019**, *2019*, 1–22. [\[CrossRef\]](#)
- Wan, K.; Lu, X. Research on the impact factors on selecting host countries of China's overseas farmland investment: An empirical study based on gravity model and random utility model. *China Land Sci.* **2018**, *32*, 75–81.
- Sun, Z.; Jia, S.; Lv, A. The status of China's overseas farmland investment. *Resour. Sci.* **2018**, *40*, 1495–1504.
- Zheng, L.; Liu, Z. Spatial pattern of Chinese outward direct investment in the Belt and Road Initiative area. *Pro. Phys. Geog.* **2015**, *34*, 563–570.
- Olesen, T. Transnational agrarian movements confronting globalization. *J. Agrar. Chang.* **2009**, *9*, 578–582. [\[CrossRef\]](#)
- Amp, S.; Leite, S.P. Agrarian structure, foreign investment in land, and land prices in Brazil. *J. Peasant. Stud.* **2012**, *39*, 873–898.
- Johan, L.C. Agricultural policy uncertainty and farm level adjustments: The case of direct payments and incentives for farmland investment. *Eur. Rev. Agric. Econ.* **2005**, *1*, 1–23.
- Deininger, K. Challenges posed by the new wave of farmland investment. *J. Peasant. Stud.* **2011**, *38*, 217–247. [\[CrossRef\]](#)
- Lee, J. Contemporary land grabbing: Research sources and bibliography. *SSRN Electron. J.* **2015**, *107*, 259–285.
- McCarthy, J.F.; Jacqueline, A.C.; Afiff, S.A. Trajectories of land acquisition and enclosure: Development schemes, virtual land grabs, and green acquisitions in Indonesia's outer islands. *J. Peasant. Stud.* **2012**, *39*, 521–549. [\[CrossRef\]](#)
- Krause, M.; Lotze-Ca Mpen, H.; Popp, A.; Dietrich, J.P.; Bonsch, M. Conservation of undisturbed natural forests and economic impacts on agriculture. *Land Use Policy* **2013**, *30*, 344–354. [\[CrossRef\]](#)
- Collins, A.M. Governing the global land grab: What role for gender in the voluntary guidelines and the principles for responsible investment? *Globalizations* **2014**, *11*, 189–203. [\[CrossRef\]](#)

34. Zoomers, A.; van Noorloos, F.; Otsiki, K.; Steel, G.; Westen, G.V. The rush for land in an urbanizing world: From land grabbing toward developing safe, resilient, and sustainable cities and landscapes. *World Dev.* **2017**, *2*, 242–252. [\[CrossRef\]](#)
35. Carter, S.; Manceur, A.M.; Seppelt, R.; Hermansneumann, K.; Herold, M.; Verchot, L.V. Large-scale land acquisitions and REDD+: A synthesis of conflicts and opportunities. *Environ. Res. Lett.* **2017**, *12*, 1–11. [\[CrossRef\]](#)
36. Knuth, S.E. Global finance and the land grab: Mapping twenty-first century strategies. *Can. J. Dev. Stud.* **2015**, *36*, 163–178. [\[CrossRef\]](#)
37. Nally, D. Governing precarious lives: Land grabs, geopolitics, and “food security”. *Geographical* **2015**, *181*, 340–349. [\[CrossRef\]](#)
38. Ducastel, A.; Anseeuw, W. Agriculture as an asset class: Reshaping the South African farming sector. *Agric. Hum. Values* **2017**, *34*, 199–209. [\[CrossRef\]](#)
39. Oliveira, G.D.L.T.; McKay, B.M.; Liu, J. Beyond land grabs: New insights on land struggles and global agrarian change. *Globalizations* **2020**, *18*, 321–338. [\[CrossRef\]](#)
40. Verma, R. Land grabs, power, and gender in East and Southern Africa: So, What’s new? *Fem. Econ.* **2014**, *20*, 52–75. [\[CrossRef\]](#)
41. Adams, E.A.; Kuusaana, E.D.; Ahmed, A.; Campion, B.B. Land dispossession and water appropriations: Political ecology of land and water grabs in Ghana. *Land Use Policy* **2019**, *87*, 40–68. [\[CrossRef\]](#)
42. Tienhaara, K. The potential perils of forest carbon contracts for developing countries: Cases from Africa. *J. Peasant. Stud.* **2012**, *39*, 551–572. [\[CrossRef\]](#)
43. Lyons, K.; Westoby, P. Carbon colonialism and the new land grab: Plantation forestry in Uganda and its livelihood impacts. *J. Rural Stud.* **2014**, *36*, 13–21. [\[CrossRef\]](#)
44. Corbera, E.; Hunsberger, C.; Vaddhanaphuti, C. Climate change policies, land grabbing and conflict: Perspectives from Southeast Asia. *Can. J. Dev. Stud.* **2017**, *38*, 297–304. [\[CrossRef\]](#)
45. Rulli, M.C. Global land and water grabbing. *Proc. Natl. Acad. Sci. USA* **2013**, *110*, 892–897. [\[CrossRef\]](#)
46. Mensah, E.; Omulo, G. Youth’s access to agricultural land in Sub-Saharan Africa: A missing link in the global land grabbing discourse. *Land Use Policy* **2019**, *89*, 104210.
47. Borras, S.M.; Franco, J. Global land grabbing and political reactions ‘from below’. *Third World Q* **2013**, *34*, 1723–1744. [\[CrossRef\]](#)
48. Davis, F.K.; Rulli, M.C.; Pichdara, L.; D’Odorico, P. Accelerated deforestation driven by large-scale land acquisitions in Cambodia. *Nat. Geosci.* **2015**, *11*, 772–775. [\[CrossRef\]](#)
49. Andrea, M.C. Financialization, resistance, and the question of women’s land rights. *Int. Fem. J. Polit.* **2018**, *11*, 1–22.
50. Martina, L. ‘How come others are selling our land?’ Customary land rights and the complex process of land acquisition in Tanzania. *J. East Afr. Stud.* **2016**, *10*, 1–20.
51. Kircher, M. Bioeconomy: Markets, implications, and investment opportunities. *Economies* **2019**, *7*, 73. [\[CrossRef\]](#)
52. Oberlack, C.; Tejada, L.; Messerli, P.; Rist, S.; Giger, M. Sustainable livelihoods in the global land rush? Archetypes of livelihood vulnerability and sustainability potentials. *Global Environ. Chang.* **2016**, *41*, 153–171. [\[CrossRef\]](#)
53. Duy, L.V.; Amekawa, Y.; Isoda, H.; Nomura, H.; Watanabe, T. Are socialist domestic land grabs egalitarian? Insights from a case involving a rubber plantation in Dien Bien Province, Vietnam. *Geoforum* **2020**, *114*, 89–106.
54. Jung, S. Evidence on land deals’ impacts on local livelihoods. *Curr. Opin. Env. Sust.* **2018**, *32*, 90–95. [\[CrossRef\]](#)
55. Messerli, P.; Giger, M.; Dwyer, M.B.; Breu, T.; Eckert, S. The geography of large-scale land acquisitions: Analysing socio-ecological patterns of target contexts in the global south. *Appl. Geogr.* **2014**, *53*, 449–459. [\[CrossRef\]](#)