

Review Article

Trajectories of deagrarianization in South Africa—Past, current and emerging trends: A bibliometric analysis and systematic review

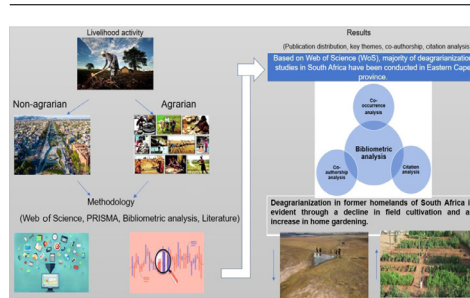
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HIGHLIGHTS

- The first document on deagrarianization was published in 1996.
- Emerging keywords in deagrarianization literature include poverty and cash transfers.
- South Africa is the only African country collaborating on deagrarianization documents.
- Deagrarianization patterns are spatially variable.
- The area of cultivated fields is declining in former homelands of South Africa.

GRAPHICAL ABSTRACT



ARTICLE INFO

Article history:

Received 24 May 2022

Received in revised form 31 October 2022

Accepted 31 October 2022

Available online 3 November 2022

Keywords:

Bibliometric analysis

Deagrarianization

PRISMA

South Africa

VOSviewer

ABSTRACT

Inquiries into rural households' engagement with smallholder agriculture remain ambiguous and complex. For this reason, research on cultivation patterns has been informed by numerous articles published in recent decades. However, studies detailing the development and progress of deagrarianization remain understudied. In attempts to bridge this knowledge gap, the study aims to provide empirical insights into the trajectories of deagrarianization in South Africa. Studies published between 1996 and 2021 were retrieved from Clarivate Web of Science for analysis. A combination of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) and bibliometric analysis was adopted to provide a comprehensive review of deagrarianization dynamics. The findings emphasize that the field of deagrarianization is gaining momentum as publications gradually emerge to indicate that although cultivation is dominant among rural households, there is a reduction in field cultivation and an increase in home-gardening in former homelands of South Africa. Furthermore, common keywords in deagrarianization literature, from a global, African and South African perspective include poverty and livelihoods. Considering that majority of deagrarianization studies analyze patterns, drivers and consequences of the phenomenon, future research needs to consider novel methodologies such as participatory GIS and new avenues that incorporate, but are not limited to, other livelihood issues such as social identities and food security. It is advised that strategies for enhancing rural development and agricultural policies focus on broader solutions that do not only sustain home-gardens but also revitalize both active and abandoned fields.

1. Introduction

Smallholder agriculture is a significant conduit for improving rural livelihoods in the Global South (Appiah et al., 2019; Shackleton et al., 2019; Salaisook et al., 2020). In Africa, including South Africa, smallholder farming is usually practiced at household level, by means of family labor with access to arable land of 1 – 2 hectares (Scoones and

Thompson, 2011; Cousins, 2013). Despite the availability of land, there is some consensus that as people attempt to increase their income and sustain livelihoods, smallholder agriculture is ceasing to be an active primary activity among rural households (Bryceson, 2004; Chapman and Tripp, 2004; Hajdu, 2005, 2006; Masunungure and Shackleton, 2018). In efforts to analyze and characterize these trends of off-farm employment in sub-Saharan Africa, Bryceson (1996) developed the term deagrarianization to refer to the declining role of agriculture in household income and livelihood strategies. Deagrarianization is defined as a process of '(i) economic activity reorientation (livelihood), (ii) occupational

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adjustment (work activity) and (iii) spatial realignment of human settlement (residence) away from agrarian patterns' (Bryceson, 1996). The process is an inclusive term that describes the declining importance and role of agricultural activities in the overall composition of rural livelihoods (de la Hey and Beinart, 2017; Connor and Mtwana, 2018). This suggests that deagrarianization does not mean that agriculture is not present or people might not be producing a surplus or cultivating gardens or fields. Rather, it emphasizes the increasing importance of remittances and non-farm income in the overall mix of rural livelihoods (Connor and Mtwana, 2018). In this case, the manifestation of deagrarianization does not only mirror the transformations embedded in agriculture but also reflects complex livelihood changes transpiring in rural households.

Deagrarianization involves livelihood, work activity and residency changes, each of which can occur separately. Thus, analysis of the phenomenon should not be a linear perspective as this could misinterpret agricultural dynamics (Shackleton and Hebinck, 2018; Bryceson and Jamal, 2019). Given these precautions, the key trajectories of deagrarianization are (i) a decline in agricultural labor compared with non-agricultural labor in rural households and in total national labor expenditure, (ii) a decline in agricultural output per capita in the national economy relative to non-agricultural output, (iii) a declining proportion of the total population residing in rural areas, and (iv) a reduction in rural household food and basic needs self-sufficiency (Bryceson, 1996). Amid analysis of changing livelihood patterns, it is crucial to recognize that the process of deagrarianization is spatially variable (Bryceson, 2002; Shackleton et al., 2019). For instance, Europe and North America witnessed intense deagrarianization during the early 19th century. With the exception of South Africa, deagrarianization in Africa developed during the 1950s but only intensified during the 1980s (Bryceson, 2018).

Propelled by escalating industrialization, deagrarianization in South Africa emerged during the early 20th century. The country did not only pave the way in Africa but also experienced the most extensive processes of the phenomenon in the continent (Bryceson, 2004, 2018). South Africa's deagrarianization is deeply rooted in the apartheid and colonial system because after the arrival of White settlers in the country, during the 15th century, a history of race and class conflict was introduced to disrupt livelihood activities (McKendrick, 1987). The Natives Land Act No. 27 of 1913 further introduced land dispossessions while proletarianization caused peasants to be separated from their land to supply cheap labor to capitalist industries and mines (Wolpe, 1972; Plaatje, 2002). Situations were further complicated when the betterment planning was initiated in 1936 to organize dwellings into nuclear villages where agricultural and ecological sustainability, infrastructure and service provision was regulated, resulting to increased distances between homesteads and fields for the majority (McAllister, 1991; De Wet, 1995; Blair et al., 2018). This political history and associated management policies severely impacted rural livelihoods and landscapes (Hajdu, 2005). Consequently, former homelands of South Africa remain victims of livelihood changes influenced by historical marginalization. Despite the availability of deagrarianization literature, state of the art studies focusing on the nature of deagrarianization patterns are limited. Analysis conducted on Clarivate Web of Science (WoS), dated 11 May 2022 revealed that only three review articles on deagrarianization exist. However, none of these focus on South Africa. Only one review article concentrates on sub-Saharan Africa (Bryceson, 1996) but this document was published in 1996 and since then, the process of deagrarianization has evolved. To date, there is a paucity of studies applying bibliometric analysis to explain the key changes in deagrarianization literature. In efforts to bridge this knowledge gap, this review delivers a comprehensive analysis discussing the development and progress of deagrarianization literature and subsequently sheds light on avenues for future research in this field. The aim of this study is to provide empirical insights into the trajectories of deagrarianization in South Africa. The objectives are to: (1) conduct a systematic re-

view of deagrarianization literature using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA), (2) conduct a bibliometric analysis of deagrarianization literature, and (3) identify methodologies used to determine deagrarianization patterns in South Africa. Through these objectives, the co-occurrence, co-authorship, citation and methodological approaches of deagrarianization studies will be analyzed.

2. Materials and methods

2.1. Data sourcing and management

Intense competition exists between scientific databases, particularly, Web of Science (WoS) and Scopus but one supersedes the other depending on what is being analyzed, the period of analysis and the scientific field (LaGuardia, 2005; Burnham, 2006; Dess, 2006; Li et al., 2010; Zhu and Liu, 2020). This study opted to use Clarivate WoS to acquire publications on deagrarianization since the database is credited for being a significant database, providing standardized and high-quality academic information with high data inclusivity and reliability (Wang et al., 2016). Data mining was conducted on 11 May 2022 using WoS search engine. Documents published between 1996 and 2021 were selected because deagrarianization publications date from this period. 'All fields' was selected to direct the query to search the different aspects of publications, including the title, abstract, keywords, authors, publication year and affiliations. Firstly, the search commenced with "deagrarianisation" OR "deagrarianization" so that documents written in both American or British English style could be included for analysis. This search yielded 65 documents. Secondly, a search within results using "Africa" was conducted and this yielded 26 publications. Lastly, these results were further distilled through another search within results using "South Africa" and 13 publications were found. In preparation for bibliometric mapping, all three search results were saved and exported as a plain text file with record content that included full records. These files were imported to VOSviewer software for graphical representation of bibliometric results. Thereafter, eight publications related to South Africa were selected for review (Fig. 1).

2.2. Data analyses

Two methods, namely, Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) and bibliometrics analysis were employed to achieve the aim of the study which is to provide empirical insights into the trajectories of deagrarianization in South Africa. PRISMA is a protocol for creating systematic reviews according to a four-phase flow diagram and a 27-item checklist (Fig. 1). The protocol was applied to minimize biased reporting (Moher et al., 2015; Shamseer et al., 2015). English was used to search for literature and the search included journal articles, review articles, editorial material and conference proceeding papers. Given the contested nature of deagrarianization - resulting from the complexities of its drivers, this study only reviewed publications related to South Africa. From the 13 identified publications, one duplicate was removed. Thereafter, a comprehensive screening of titles and abstracts was conducted to identify the content of each publication, including methodologies used to provide empirical evidence of deagrarianization dynamics. Thus, only 12 articles were available for further screening. In terms of eligibility, four publications were removed since the content did not relate to deagrarianization in South Africa. Therefore, these publications were found to be inappropriate for the desired results of the present study. A full text reading of the remaining eight publications was conducted to provide insights into methodologies used to identify deagrarianization patterns in South Africa.

Bibliometrics is a systematic approach for analyzing scientific publications and measuring scientific progress of various fields (Chen et al., 2017; Geng et al., 2017). This analysis provides an opportunity for

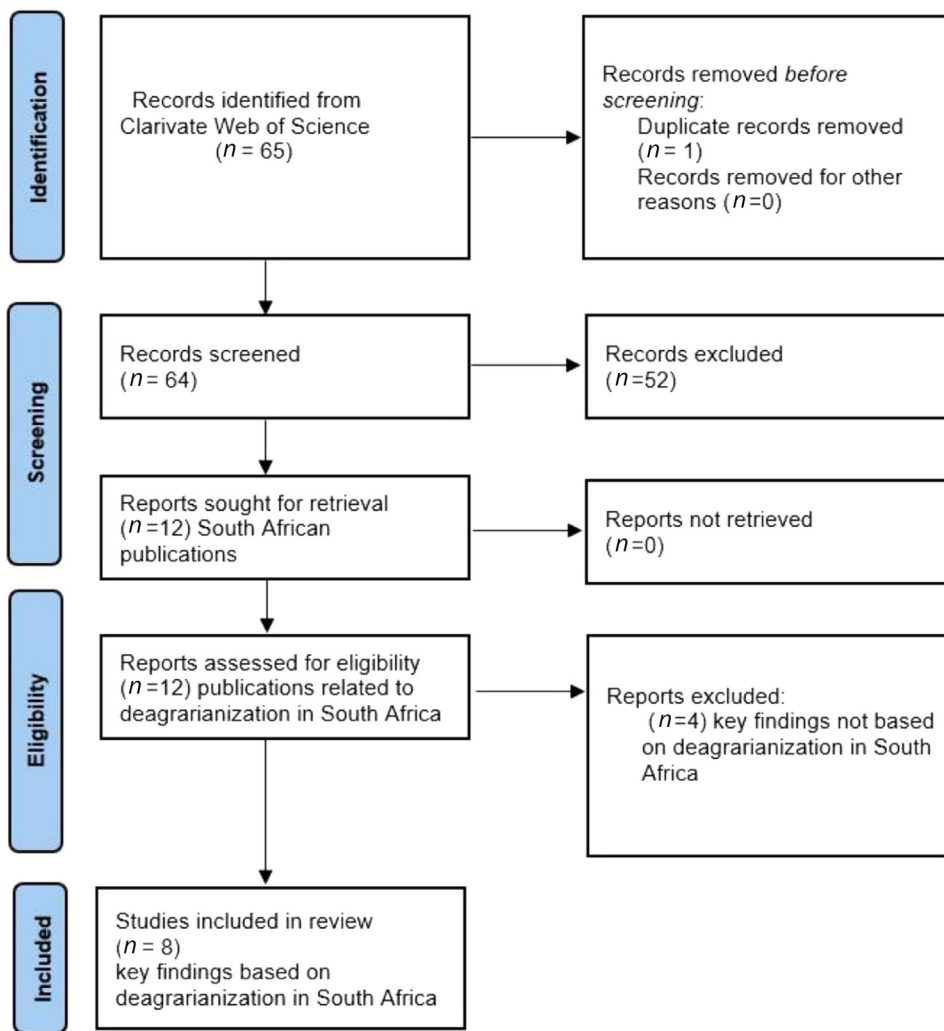


Fig. 1. Systematic review flow diagram.

creating a network based on the relationships between keywords, authors, journals, countries and institutions related to the analyzed topic (Chen et al., 2016). Bibliometric analysis was preferred for this study because it uses quantitative analysis and statistics to analyze scientific publications, investigate the structure of knowledge and development of research fields, in order to improve understanding of current research and indicate directions for future research (Zou et al., 2018; Chen et al., 2020). Compared to other methods, bibliometrics is more powerful due to its objectivity and ability to model from a broader perspective (Zahra et al., 2021). In this study, bibliometric analysis was applied to conduct co-occurrence, co-authorship and citation analyses. Among different software tools—for example, Biblioshiny, Carrot2, CiteSpace and Pajek, developed for creating, visualizing and analyzing bibliometric networks—VOSviewer version 1.6.18 was adopted for the creation of bibliometric maps. The software is an advanced tool that applies smart local moving algorithms to create and visualize graphical relationships and perform analyses based on the networks of a research topic (Van Eck and Waltman, 2010; Waltman and Van Eck, 2013). Table 1 explains the terms used by VOSviewer for bibliometric analyses.

Literature reviews are useful for assessing the influence of different journals (Tahai and Meyer, 1999; Baumgartner and Pieters, 2003), obtaining an overall reflection of the intellectual structure of a field (Hill and Carley, 1999; Locke and Perera, 2001), viewing scientific impact (Van Dalen and Henkens, 2001) or suggesting how a field might progress (Margolis and Walsh, 2003). Through the use of PRISMA, relevant literature was identified and reviewed to gain empirical insights into deagrarianization in South Africa.

3. Results

3.1. Distribution of deagrarianization publications

Fig. 2 illustrates the total number (65) of published documents related to deagrarianization from 1996 to 2021. From these documents, 26 were related to Africa while 13 were related to South Africa. A gradual increase in published documents has been recorded since 1996 but these publications have been fluctuating throughout the years leading to 2021.

While, only five documents were published between 1996 and 2005, these publications recognized the increasing diversifications from farm to non-farm activities and characterized dominant patterns in countries such as Thailand and those in sub-Saharan Africa. Through defining and explaining the process of deagrarianization in sub-Saharan Africa, the publication by Bryceson (1996) set the foundation for deagrarianization literature and played a crucial role in expanding knowledge related to the field. Contrary to the period between 2006 and 2015 which yielded 22 publications, the period between 2016 and 2021 yielded 38 publications. Due to global changing ecological, political and socioeconomic drivers stimulating diversifications towards non-farm activities, research on deagrarianization has attracted a wider audience. Farming is not only one of the several livelihood activities practiced by rural households, it is also an activity considered to be insufficient to keep smallholders committed to agriculture. Thus, it is anticipated that deagrarianization related publications will escalate as researchers analyze patterns associated with agrarian changes.

Table 1
Description of terms used by VOSviewer for bibliometric analyses (Van Eck and Waltman, 2018).

Term	Description
Items	Objects of interest (e.g., terms, researchers, publications)
Link	Connection or a relation between two items (e.g., co-authorship links between researchers)
Link strength	Attribute of a link represented by a positive numerical value. The higher the value, the stronger the link
Network	Set of items and links between the items
Cluster	Set of items included in a map. An item can belong to only one cluster
Weight attribute: Number of links	Indicates the number of links of an item with other items
Weight attribute:	The cumulative strength of the links of an item with other items
Total link strength	

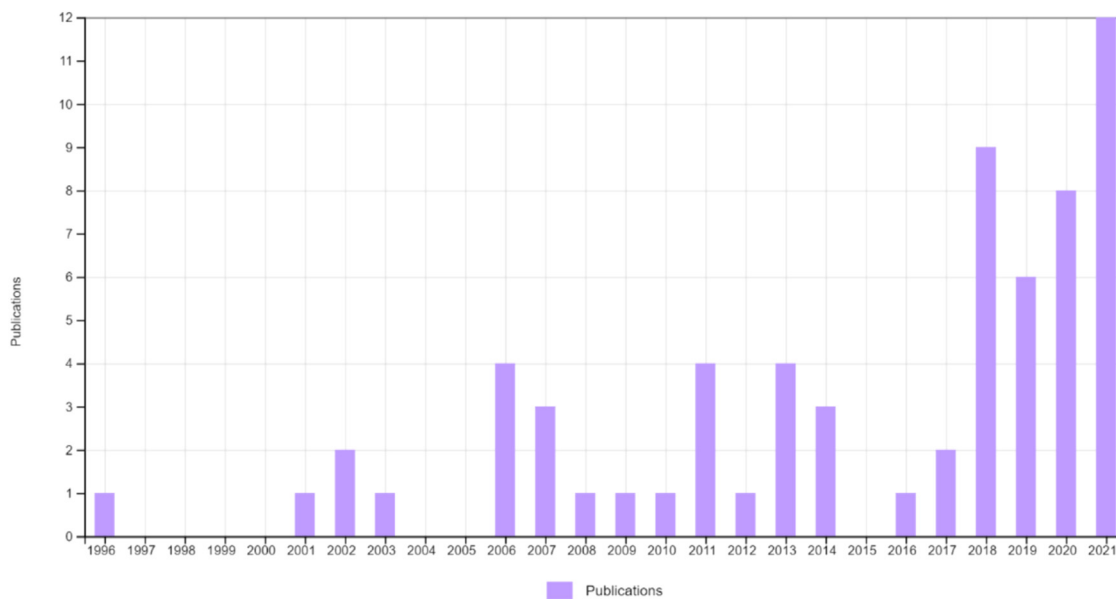


Fig. 2. Distribution of deagrarianization publications between 1996 and 2021.

3.2. Key thematic analysis

Fig. 3 visualizes the co-occurrence of keywords included in deagrarianization literature at a global, African and South African level. Fig. 3a highlights the global analysis, whereby 13 of the 418 keywords met the threshold of a minimum of five occurrences per keyword. These keywords were divided into three keyword clusters grouped according to closely related themes. Fig. 3b is a visualization of keywords related to deagrarianization literature in Africa. From 176 keywords, 5 met the threshold of a minimum of 5 occurrences per keyword. These keywords were grouped into one keyword cluster. Fig. 3c highlights the South African analysis. From 110 keywords, 5 met the threshold of a minimum of 3 occurrences per keyword. These keywords were also grouped into one cluster.

In terms of the network visualization (Fig. 3), each keyword (item) is linked to another but these keywords are further grouped according to clusters of closely related themes. The size of each keyword node reflects the weight—thus, the larger a circle, the more a keyword has been co-selected in deagrarianization publications. At a global level (Fig. 3a), the blue cluster is the most significant cluster dominated by the keyword deagrarianization (American style) which is closely related to land, rural livelihoods and Thailand. Several studies (Rigg and Natapoolwat, 2001; Rigg, 2006; Rigg et al., 2018) have reflected both livelihood changes and adaptation strategies adopted by smallholder farmers affected by deagrarianization in Thailand. The red cluster was dominated by the keyword livelihoods which is closely related to Africa, sub-Saharan Africa, poverty and strategies. The green cluster is dominated by the keyword agriculture, followed by deagrarianisation (British style), agrarian changes and migration. Since deagrarianization is a multi-dimensional process involving livelihoods, it is crucial to analyze

factors embedded in the phenomenon. Poverty is one of the keywords central to deagrarianization research as it is a major constraint affecting cultivation and rural livelihoods. Thus, recognizing the potential of farming can reduce poverty, food insecurity and household vulnerability (Blair et al., 2018). The three levels of analysis share common keywords but literature in Africa is distinguished by the keywords Africa and sub-Saharan while at the South African level, literature is distinguished by the keywords agriculture and South Africa. Agriculture is a dominant keyword in South African deagrarianization literature since prevalent patterns of the phenomenon in the country are defined by changes in field and home-garden cultivation. Although rural areas of Africa, including South Africa, are associated with agriculture, majority smallholders in rural Eastern Cape, South Africa, are less engaged in agricultural activities than before (Bezu and Holden, 2014; Schramski and Barnes, 2016). This decline in agricultural engagements suggests that deagrarianization literature is more likely to include new keywords in the future since livelihoods are defined by changing agrarian activities.

3.3. Past, current and emerging trends of keywords in deagrarianization literature

Fig. 4 represents an overlay visualization of past, current and emerging trends of keywords used in deagrarianization literature, at a global level, between 2012 and 2017. The minimum number of occurrences for each keyword was set at a default of five in VOSviewer and of the 418 keywords, 13 met the threshold.

The overlay visualization of co-occurrence analysis provides a platform for reflecting past, current and emerging keywords in deagrarianization research. Keywords are significant nouns or phrases highlighting key topics of a publication (Xiang et al., 2017; Shasha et al., 2020).

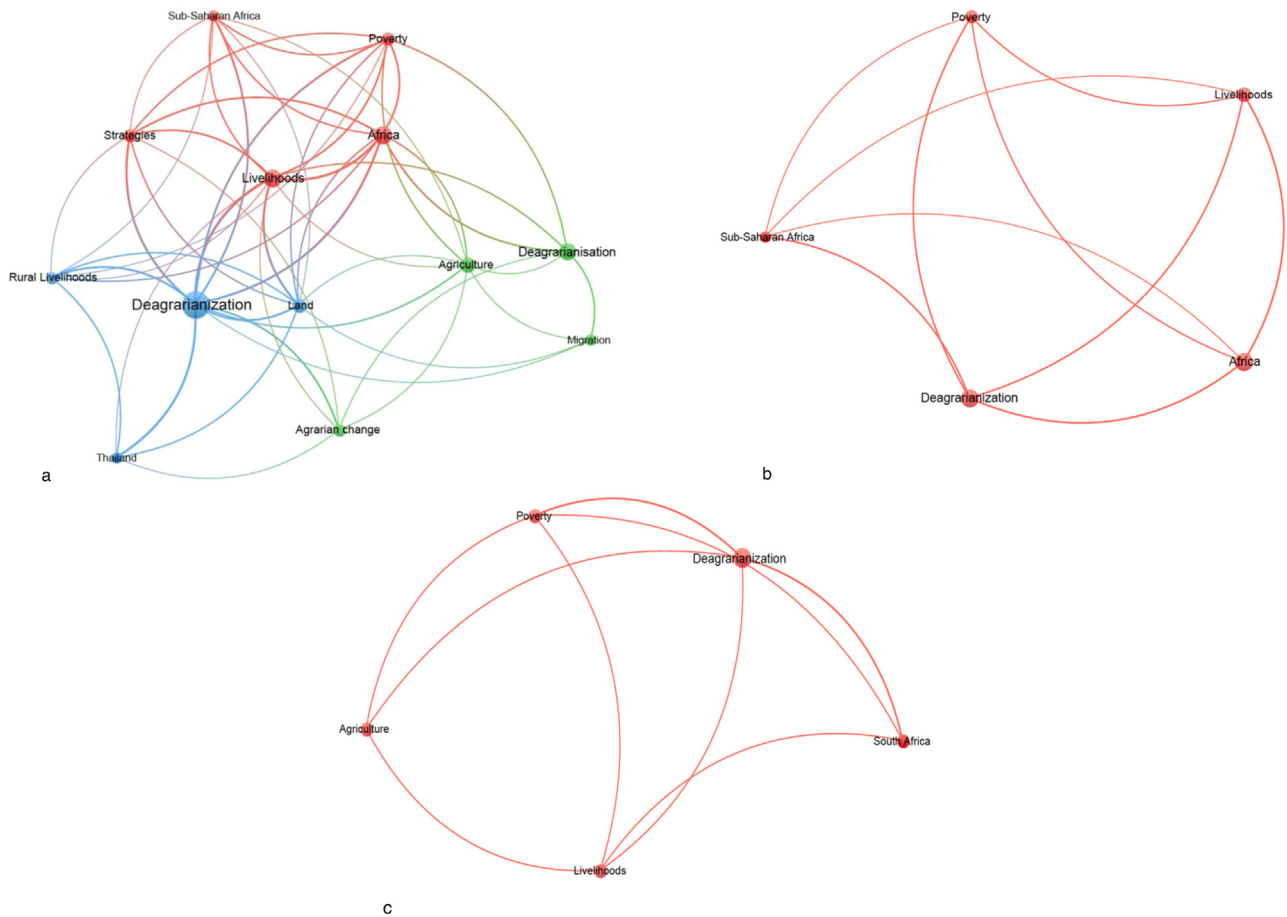


Fig. 3. Network visualization map of keywords co-occurring in deagrarianization literature: global perspective (a), African perspective (b), and South African perspective (c).

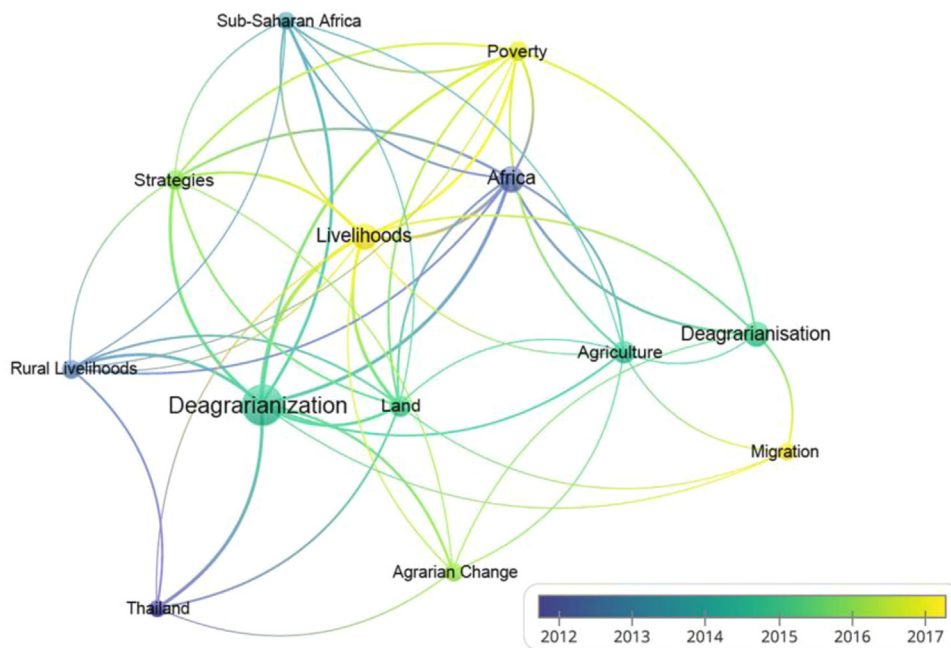


Fig. 4. Global level overlay visualization of past, current and emerging keywords in deagrarianization literature.



Fig. 5. Network visualization map of countries co-authoring deagrarianization publications at a global level.

Based on the analysis of the timeline presented on Fig. 4, it is possible to understand how the core content of deagrarianization literature has transformed. Keywords prior to 2012 are regarded as past, while those between 2012 and 2017 are regarded as present and keywords beyond 2017 are regarded as emerging. Between 1996 to 2012, most research on deagrarianization focused on Africa, rural livelihoods, sub-Saharan Africa and Thailand. Keywords in 2017 focused on livelihoods, migration and poverty. Analysis of the African and South African level highlights emerging keywords beyond 2017. These keywords include abandonment, artisanal mining, patterns and cash transfers. Cash transfers are an effective policy response to poverty, however, attributing livelihood changes to the effects of acquiring social grant is challenging and requires deeper insights into livelihoods (Davis et al., 2012). As highlighted in Masunungure and Shackleton (2018), during the absence of income-earning opportunities, rural households diversify their livelihood activities, in some cases away from farming activities, and adopt various strategies such as cash transfers to sustain their livelihoods. Cash transfers, mainly social grants in the form of old age, child support, disability, foster child and care dependency grant play a significant role in improving living conditions and livelihoods in South Africa (Hajdu et al., 2020). As highlighted by emerging keywords, with increasing deagrarianization publications, it is anticipated that future research will incorporate broader aspects associated with agrarian changes and livelihoods.

3.4. Collaborations among countries and institutions

Fig. 5 presents the global level analysis of a co-authorship network between leading countries collaborating to publish deagrarianization documents. These results were derived from setting the minimum number of documents of a country as well as citations to two. Of the 29 countries, 16 met the threshold but the largest set of connected items consisted of 14 items grouped into four clusters.

Compared to other countries, England is a leading collaborator of deagrarianization publications since the country has produced 11 documents with a total link strength of 8. There are considerable collaborations between countries, with South Africa representing the African continent. A core reason for this outstanding performance could be attributed to the fact that South Africa is a pioneer of deagrarianization in Africa (Bryceson, 2018), thus, authors from this country have conducted extensive research and attracted collaborations which have generated numerous publications.

Fig. 6 represents institutions co-authoring deagrarianization publications at a global level. The minimum number of documents of an institution and citations was set to two. From 92 institutions, 13 met the threshold but the largest set of connected items consisted of 8 items. These institutions were grouped into three clusters.

The network visualization map of institutions co-authoring deagrarianization publications at a global level informs about the productivity and prominence of each institution collaborating on deagrarianization publications. Based on the total link strength of each institution, the green cluster holds the most productive institutions in the field of deagrarianization research. The red cluster holds the second most productive institutions and the blue cluster has the third most productive institutions. These results can be ascribed to majority of researchers publishing on deagrarianization being affiliated to South African institutions for

various reasons, including academics, funding opportunities and completing research projects.

3.5. Citation analysis

Fig. 7 demonstrates citation rates of deagrarianization publications at a global level. The larger the circle, the greater the number of citations and prominence of the publication. The minimum number of citations of a document was set to zero so that all 65 deagrarianization related publications could be included. Only the connected items (publications) are shown on the map, hence, only 35 of the 65 publications are presented.

In terms of citation analysis, Bryceson accounts for the most cited author in deagrarianization research, possibly because the author was the first one to analyze, characterize and publish trends of off-farm employment in sub-Saharan Africa, thereby popularizing the term of deagrarianization. This citation analysis is key for informing researchers about the contributions of different authors. From this analysis, significant publications in the field of deagrarianization can be identified and used as a guide to inform future research.

3.6. Empirical insights into deagrarianization trajectories in South Africa

Table 2 identifies methodologies used to provide empirical insights into deagrarianization in South Africa. A summary of the author details, study area and key findings for each of the eight reviewed studies is presented to explain the current state of deagrarianization in the country. Trajectories of deagrarianization vary according to class, location and economic conditions of villages (Bryceson and Jamal, 2019). Since deagrarianization patterns of a country stem largely from various context specific historical, political, economic and ecological factors, this study only reviewed literature related to South Africa.

4. Discussion

This section discusses trajectories of deagrarianization and evaluates methodologies adopted by the reviewed publications (Table 2). Existing deagrarianization knowledge in South Africa indicates distinct patterns of agricultural land-use and land cover changes marked by declining cultivation engagements and deactivations from field farming among rural households. The distribution of publications tracks the progression of global scientific publications related to deagrarianization. Fig. 2 emphasizes how deagrarianization is a relatively new field of research which developed from just one publication in 1996. Nonetheless, the highest number of publications were recorded in 2021, suggesting that the field is gaining momentum. With the use of VOSviewer software, bibliometric analyses were conducted to create network visualization maps of keywords for the global, African and South African level. Since researchers have recognized the presence of deagrarianization in South Africa and other countries, keywords continue to highlight the direction of these publications. Furthermore, extensive collaborations have occurred between countries co-authoring deagrarianization publications, suggesting that the phenomenon is a prevalent process affecting different countries worldwide (Fig. 5). Although a multitude of factors have spurred changes with agricultural engagements, across countries, some of the widely discussed countries in deagrarianization literature include Mexico, Poland, South Africa and Thailand. Based on the network visualization map of institutions co-authoring deagrarianization publications,

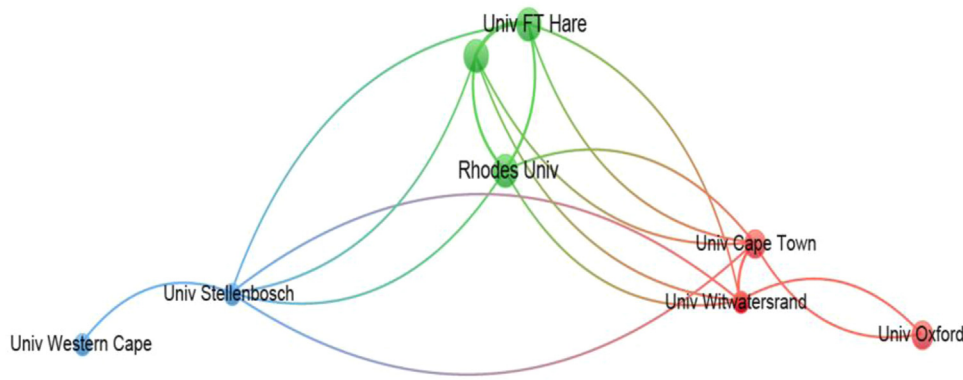


Fig. 6. Network visualization map of institutions co-authoring deagrarianization publications at a global level.

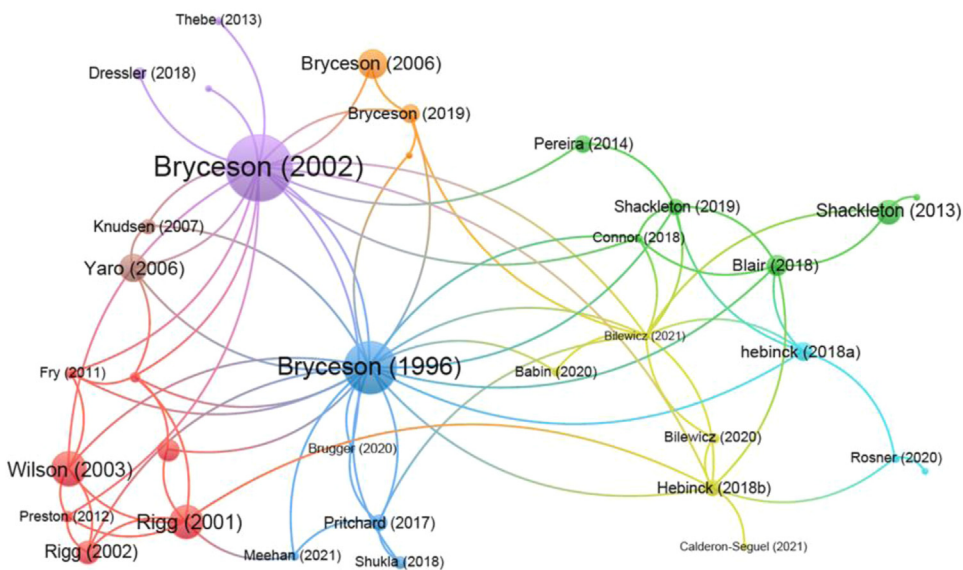


Fig. 7. Citation analysis map of deagrarianization publications.

South African institutions play a key role in narrating processes of deagrarianization in the country. As seen in Fig. 6, each of the clusters in the map is dominated by South African institutions.

Numerous methodological approaches from both quantitative and qualitative methods have been applied to identify and explain deagrarianization patterns in South Africa (Table 2). These include aerial photographs, focus group discussions, household questionnaire surveys, interviews, observations, oral histories and thematic analysis. The integration of Geographic Information System (GIS) and remote sensing with aerial photographs has played a significant role in analyzing land use and land cover changes (LULCC), evident from the process of deagrarianization in South Africa. Among other capabilities, remote sensing technology is capable of mapping large-scale agricultural abandonment through providing the whole spatial-temporal picture of land abandonment over a period of time (Estel et al., 2015). Other studies concur that spatial analysis has improved with the development of GIS, remote sensing and data sources of assessing spatial-temporal LULCC (Zhai et al., 2020). While time series analysis of aerial photographs reflected past and present LULCC, the calculated rates of changes proved that land cover varies across villages of South African former homelands. Moreover, the most prominent features defining deagrarianization in the country are field abandonment, decreased field cultivation and increased home-gardening.

Research methods such as interviews, observations and questionnaires are widely used as social research methods of collecting data from and about people (Robson et al., 2016). The study by Pereira et al. (2014) conducted focus group discussions with food

providers to understand food availability, accessibility, consumption and coping strategies adopted by families in response to household shocks. Likewise, Hebinck et al. (2018) used focus group discussions to comprehend the use of natural and social resources in contemporary rural settlements in the central Eastern Cape. While Blair et al. (2018) administered household interviews to understand local perceptions on cropland abandonment and crop farming, Connor and Mtwana (2018) held individual and group interviews to understand vertige garden production. This present study verifies how several methods, inter-alia, surveys, household interviews, oral histories served the advantage of capturing local peoples' perceptions of deagrarianization. Questionnaire-based surveys incorporate advantages of providing a straightforward and simple approach to the study of attitudes, beliefs, motives and values. Disadvantages of these surveys include that data can be affected by the characteristics of respondents, such as their experience, knowledge, memory, motivation and personality (Robson et al., 2016). Research methods employed by the reviewed studies have a major contribution towards understanding the trajectories of deagrarianization in South Africa. Empirical evidence indicates that majority of deagrarianization research in the country has been conducted in the former homelands of Eastern Cape. This province is described as one of the most highly deagrarianized zones in South Africa (Connor and Mtwana, 2018). While the aforementioned research methods assisted with describing patterns, drivers and consequences of deagrarianization, bibliometric analysis and PRISMA adopted by this study contributes to comprehending methodologies applied in deagrarianization studies and provides valuable insights into the evolution and direction of emerg-

Table 2
Reviewed studies on deagrarianization in South Africa.

Author(s)	Study area	Approach	Key findings
Shackleton et al. (2013)	Willowvale, along the Wild Coast, Eastern Cape	Aerial photographs analyzed using Geographic Information Systems (GIS)	Land-use and land cover changes indicated continuous field abandonment, accompanied by woody vegetation encroachment from 1961 to 2009
Pereira et al. (2014)	Agincourt Health and Demographic Surveillance System (AHDSS) site, Mpumalanga Province	Sustainable rural livelihoods approach, secondary data, focus group discussions, in-depth interviews, household questionnaire surveys and images	Due to the vulnerabilities exposed by climate change and deagrarianization on food security, households have disengaged from agricultural production to rely on other income-earning activities. Rather than cultivating, households have adopted a food security strategy of purchasing staple food
Spierenburg and Brooks (2014)	KwaZulu-Natal and Karoo region, Eastern Cape	Thematic analysis	The social consequences of private game farming include that privatized wildlife production creates opportunities for defending space, thereby reducing engagements with agrarian activities for majority of those denied access. Thus, policies need to be revised to address land rights and property ownership challenges
Blair et al. (2018)	Four former homelands of South Africa (Transkei, KwaZulu, Lebowa and Venda)	Aerial photographs and household interviews	All sites experienced a reduction in active fields accompanied by an increase in abandoned fields
Connor and Mtwana (2018)	Three villages in Eastern Cape (Lutengele, Sirhosheni and Mbekwini)	Individual and group interviews	Cultivation of household gardens was a dominant agricultural activity in all three villages, followed by field cultivation. Agricultural land-use changes indicated an increase in household-gardening, coupled with reductions in field cultivation and varying rates of field abandonment
Hebinck et al. (2018)	Two villages in Eastern Cape (Guquka and Koloni)	Multi-methods: household surveys, aerial photographs, informal interviews, focus group discussions and oral histories, direct observations and repeated visits between 1996 and 2016	Prominent deagrarianization dynamics included a decline in the number of cultivated fields as fields were abandoned and years later restored or transformed into homesteads. Although there was an increase in abandoned gardens, majority of these were still active
Shackleton et al. (2019)	Communal areas of South Africa	Case studies	Although cultivation is still a dominant process, there is a decline in the number of households engaged in field cultivation. Consequently, the area of cultivated fields is declining in many communal areas of South Africa. The study also yielded new studies indicating a decline in field cultivation in communal areas of the country. These studies were Andrew and Fox (2004); De Klerk (2007); Giannecchini et al. (2007); Lent and Mupakati (2007); Matsika (2012); Manyevere et al. (2014); Burgoyne et al. (2016); de la Hey and Beinart (2017); Herd-Hoare (2018); Masunungure and Shackleton (2018); Swemmer et al. (2019); Gouws and Shackleton (2019)
Hajdu et al. (2020)	Two villages in Eastern Cape (Cutwini and Manteku)	Questionnaire survey, in-depth interviews and participatory observations	The long-term productive effects of cash transfers, particularly, child support grant on impoverished livelihoods indicates a statistically significant positive correlation between child support grant and crop cultivation. Considering that sustainable livelihoods are threatened by deagrarianization, the grant is applauded for its ability to improve rural living conditions and livelihoods

ing deagrarianization research. Thus, future research needs to introduce other methods such as participatory GIS to capture peoples' experiences of deagrarianization. It is highly recommended that future research becomes directed but not limited to analyzing the implications of deagrarianization on social identities, food security and ecological factors as this holds potential to improve rural livelihoods and landscapes. Transdisciplinary approaches can also be infused with deagrarianization studies to reinforce knowledge on the vulnerabilities entrenched in agricultural land-use and land cover changes. The results of this study should be recognized in consideration of limitations. Only one database, namely, Web of Science, was applied to yield data for analysis. Due to the search inclusion and exclusion criteria used, other relevant publications may be excluded. Furthermore, review of deagrarianization publications only focused on those relevant to South Africa. Consequently, future research can consider acquiring publications from other databases as this could produce additional publications relevant to deagrarianization research.

5. Conclusions

Empirical insights into the trajectories of deagrarianization in South Africa were elaborated using PRISMA method which permitted a systematic review of deagrarianization literature and VOSviewer software which enabled bibliometric analyses of co-occurrence, co-authorship and citation networks. Synthesis of methodological approaches asserts that numerous methods have been applied by researchers to determine

deagrarianization patterns and perceptions but household surveys and time series analysis using aerial photographs are the commonly adopted methods. While rural households continue to cultivate, smallholder agriculture is ceasing to be an active primary activity among rural households. Subsequently, varying prevalence of abandoned fields and reductions in field cultivation, accompanied by increasing uptake of home-garden cultivation is prominent in former homelands of South Africa.

Declaration of Competing Interests

The authors declare that there are no known competing financial interests or personal relationships that influenced the work reported in this paper.

Acknowledgements

The authors would like to express their gratitude to the National Research Foundation for funding PhD qualification for Felicity Aphiwe Mkhongi.

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