Barriers to sustainable agribusiness: a systematic review and conceptual framework

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Abstract

Purpose – As global concerns for sustainability have gained traction in all sectors of every economy including agribusiness, the need to investigate the critical barriers that could hamper this novelty has also risen. In that regard, this study presents a comprehensive overview of the dominant barriers encountered by agribusinesses to ensure long-term success through the lenses of a literature review.

Design/methodology/approach – The study used a systematic literature review (SLR) of 43 relevant articles. The study applies content analysis to identify and analyze the selected articles. The conceptual framework underlines the three principal barriers to sustainable agribusinesses.

Findings – The results from the SLR demonstrates that inadequate financial support, excessive post-harvest loss, gender inequality, non-climate-smart policies and weak institutional controls constitute the major challenges to the sustainability of agribusinesses.

Research limitations/implications – The study is limited in scope to barriers to the sustainability of agribusiness only not the broad spectrum of the concept of agriculture.

Originality/value – This study's uniqueness is twofold. First, it provides a checklist for practice with the goal of addressing problems that hamper the sustainability of agribusinesses. Second, the findings and research gaps in this study are important to support future studies.

Keywords Agribusiness, Sustainability, Systematic literature review, Conceptual framework

Paper type Research paper

1. Introduction

The importance of sustainability for businesses, industries and economies around the globe has reached new heights in the last decade (Danley, 2019). In the agribusiness industry, sustainable practices are predicted to take a strong root in the sector in the coming years (Oostendorp *et al.*, 2019; Rosano-Peña *et al.*, 2014). Evidences corroborate the growing acceptance of the sustainability among the major players of the agribusiness industry. Major players in this sector such as politicians have prioritized sustainability in the agribusiness by forming political parties (such as the Greens party in the western world) which focus on the preservation of nature, equality and social justice in agribusiness (Camcastle, 2007). National policies and legislations have seen much improvement in relation to sustaining the

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agribusiness to protect the environment for future generations (Bolarinwa *et al.*, 2021). Research institutions (like the universities), independent local and international bodies have been drawn into raising awareness to ensure the longevity of agribusinesses (Malorgio and Marangon, 2021). To ensure the preservation of natural resources, sustainable practices are necessary because the agribusiness relies heavily on the natural environment: land, climate and water (Hinson *et al.*, 2019). More so, the agribusinesses are operating on 40% of the lands in the world for food production and all business transactions activities. Activities of agribusinesses withdraw 70% of the water from the land to produce food and biomass (Rosano-Peña *et al.*, 2014). Moreover, agribusinesses compete for natural resources and social facilities with the growing number of people all over the world (Danley, 2019).

Sustainability-enabled solutions to counter these problems are driven by two key factors. First, an international call to reduce carbon emissions (biomass) and sustain the climate and the environment (Sehnem and Oliveira, 2017). The activities of agribusinesses account for the large emission world's carbon dioxide. Intergovernmental panel on Climate Change has mentioned that almost 25% of the anthropogenic carbon emissions comes from the activities of agribusinesses (Porter *et al.*, 2019). Further, the sector contributes immensely to the non-carbon emissions in the form of waste, food excesses and polluted water bodies. Second, the concerns of consumers over health, animal welfare and social justice have fueled the urgency attached to sustainability of agribusiness (Oroian *et al.*, 2017; Sánchez-Bravo *et al.*, 2021). In emerging economies, efforts have been made to reduce the use of fertilizers in farms run by agribusiness firms. While, in the advanced world like New Zealand has planned to reduce the methane emissions (released from livestock) in 2030 to a minimum of 10% (Packer, 2009; Walmsley *et al.*, 2015). Consumers are having a structural change toward preferences for meals from agriproducts (Sánchez-Bravo *et al.*, 2021). In addition, the preference for meat and animal products is declining due to the concerns over health and environmental issues (Allegretti *et al.*, 2018). This is driven by social media which makes it easier to access information and expose agribusinesses which are not adhering to best sustainable practices (Pretty *et al.*, 2020). In addition, big food brands and companies such as Unilever, Nestle and Kellogg exert much pressure on suppliers (i.e. agribusinesses) to protect natural resources, changing their traditional practices that harm the environment. Mega retail shops like Target, Walmart, Aldi and Costco hold agribusinesses and themselves to the increasing pressure from consumers to change their internal policies to reflect the sustainability and respect for humanity (Morris and James, 2017).

Nonetheless, the problematic hurdle to change traditional practices to adopt sustainable practices has not receive full integration into the agribusiness sector. Moreover, the challenges of sustainable agribusiness that have consequentially trickle-down effects on other sectors of an economy have received limited investigations in the scientific research community. Further, inadequate public debate and scholarly articles have raised concerns about the major barriers to specifically sustainable agribusinesses (Malorgio and Marangon, 2021; Sánchez-Bravo *et al.*, 2021; Pretty *et al.*, 2020). Limited studies that exist to address these concerns have missing links to how the barriers are identified and practically addressed to keep agribusinesses functional and profitable (Mariyono, 2020). Against these backdrops, this research presents a review of literature (empirical studies and prominent authorized documents) on the major barriers facing the sustainability of agribusinesses. The objectives of the study include the following.

(1) To analyze the existing publications on barriers of sustainable agribusinesses in the last decade (2011–2020).

(2) To identify and comprehensively discuss the key barriers of sustainable agribusiness.

(3) To conceptualize and operationalize the dominant findings and present future directions.

As a response to calls for more studies on sustainability in the agribusinesses, this study provides a checklist of major problematic issues that principal stakeholders (or owners) must address to sustain agribusiness firms into the near future. Additionally, this study is a preliminary work to kick-start and increase investigations into the challenges on sustainable agribusiness and profess measures to address from the scientific research community. Thus, the results are expected to contribute immensely to further research. The next section provides a brief discussion of sustainability in the agribusiness industry. It is followed by details of the systematic literature review method underlying this study. The results and in-depth analysis of the findings follow conceptualization of the key themes of the study. This paper concludes with implications and suggestions for practice and future studies.

2. Sustainability in the context of agribusiness

Although, there is no single definition for sustainability because scholars interpret the concept differently but Brundtland Commission's explanation is commonly accepted as the gold standard in the definition of sustainability (Barkemeyer *et al.*, 2014). The Brundtland Commission's report explained sustainability as the integration of ecological principles into activities that minimizes harmful substances released onto the environment by human beings, preservation of the environment, improvement in human capital and utilization of societal and economic models to solve problems that advance the production processes and preserves natural resources for unborn generations (Khomah *et al.*, 2021, Klychova *et al.*, 2019). Due to the complexity of sustainability as a concept, it is summarized in three layers: social, economic and the environmental structures (Bajan and Mrówczyńska-Kamińska, 2020). In agribusiness, despite the great strives made in the lives of people over the centuries by the firms in the agribusiness industry, what constitutes sustainability is not clear and interpreted in the context of the entire agriculture. However, studies such as Trevors and Saier (2010), Mittal and Singh (2007) and Cameron (2006) lay down the differences in agribusiness and agriculture which agribusiness is conceptually established as part of the bigger concept of agriculture. Not all agriculture activities are business-inclined but agribusinesses panders to the economic transactions of agricultural produce with the aim of making profit from large-scale agricultural activities (Martínez Valle, 2017). The concerns to sustain the needs of people over the years and protect the current environment and preserve future resources have put a spotlight on the sustainability of incorporated firms of agribusiness (Mariyono, 2020). However, attaining sustainability in agribusinesses has been bombarded with many financial, ecological and societal challenges. For instance, food prices on the world market alongside domestic price hikes together with health-related challenges are turning stakeholders in the industry to ask alternative means of finding solutions (Sehnem and Oliveira, 2017). In addition, the constant fluctuations in macroeconomic indicators continue to have negative impacts agribusiness. These external influencers have worsened during the COVID-19 pandemic (Fernando, 2020). Moreover, societal fabric of nations is changing with increment of the involvement of women in agribusinesses and the acceptance of diversity in work environment (Klychova *et al.*, 2019). The changing demographics and rural-urban migration put another layer of pressure on the sector by necessitating the adoption of practical sustainable measures to prolong the longstanding outcome of the limited-liability agribusinesses.

3. Research methodology

3.1 Search and selection of relevant articles

This study utilizes a systematic literature review (SLR) method of reviewing existing articles. The SLR examines previous studies through identification, selection, evaluation and analyzing of retrieved articles (Akomea-Frimpong *et al.*, 2021a; Rauniyar *et al.*, 2021). This technique has been used by researchers such as Velten *et al.* (2015) and Aarseth *et al.* (2017) to

review relevant studies on sustainability. The three steps of retrieving and analyzing the studies on barriers of sustainable agribusiness are displayed in Figure 1.

3.1.1 Step 1: search articles in Scopus and Web of Science. The search process began with the search for the keywords: "barriers", "barriers of sustainability", "challenges of sustainability", and "agribusinesses", "agribusiness enterprise", "agri-business". These search strings (keywords) were entered into reputable academic databases of Scopus and Web of Science which have wider coverage of literature on agribusiness (Singh *et al.*, 2021). The search code output of the articles: (TITLE-ABS-KEY ("barriers" OR "barriers of sustainability" OR "challenges of sustainability") AND TITLE-ABS KEY ("agribusiness enterprises" OR "agribusiness" OR "agri-business")) AND (LIMIT-TO (SRCTYPE, "j")) AND (LIMIT – TO (DOCTYPE, "ar") OR LIMIT TO (DOCTYPE, "re")) AND (EXCLUDE (2021)) AND (LIMIT – TO (LANGUAGE, "English")). The Boolean "OR" and "AND" combination steered the search to identify numerous articles associated with the study objective. The initial output from the search generated 147 articles (Scopus: 85 articles and Web of Science: 62). Then, the results were limited to language (English) and document type (only journal articles) which generated an automatic search period of 2011–2020. After these restrictions, the search results reduced to 69 articles that were downloaded for further analysis.

3.1.2 Step 2: inclusion and exclusion analysis. The 69 articles retrieved from the initial search were subjected to inclusion and exclusion analysis. The inclusion criteria focused on the selection of articles related to sustainable agribusiness and articles from peer-reviewed journals recognized by journal impact citation factors or websites such SCIMAGO and ISI (Akomea-Frimpong *et al.*, 2021b). An article is excluded if the article was published by a journal where the review processes are less rigorous such as conference proceedings,

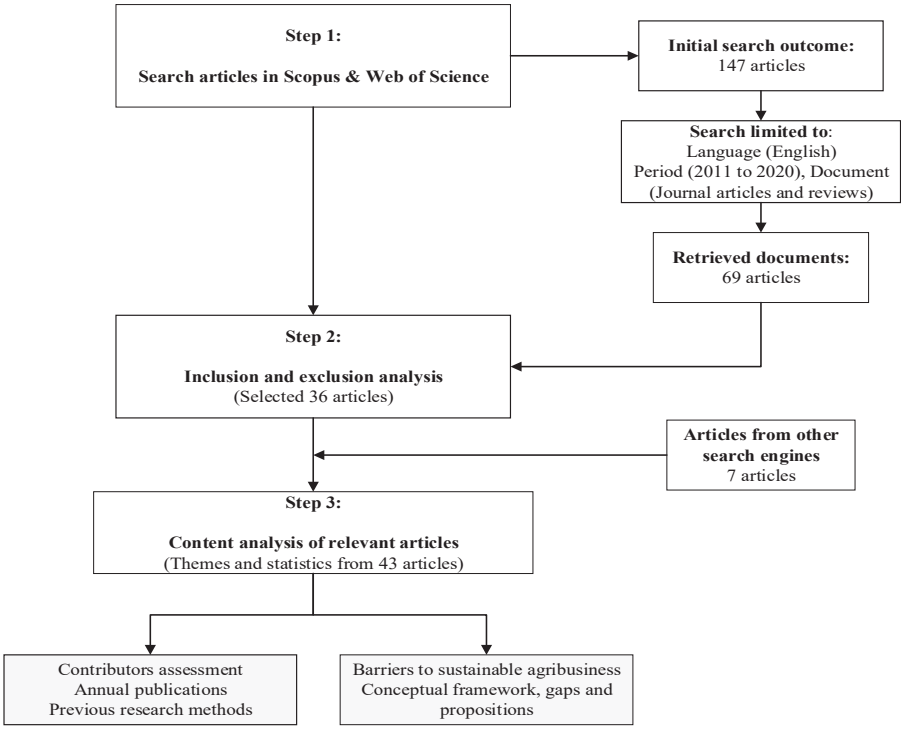

Figure 1.
Overall research approach

personal notes and short essays. Secondly, a journal article is excluded if it just mentions sustainability of agribusiness without zooming into the challenges of sustainability of agribusinesses. Studies that comprehensively discuss barriers of sustainable agribusiness were selected to align with the main objectives of this study.

3.1.3 Step 3: acceptance and final analysis of relevant articles. Overall, the inclusion and exclusion analysis from step 2 resulted in the 36 articles that were accepted for further analysis. In addition, 7 highly relevant articles were found and added to the 36 articles from Google Scholar. Thus, 43 articles were used for this study. The utilization of both qualitative and quantitative methods aided in the analysis of 43 articles. The qualitative content analysis helped to retrieve the key barriers to sustainable agribusiness through coding and theming of the extracts. The quantitative statistical analysis assisted in ranking the significant contributors to this research area (see section 3.2).

3.2 Quantitative assessment of contributors

Sustainability has become an essential benchmark that influences the decisions of stakeholders of agribusinesses. Thus, measuring the contribution of researchers and institutions are very important to ensure the realization of this coveted idea in the agribusiness industry. We applied Howard *et al.* (1987) methodology that frames the contributing researchers in a matrix form (see Table 1). In this matrix, the first and most contributing co-author gets the highest scores followed by others in descending order.

4. Results and discussions

4.1 Contributors to researches on sustainable agribusiness

Table 2 draws from the scores in the score matrix of Table 1 to rank the countries and the authors on sustainability of agribusiness. Averagely, the analysis demonstrated that the higher the number of authors in a particular country, the higher they are ranked and scored.

Number of Author(s)	Order of co-authorship 1	2	3	4	5
1	1.00				
2	0.60	0.40			
3	0.47	0.32	0.21		
4	*0.42*	0.28	0.18	0.12	
5	0.38	0.26	0.17	0.11	0.08

Table 1. Authors assessment score matrix

Rank	Country	Institution	Researchers/Authors	Papers	Score
1	US	22	42	10	7.77
2	Germany	9	12	8	7.04
3	UK	6	6	6	4.56
4	Italy	9	11	6	2.78
5	Kenya	9	14	7	2.20
6	China	2	4	2	2.00
7	Netherlands	7	12	4	1.91
8	France	6	6	6	1.80
9	Ethiopia	1	1	1	1.26
10	Romania	3	6	1	1.00

Table 2. Scores of contributing countries and researchers

The United States was ranked first among all the countries under review with 42 authors from various institutions in the country representing an impact score of 7.77. This observation indicates researchers in United States' keen interest in managing barriers of sustainability of agribusiness in the country. The next three ranked countries were contributors from Europe: Germany with 12 authors (2nd), UK with 6 authors (3rd) and Italy with 11 authors (4th), designating 7.04, 4.56 and 2.78 scores respectively. Kenya emerged as the first country from the African continent to be ranked among the first ten countries whose authors made a research contribution to sustainable agribusinesses. Kenya took the 5th position with an impact score of 2.20. China being the only Asian country among the countries obtained the 6th position with 2.00 score. The Netherlands with 12 authors had an impact score of 1.91 (7th) because it has few publications and authors from the region are not the first authors of those publication. Furthermore, the second African country that contributed to sustainable agribusiness, Ethiopia, was ranked 9th with 1.26 score after France which had 6 authors and took the 8th position of the total significant contributors on the subject. Moreover, Romania obtained the 10th position followed by the rest of the countries found in this review. As described in Table 2, the study reveals developed countries dominating the agribusiness industry while developing countries record larger peasant agriculture (personal consumption) to a formal agribusiness structures (Janker *et al.*, 2018).

Additionally, the studies are grouped according to the institutional affiliation of the authors. Table 3 shows the geographical locations of the institutions that contributed most to the subject under review. Europe had five institutions dominating in the research on sustainable agribusiness, among them is Brandenburg University of Technology Cottbus-Senftenberg with an impact score of 2. Followed by the United States as a country with two strong institutions: University of Illinois and Harvard University with an impact score of 2.88 and 1 respectively. Furthermore, Kwame Nkrumah University of Science and Technology, Ghana and Addis Ababa University, Ethiopia, represented Africa contribution to the study with 1.18 and 1 score, respectively. Likewise, a well-known leading institution on the Asian continent, Chinese Academy of Sciences with an impact score of 1, was ranked among the first ten institutions in the world that made significant contribution to the studies in the field. The result in Table 3 buttresses the point that the institutions in the developing countries are not doing much research in the subject matter even though agribusiness is seen as potential major contributor to economic development in these countries (Ayambire *et al.*, 2019).

4.2 Annual trend of publications

Figure 2 indicates that, the year 2020 holds six publications with almost 19% of the total accepted papers used in this review. The majority of the sustainable agribusiness literature review papers (9) came from 2019, making it one-fifth of the total publications with 20%. 2018

Table 3.
Major research centers on sustainable agribusiness research

Ranking	Institution	Country	Researchers	Score
1	University of Illinois	USA	6	2.88
2	Brandenburg University of technology Cottbus-Senftenberg	Germany	1	2
3	Kwame Nkrumah University of Science and Technology	Ghana	5	1.18
4	Babes-Bolyai University	Romania	6	1
5	Harvard University	USA	1	1
6	University of Liverpool	UK	1	1
7	German development Institute	Germany	1	1
8	Addis Ababa University	Ethiopia	1	1
9	Université Grenoble Alpes	France	1	1
10	Chinese Academy of sciences	China	2	1

and 2014 made a percentage point of 12, leaving 2016 as the third highest among the papers ranked in a particular year. Moreover, 2011, 2012, 2013, 2015 and 2017 had less than five publications based on the analysis of papers used for this study. The trend in publication shows that agribusiness is a significant component of the global society which gives rise to development in most countries especially in the developing economies (Adenle *et al.*, 2017). However, in this study, we discovered most of the research done in sustainable agribusinesses in the last 10 years were done in the developed countries giving them more advantage in achieving the development goals of the United Nations (Barzola Iza *et al.*, 2020). This disparity denies developing countries the benefits of modern sustainable agribusiness, a key proponent of resolving perpetual hunger, poverty, diseases within the framework of United Nations Sustainable Development Goals (Franklin and Oehmke, 2019). As sustainability in agribusiness and other sectors continue to be an imperative subject matter in the current geopolitical discourse, research on it will continue to rise in the coming years.

4.3 Applied research approaches in the selected articles

To facilitate the understanding of the methodology used in the articles under review, the identified methodologies were classified into seven namely: case studies, literature review, interview, quantitative model, questionnaire survey, policy documents and mixed methods. As depicted in Figure 3, most of the articles used literature review in their interpretation of sustainability of agribusiness with 30%. The policy document with 14% was found to have been adopted by some of the international institutions. Furthermore, the quantitative model and case study methodology had 16 and 14% of the total methodologies applied in the studies. The commonly used procedures by researchers such as questionnaire surveys and interviews had 9% with the mixed method housing the remaining percentage points. Figure 3 clearly shows that global research institutions used various theoretical and empirical

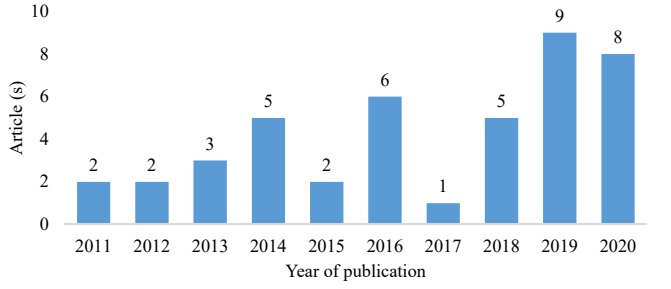

Figure 2.
Growth in publication of researches

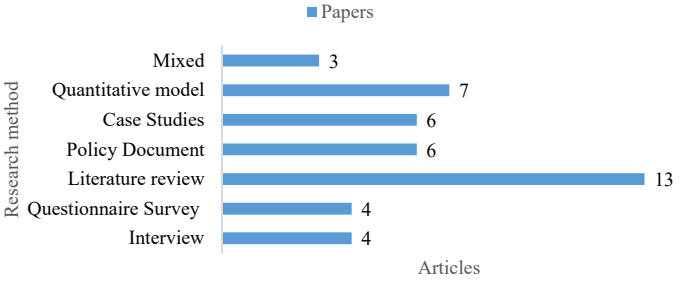

Figure 3.
Methodologies of the articles under review

underlying principles in evaluating their studies (Klerkx *et al.*, 2019), where different research approaches are compatible to different circumstances.

4.4 Critical barriers on sustainability of agribusiness

The major highlighted challenges reported in literature on sustaining agribusinesses (see Table 4) include the following.

4.4.1 B1: inadequate financial support. The review of the studies indicates that the absence of financial support greatly hinders sustainable agribusiness (Halimanjaya, 2015). Financial support serves as an essential tool for paying for the promotion of awareness campaigns that influence the behavior of stakeholders towards adoption of sustainable practices in agribusiness (Amadu *et al.*, 2020; Fernando, 2020). However, there many geographical regions that lack such support. In addition, the capital to start agribusiness is either inadequate or unavailable to sponsor peasant farmers who wants to transition to large-scale agribusiness (Huang and Wang, 2014).

4.4.2 B2: poor policies and regulations on climate change. The lack of government policies and regulations is among the pertinent barriers identified by this review (Chirambo, 2018; Simbanegavi and Arndt, 2014). Sustainable agribusiness policies and regulations are relevant for guiding the choices of stakeholders to accomplish a coherent result (Harwatt, 2019) to cut down the consequences of climate crisis. Policies and regulations are largely supervised by governmental agencies or industrial regulators (Parker *et al.*, 2019) to ensure efficient operation. Nonetheless, most policies and regulations on the activities of agribusinesses are not monitored leading to no-policy and measures to resolve climate crisis contributed by agribusiness. Sehnem and Oliveira (2017) encouraged governments and owners of agribusinesses to develop a comprehensive framework and adhere to existing policies laid down for sustainability in the industry.

4.4.3 B3: excessive post-harvest losses. Numerous articles highlighted post-harvest losses as one of the barriers of the sustainability of emerging agribusiness (Daly, 2017; Huang and Wang, 2014; UKID, 2011). Post-harvest storage service is a key area of sustainability for agribusinesses. Generally, farmer owners are accountable for ensuring the farm produce do not go waste. However, products fail to get the necessary support to be transported to markets or targeted customers extending the possibility of the products being spoiled (Kamble *et al.*, 2020). Moreover, huge expenses on storage which cannot be afforded by small-scale farmers reduce the products to waste (Sánchez-Bravo *et al.*, 2021). In most remote areas, storage facilities do not exist so the farmers are compelled to give the farm produce to the open weather and thieves (IFAD, 2020).

4.4.4 B4: land acquisitions constraints. Land constraint is another barrier to sustainability of agribusiness that is regularly cited in the literature (Fernando, 2020; Locatelli *et al.*, 2016). Landowners normally lease lands to the rich and large corporations (Rankin, 2010). However, many agribusiness start-ups cannot afford the price tag of the lands. Thus, they end up cultivating a small area that comes with small outputs. Additionally, protracted problems associated with land tenure system worsen the challenge of agribusinesses to acquire lands (Duker *et al.*, 2019; Fernando, 2020).

4.4.5 B5: food insecurity. Food insecurity is one of the devastating barriers to sustainability of agribusinesses and the world at large (Malorgio and Marangon, 2021; Simbanegavi and Arndt, 2014). Agribusinesses and all aspects of agriculture in general due to depletion of land and changing climate that make it difficult in meeting global food targets (Huang and Wang, 2014). According to Ayambire *et al.* (2019), the world population will need approximately 60% increase in agricultural output to meet the food demand of 9 billion people by the middle of this century (Abraham and Pingali, 2021). Doing this will help mitigate food insecurity, however, it comes with a cost on the health of consumers and the

Code	Barriers	References
B1	Inadequate financial support	Batrancea *et al.* (2020), Duker *et al.* (2019), Odhong *et al.* (2019), Chirambo (2016, 2018), Blasiak and Wabnitz (2018), Wong (2016), Junghans and Köhler (2016), Pauw (2015), Simbanegavi and Arndt (2014), Mekonnen (2014), Branca *et al.* (2013), Narain *et al.* (2011), Steenwerth *et al.* (2014), Locatelli *et al.* (2016), Ryan Hogarth (2012), Zhang and Pan (2016), Huang and Wang (2014), Harvey *et al.* (2014), Oostendorp *et al.* (2019), Pauw (2013), Chiriac *et al.* (2020), UKID (2011), IFAD (2020), Duarte (2013), Halimanjaya (2015)
B2	Poor policies and regulations on climate change	Rosenstock *et al.* (2019), Mahat *et al.* (2019), Duker *et al.* (2019), Harwatt (2019), Chirambo (2016, 2018), Simbanegavi and Arndt (2014), Narain *et al.* (2011), Banga (2019), Ryan Hogarth (2012), Harvey *et al.* (2014) Chiriac *et al.* (2020), IFAD (2020), Halimanjaya (2015)
B3	Huge post-harvest loss	Negra *et al.* (2020), Mahat *et al.* (2019), Duker *et al.* (2019), Parker *et al.* (2019), Odhong *et al.* (2019), Blasiak and Wabnitz (2018), Chirambo (2016), Simbanegavi and Arndt (2014), Branca *et al.* (2013), Scherr *et al.* (2012), Huang and Wang (2014), Chiriac *et al.* (2020), IFAD (2020), Joshi *et al.* (2020)
B4	Land acquisition constraints	Amadu *et al.* (2020), Rosenstock *et al.* (2019), Duker *et al.* (2019), Wong (2016), Junghans and Köhler (2016), Simbanegavi and Arndt (2014), Branca *et al.* (2013), Scherr *et al.* (2012), Chiriac *et al.* (2020), Ayambire *et al.* (2019)
B5	Strong food insecurity	Amadu *et al.* (2020), Blasiak and Wabnitz (2018), Chirambo (2016), Junghans and Köhler (2016), Steenwerth *et al.* (2014), Scherr *et al.* (2012), Huang and Wang (2014), Harvey *et al.* (2014), Chiriac *et al.* (2020), UKID (2011), IFAD (2020), Joshi *et al.* (2020)
B6	Lack of technical know-how	Rosenstock *et al.* (2019), Chirambo (2016, 2018), Junghans and Köhler (2016), Pauw (2015), Branca *et al.* (2013), Ryan Hogarth (2012), Scherr *et al.* (2012), Harvey *et al.* (2014), Chiriac *et al.* (2020), IFAD (2020)
B7	Difficulty in adopting new sustainable agribusiness practices	Amadu *et al.* (2020), Amadu *et al.* (2020), Mahat *et al.* (2019), Odhong *et al.* (2019), Wong (2016), Steenwerth *et al.* (2014), Scherr *et al.* (2012), Huang and Wang (2014) Harvey *et al.* (2014), Pauw (2015)
B8	Inherent domestic institution constraints	Rosenstock *et al.* (2019), Mahat *et al.* (2019), Chirambo (2018), Junghans and Köhler (2016), Ryan Hogarth (2012), Scherr *et al.* (2012), Harvey *et al.* (2014), UKID (2011), Halimanjaya (2015)
B9	Rampant soil erosion	Amadu *et al.* (2020), Mahat *et al.* (2019), Parker *et al.* (2019), Pauw (2015), Scherr *et al.* (2012), Harvey *et al.* (2014), Chiriac *et al.* (2020), UKID (2011), IFAD (2020)
B10	Extreme poverty	Amadu *et al.* (2020), Chirambo (2016, 2018), Simbanegavi and Arndt (2014), Steenwerth *et al.* (2014), Harvey *et al.* (2014), UKID (2011), Halimanjaya (2015), Ayambire *et al.* (2019)
B11	Gender inequality	Amadu *et al.* (2020), Amadu *et al.* (2020), Chirambo (2016), Wong (2016), Steenwerth *et al.* (2014), Chiriac *et al.* (2020), IFAD (2020), Ayambire *et al.* (2019)
B12	Excessive pollution	Mahat *et al.* (2019), Harwatt (2019), Chiriac *et al.* (2020), IFAD (2020), Halimanjaya (2015)

(*continued*)

Table 4.
Key barriers to sustainable agribusiness

Code	Barriers	References
B13	Insufficient scientific research	Negra *et al.* (2020), Blasiak and Wabnitz (2018), Simbanegavi and Arndt (2014), Steenwerth *et al.* (2014), Harvey *et al.* (2014)
B14	Collateral handicap	Batrancea *et al.* (2020), Odhong *et al.* (2019), Chiriac *et al.* (2020), IFAD (2020)
B15	Political interferences	Chirambo (2016), Scherr *et al.* (2012), Harvey *et al.* (2014)
B16	Insufficient innovative ideas on sustainability application	Odhong *et al.* (2019), Chirambo (2018), Ryan Hogarth (2012), Oostendorp *et al.* (2019)
B17	Underdeveloped social infrastructure to support agribusiness	Amadu *et al.* (2020), Mahat *et al.* (2019), Parker *et al.* (2019), Pauw (2015)

Table 4.

natural resources that emanates from enormous pressure exerted on them (Harwatt, 2019; Hinson *et al.*, 2019).

4.4.6 B6: lack of technical expertise. Lack of technical know-how is a hindrance to the sustainability of agribusiness (IFAD, 2020; Rosenstock *et al.*, 2019). Governments and industry leaders are expected to enlighten owners of agribusiness the various sustainability practices through educational training and workshops in order to enhance the management skills (Calegari *et al.*, 2020) Yet, literature reveals the failure in obligations of these key actor and this has affected the sustainability of agribusiness (Scherr *et al.*, 2012).

4.4.7 B7: Difficulty in adoption of sustainable agribusiness practice. The adoption of sustainable agribusiness practice is a challenge in most countries (Amadu *et al.*, 2020; Fernando, 2020). This denotes that, notwithstanding the number of funds invested into sustainability of agribusiness by the entrepreneurs, governments and most especially the international community, business owners in the agribusiness industry still resort to conventional business management models. It is difficult to persuade the stakeholders to adopt practicing the science and art of sustainability of agribusiness (Mello *et al.*, 2021). (Rosano-Peña *et al.*, 2014) confirmed that, the adoption of sustainable agricultural activity practice is a challenge to agribusiness as it is not widespread and this makes stakeholders find it difficult to acquire the precise information about the benefits of sustainable practices.

4.4.8 B8: inherent institution constraints. Institutions in the various countries play an essential role in the elevation of sustainability of agribusiness. However, inherent internal problems such as ineffective use of data, the unfamiliarity of the products and services and the lack of clear sustainability focus for the agribusinesses hinders full transition to thriving business venture (Steenwerth *et al.*, 2014). Inherent challenges are augmented by the location of the agribusiness and the unskilled personnel who run the business (Harvey *et al.*, 2014, Klychova *et al.*, 2019).

4.4.9 B9: Rampant soil erosion. Soil erosion is among the barriers of sustainable agribusiness that cause farmlands to wash away with planted seeds and crops (Parker *et al.*, 2019). Additionally, Rankin (2010) asserted that soil erosion is a key contributor to loss of vegetation cover linked to other livelihoods and properties of agribusinesses. This brings excess soil rectification cost and continues to exert growing pressure on sustainable agribusiness in several countries.

4.4.10 B10: extreme poverty. Poverty mitigation is top-ranked in the UN Sustainable Development Goal (UKID, 2011). Our review has identified extreme poverty as the relevant barrier in the literature (Mariyono, 2020; Packer, 2009; Rosano-Peña *et al.*, 2014). Usually, entrepreneurs who set up agribusiness have a long term-goal of doing business into the near future. However, as a result of pressures from families and other financial commitments to provide good standard of living, the capital of such businesses are squandered (Halimanjaya, 2015). In most cases in the

developing world, extreme poverty has unleashed thievery of farm produce by employees and withholding of farm hand wages (and salaries). These happenings have been established in the literature to have an adverse effect on the sustainability of agribusiness (Malorgio and Marangon, 2021).

4.4.11 B11: gender inequality. Gender equality, the 5th objective of the United Nations Sustainable Development Goal agenda (UKID, 2011), tremendously impacts sustainable agribusiness development. Our review found gender inequality as a hampering barrier to sustainable agribusiness development (IFAD, 2020; Steenwerth *et al.*, 2014). The principles of gender equality are hardly practiced in the agribusiness sector as most firms in the sector are owned and managed by men. Women are not given the same advantage to acquire the necessary resources to manage the various institutions in the agribusiness industry. However, the national culture and organizational culture operates to give men more opportunities and credits than women irrespective of the knowledge and experience they possess. This gender disparity has a negative impact on the sustainability of agribusiness (Focus, 2011).

4.4.12 B12: excessive pollution. Pollution hinders the attainment of sustainable agribusiness (Pauw, 2013; Sehnem and Oliveira, 2017). Agribusiness activities such as animal agriculture are major sources of pollution, contributing 72% of phosphorus and 63% of nitrogen pollutants as a result of manure and fertilizers application (Malorgio and Marangon, 2021; Odhong *et al.*, 2019). As a result, financial and technical resources that were supposed to intensify the sustainability of agribusiness are diverted to fight carbon emissions.

4.4.13 B13: Insufficient scientific research. Scientific research conducted in research institutions, civil societies, etc., has proven to be the cornerstone needed for the development of the sustainable agribusiness sector. Such research findings give insight into the evaluation and precise decision-making on sustainable practices (Pauw, 2015). Yet, it was revealed that inadequate research outputs and investment into research models have been geared toward sustainable agribusiness. Moreover, scientific institutions in many developing countries receive little or no support needed to undertake studies into the models that could improve sustainable practices of agribusiness (Narain *et al.*, 2016; Parker *et al.*, 2019; Simbanegavi, 2019). Potent solutions to existing problems can be proposed by scientists to reduce the damaging effects of poor sustainability measures in agribusiness.

4.4.14 B14: collateral handicap. How can the aspiring owners of agribusinesses thrive if collaterals on loans and/or credit from the bank outweigh the start-up capital? Studies reveal huge collateral deter potential agribusiness owners (Odhong *et al.*, 2019; UKID, 2011). Besides, this barrier was noted among existing agribusinesses who have to either sell the properties of the business or bequeath part of the business ownership to financiers as collateral to get enough funds to run the business.

4.4.15 B15: political interferences. Political unpredictability is happening at alarming rates in institutions that supervise the activities of agribusinesses in many countries (Negra *et al.*, 2020). Political leaders and ruling government political functionaries control the resources that support small-scale agribusiness to grow. Agribusiness owners who are not part of the party in government in oftentimes are denied access to governmental guarantees and technical expertise to expand (Malorgio and Marangon, 2021). Political volatility within a country also pose a challenge to the sustainability to agribusiness as political violence, conflict and war can erupt anytime curtailing the long-term growth agenda of agribusinesses (Duker *et al.*, 2019).

4.4.16 B16: lack of innovation in sustainability application. The findings of the review show lack of innovation in agribusiness (Hinson *et al.*, 2019). Notwithstanding the benefits obtained from sustainable practices, the application of innovation models in most traditional agribusiness settings is either non-existing or much belittled.

4.4.17 B17: inadequate social infrastructure. Inadequate physical infrastructure hinders the growth of agribusinesses (Parker *et al.*, 2019; Pauw, 2015). Social amenities such as roads, railway and public markets (stores) influence the business prospects and the results of agribusinesses. In many countries, the state has failed to provide the state-of-the art facilities to promote the growth of agribusinesses. Furthermore, Oostendorp *et al.* (2019) postulate the inadequacy of storage facilities for raw materials and produce from agribusiness products. These difficulties are mostly encountered in the rural areas.

4.5 Conceptual framework

The conceptualization of the barriers to sustainable agribusiness is summarized within three main constructs: namely, economic, social and environmental challenges. The concept of sustainability has a long history in agribusiness and in particular the entire agriculture field. However, the concept has gained much attention in national discourse and academic research in the last few decades (Janker *et al.*, 2018). The three constructs in this conceptual framework (see Figure 4) underline the United nation's Sustainable Development Goals which is largely conceived from Brundtland Commission's Report on sustainability (Brundtland, 1987). The report and UN SDG's provide a platform the assessment of the major barriers to profit-oriented interest of agribusiness owners, the social well-being of people and preservation of natural resources in the environment. Table 5 presents the operationalization of the constructs in the context of the sustainability of agribusiness.

The key constructs of the framework in Table 5 and Figure 4 are explained as follows.

BGA Environmental barriers – These barriers postulates practices that could hamper and compromise the resources in the environment. Engaging in activities that could destroy natural habitats and resources for the next generation must be discouraged to sustain the progress made in the environmentalism of green revolution (Sargani *et al.*, 2020). Also, the environmental barriers pertain to the destruction of the preservation and conservation of resources and increased of carbon emission and ecological footprint as well as adverse effects of climate change (Hsu *et al.*, 2019). Environmental initiatives such as Paris Climate

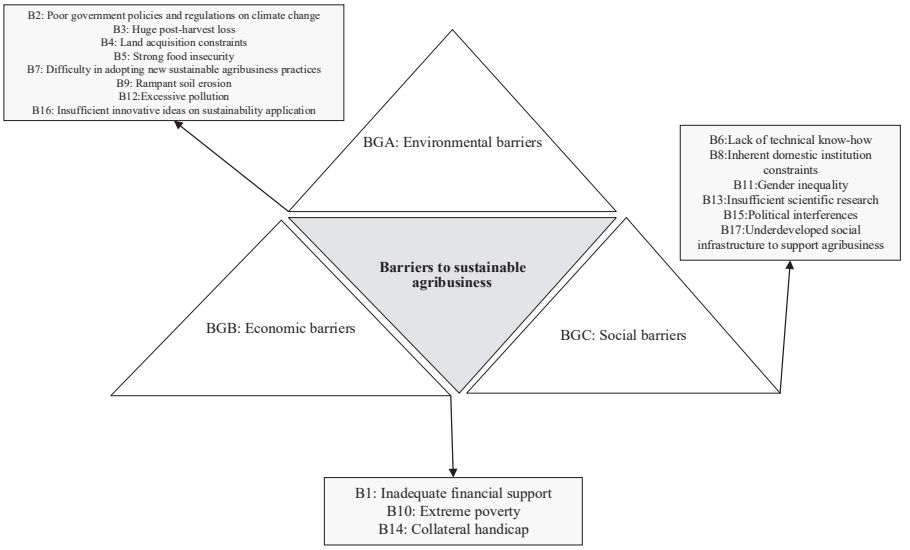

Figure 4.
A three-dimension conceptual framework (designed by Authors)

Code	Variable	Operationalization of variables	Reference
BGA	*Environmental barriers*		
B2	Poor policies and regulations on climate change	No policies = 1, Insufficient policies = 2, complex policies = 3, Drafted but not implemented policies = 4	Mahat *et al.* (2019)
B3	Huge post-harvest loss	Loss of harvest from 0 to 500 metric tonnes = 1, 501–1,000 metric tonnes = 2, 1,001 metric tonnes and above = 3 from each agribusiness	Amadu *et al.* (2021)
B4	Land acquisition constraints	Yes = 1, No = 0: Dummy if land acquisition is a problem	Amadu *et al.* (2021), Malorgio and Marangon (2021)
B5	Strong food insecurity	Dependent on the needs of the consumers and nation at large	Klerkx *et al.* (2019)
B7	Difficulty in adopting new sustainable agribusiness practices	Yes = 1, No = 0: Dummy if it is difficult to integrate sustainable practices into agribusiness	Danley (2019)
B9	Rampant soil erosion	Cases of soil washing away (0–10 = acceptable, 11 and beyond = not acceptable and risky)	Locatelli *et al.* (2016)
B12	Excessive pollution	0-100 on the air quality index = Moderate to healthy pollution, 101 and beyond on the air quality index = Unhealthy and hazardous	Inwood and Dale (2019), UKID (2011)
B16	Insufficient innovative ideas on sustainability application	Yes = 1, No = 0: Dummy if insufficient innovative ideas on sustainability apply or not	Björklund (2018)
BGB	*Economic barriers*		
B1	Inadequate financial support	Threshold of inadequacy is an agribusiness receiving less than $1,000 financial support	Odhong *et al.* (2019), Batrancea *et al.* (2020)
B10	Extreme poverty	$730 or less annual income based on world Bank's less $1.90 a day poverty limit	Costanza *et al.* (2016)
B14	Collateral handicap	Yes = 1, No = 0: Dummy if there is no property to secure a loan	Mekonnen (2014)
BGC	*Social barriers*		
B6	Lack of technical know-how	Number of skilled employees (0 = Not acceptable, 1–5 = Acceptable, more than 5 = Ideal)	Sánchez-Bravo *et al.* (2021)
B8	Inherent domestic institution constraints	The number of cases of constraints (0–5 = acceptable, 6–10 manageable, 11 and above = needs special attention)	Pauw (2013)
B11	Gender inequality	Yes = 1, No = 0: Dummy whether gender inequality exist in agribusinesses	Rosano-Peña *et al.* (2014)
B13	Insufficient scientific research	Research outputs (0–5 publication = Not acceptable, 6 and above = acceptable)	Polimeni *et al.* (2018)
B15	Political interferences	Yes = 1, No = 0: Dummy whether politicians/politics influence sustainable policies of agribusinesses	Khomah *et al.* (2021)
B17	Underdeveloped social infrastructure to support agribusiness	Yes = 1, No = 0: Dummy if there are no social amenities to support agribusiness and vice versa	Hinson *et al.* (2019)

Note(s): NB; A priori expectation of the variables (barriers) on sustainable agribusinesses is negative (−) for all the 17 variables

Table 5. Operationalization of the critical barriers of sustainable agribusiness

Agreement targeted to keep governments and businesses including agribusinesses to stick to a roadmap to control measures that affect the climate negatively (Westerman *et al.*, 2020).

BGB Economic barriers – This construct is influenced by the economic systems within which an agribusiness operates (Elkington, 1997). It borders on two central issues namely, the inadequate financial support for agribusinesses especially in the developing economies (Hsu *et al.*, 2019). Although, agribusiness is the backbone of most developing economies, it is normally inundated with little (or no) agricultural credits to keep the agribusiness going. Capital intensive mechanisms is short of use in developing economies due to inadequate financial support (Kamble *et al.*, 2020; Williams *et al.*, 2018). Second, inaccessibility to capital for agribusiness as result of numerous and complex collateral agreements to acquire finance to support agribusiness (Adnan *et al.*, 2019; Sargani *et al.*, 2020). The baseline of these problems is unfavorable macroeconomic conditions that keep worsening at the detriment of the poor small-scale agribusiness owners. Persistence and capability of robust macroeconomic policies could ensure the sustainability of agribusinesses (Janker *et al.*, 2018).

BGC Social barriers – The society plays a major role in the development of agribusiness. Humanity and communities cannot survive without agribusiness and the opposite is true (Brundtland, 1987; Talukder and Blay-Palmer, 2017). The changing world has brought different lifestyles to bear within the agribusiness sector. Inclusive and diversity policies are encouraged to be designed to provide a platform for fair wages, gender equality, strong institutions, mental health treatments and provision of affordable healthcare for agribusinesses (Kusnandar *et al.*, 2019). Aside these issues, the ethical concerns on honesty, fairness and respect for humanity are being touted in the agribusiness industry (Malorgio and Marangon, 2021).

5. Conclusions and implications

In the end, this study has presented the key barriers to ensuring sustainable agribusiness as identified through a systematic review of studies on barriers of sustainable agribusiness from the year 2011–2020. Poor policies on climate change, inadequate financial support, excessive post-harvest loss, gender inequality and weak institutional controls are some of the prominent challenges of sustainability of agribusinesses. The major contribution of this study to knowledge and research is its identification of the dominant barriers hampering sustainable agribusinesses. The results of this study advances knowledge of global trends in sustainable agribusiness, paving a way for design appropriate measures to tackle challenges facing the sustainability of agribusinesses worldwide. Taking all the three classified barriers contextualizing them are meant to end some of the ambiguities in establishing the key barriers of agribusinesses in the face of transitioning to more sustainable business practices in the twenty-first century. Therefore, this study provides a better framework for investigating further the raging challenges in the agribusiness sector such as diversity, climate change and robust credit support systems.

6. Limitations and recommendations for further studies

The following knowledge gaps and recommendations are relevant for further studies, policy and practice.

Firstly, there is inadequate data to enhance scientific research on this topic. This review has disclosed that developing economies are handicapped in terms of providing large data sets to help analyze and disclose trends relating to challenges of sustainable agribusiness. This explains the lack of public and institutional knowledge of this subject in the developing

countries. Therefore, governments and research institutions in developing economies should design and invest in data collection to assist future studies in the quest to find solutions to barriers of sustainable agribusiness.

Secondly, most of the studies included in the current review on sustainable agribusiness is geographical biased toward developed institutions and economies that demonstrates that sustainable agribusiness has not gained the needed attention in the global south. It suggested that more studies must be conducted in the developing world where majority of the people are into small-scale agribusiness.

Additionally, it is clear from reviewed studies that there is a lack of comparative assessment of the barriers of sustainable agribusiness in the literature. Comparative studies of the barriers of sustainable agribusiness could improve the learning curve for the right solutions designed and implemented to attain the best management practices. Furthermore, relevant issues such as trade wars and sanctions, disasters, competitiveness among countries, *inter alia*, that have impact on sustainable agribusiness have not been incorporated into the literature. The structural relationships between barriers could be analyzed with structural equation modeling and other data analysis techniques to establish which barriers must be grouped and control.

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