Farther from Evidence-informed Policymaking? Assessing the Status of Systematic Reviews in Nigerian Agriculture

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Abstract

Evidence-based policymaking (EBPM) is seen by its advocates as an objective way of identifying problems and proffering solutions that work, given its potential to offer sound bases for choices, helping with more effective decisions, and preventing detrimental outcomes. However, EBPM is often criticized as being susceptible to bias and selective use of evidence. One of the tools that policymakers may use to address this is a systematic review which is known to be objective and rigorous. This article assessed the availability and status of systematic reviews that focus on agriculture in Nigeria using peer-reviewed articles from different online databases. We found only 20 systematic reviews meeting our a priori criteria, which is a low number considering that agriculture plays a critical role in Nigeria's economy. Broadly, most of the reviews discussed climate change, natural resource deception, and livestock parasites and diseases, while only few discussed forestry and fishery. About half of the systematic reviews were neither open access nor funded by any agency which has implications for access to and use of this kind of evidence by policymakers. We recommended that further study is needed to understand agricultural policymakers' awareness and use of systematic reviews in Nigeria and more attention paid to this source of evidence by both researchers and policymakers to advance objectivity in the policy process and the potential for better policy outcomes in Nigeria.

Keywords: *systematic reviews, meta-analysis, meta-synthesis, evidence, agriculture, Nigeria*.

Background

The use of evidence in policymaking, i.e., evidence-based policymaking, has been suggested as an objective way for identifying problems and proffering solutions that work (Whitfield, 2012). Evidence-based policymaking came out of calls to ensure that policies are formulated and implemented based on research output (Newman *et al.* 2015) instead of political ideologies or prejudices (Nutley *et al.*, 2007). Advocates of the use of scientific information in policymaking have suggested that this may lead to more effective decisions and prevent detrimental outcomes (Haddaway and Pullin 2014; Thomas-Walter *et al.* 2021). Researchers have also argued that policies based on evidence deliver the most outcome and impact (Ndu *et al.* 2022) and provides a sound basis for choices, promote critical questions, and assist the evaluation of the success or failure of implemented policies (Yanovitzky and Weber 2020 in Fussy 2022).

In that sense, systematic reviews are regarded as a useful tool that policymakers can use to support policymaking. Together with randomised control trials, systematic reviews rank top in the hierarchy of evidence among advocates of evidence-informed policymaking (Bedard and Ouimet 2012; Cairney and Oliver 2017; Parkhurst and Abeysinghe 2016). Also sometimes called research synthesis or research review (Siddaway *et al.* 2019), "a systematic review involves the application of strategies that limit bias in the

assembly, critical appraisal, and synthesis of all relevant studies on a specific topic" (Newcomer *et al.*, 2015). They are useful in assessing multiple studies to better understand an intervention, replicate it or generalize findings (Newcomer *et al.* 2015) and in summarising complex evidence while limiting bias (Bedard and Ouimet 2017). Given the importance of evidence use in policymaking (Ndu *et al.* 2022; Fussy 2022) and the susceptibility of policymaking to bias and selective evidence use (Buffardi *et al.* 2020; Strassheim and Loer 2019), availability of and access to systematic reviews could potentially be useful in achieving more objective use of evidence in the policy process. Moreso, even though many policy analysts may not know about or use systematic reviews (Bedard and Ouimet, 2017), there is interest in their use if they are available to policymakers (Thomas-Walters *et al.* 2021).

In Africa, the call for the use of evidence in agriculture policymaking dates to the late 1980s, although discussions around it did not become popular until the 2000s (Whitfield, 2012). Agriculture is important to the Nigerian economy given that the sector employs more than 36% of the labour force (Anugwa *et al.* 2022) and contributes to more than 23% of the GDP in a population of more than 200 million people (World Bank 2022). Yet there is still a gap in the use of scientific evidence to inform agriculture policymaking (Delgado *et al* 2019; Elueze, 2016). Despite the popularity of evidence-based policymaking, many of the studies published on this subject are in developed countries and have focused on health and medicine whereas it is difficult to generalise the findings of these studies because of the context-specific nature of policy problems (Fussy 2022). In Nigeria particularly, there are limited studies on knowledge utilisation generally and especially in the agriculture sector as the few existing ones also focus on health (Elueze, 2016).

This study aims to fill some of these gaps as a first synthesis of agriculture-related systematic reviews that focus on Nigeria. The general question of this study is: what is the status of systematic literature reviews available for agricultural policymakers in Nigeria? We find very few systematic reviews published in peer reviewed journal with the implication being the limited availability of a potentially useful tool towards advancing evidence-based agricultural policymaking in Nigeria. We make recommendations on how to improve the production of systematic reviews to increase the chance of their use by policymakers.

Method

There are two broad classes of systematic reviews, depending on whether the approach to the review is quantitative or qualitative (Siddaway *et al.* 2019). In this study, we employ a qualitative systematic review – a narrative review – which is appropriate for the type of question this research seeks to answer. A narrative review is useful when synthesizing studies "that have examined different theoretical conceptualizations, constructs, and/or relationships" (Baumeister 2013 in Siddaway *et al.* 2019). In our case, it is expected that the systematic reviews to be assessed are different areas of agriculture and study different agricultural concepts and relationships. One of the studies reviewed in this paper (Anugwa *et al.* 2022) adopts this qualitative synthesis approach in their systematic review of how gender is researched in the agricultural climate vulnerability in Nigeria.

Search strategy

A search was initially conducted on the Web of Science database in November 2022 which produced 1087 results. The search was refined and repeated in January 2023, producing 187 initial results with the following terms: "meta-analysis" OR "systematic review" OR "meta-synthesis" OR "systematic literature review" OR PRISMA [in the abstract] AND (agriculture OR animal OR livestock OR fish OR aquaculture OR crop OR forest OR farm) AND Nigeria [in all fields]. The same search terms were used on Science Direct, Taylor and Francis Online, and Wiley Online Library databases, producing 1435, 288, and 508

initial results respectively (figure 1). A similar search was conducted on Google scholar with the terms: (systematic review OR synthesis OR meta-analysis OR meta-synthesis) AND Nigeria AND (agr* OR food OR farm* OR forest OR fish* OR livestock) -metal* -nano* which produced an initial 7,160 results.[1] Based on the *a priori* criteria and after title and abstract screening and duplicate removal, full text of 57 articles were reviewed which eventually led to a total of 20 articles that met the inclusion criteria and were included for the qualitative systematic review (figure 1).
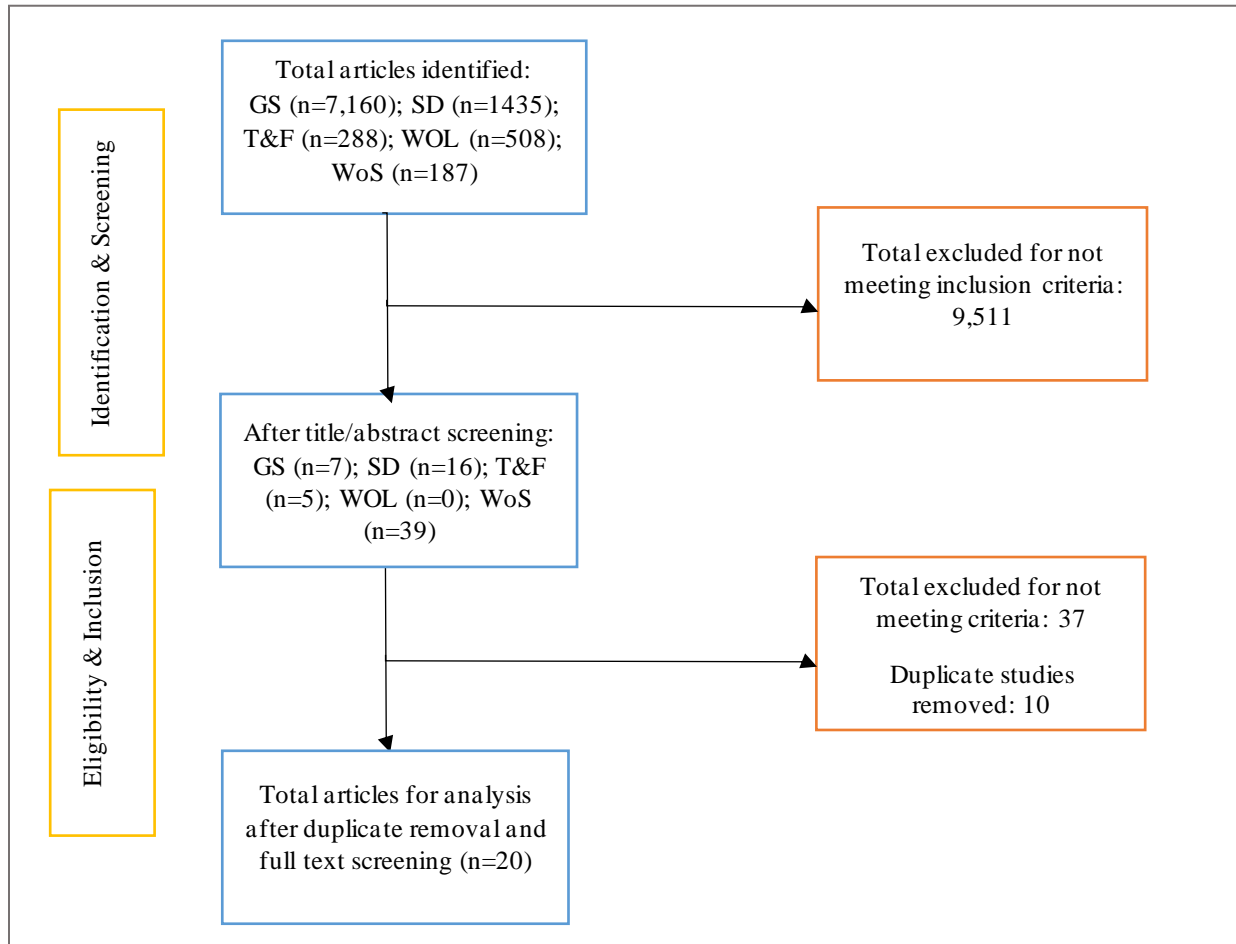

Figure 1 Flow diagram of the steps in the selection of eligible studies for the review

Note. GS = Google Scholar, SD = Science Direct, T&F = Taylor and Francis Online, WOL = Wiley Online Library, and WoS = Web of Science

Inclusion and exclusion criteria

The inclusion criteria defined *a priori* are (1) systematic reviews and meta-analyses that relates to food and agriculture (i.e., discussing crop, livestock, fisheries, forestry, or general agriculture), and (2) focus directly on Nigeria. That is, a study with a West African, sub-Saharan Africa or African focus was not included as these were beyond the scope of this study. Studies that also focused on food science, processing, safety, and technology, human health, nutrition and biofortification, toxicology, diseases, environmental science,

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[1] Because Google Scholar does not allow viewing more than 1000 results, the search results were divided into range of years so that results returned are less than 1,000 until all results assessed for relevance to this study

botany and medicinal plants, conservation, energy, etc. were excluded because we regarded them as not directly related to agriculture which is the focus of this review. For instance, two of the excluded studies are Abdullahi *et al* (2020) on hospital infection-causing Vancomycin-Resistant Enterococci and Wada *et al* (2020) on West Nile virus. Only few of the original articles used in these two studies were animal-related and of those animals, fewer were livestock or food animals. We also excluded meta-analytic studies on chicken feed from a research group in Nigeria (e.g., Ogbuewu *et al*. 2020, 2021, 2022) because their data were not sourced from primarily Nigerian studies. However, a study that focuses on animal diseases was included in the selection.

Analytic approach

Articles were jointly assessed based on the sub-sector of agriculture that they focus on (i.e., crop, livestock, fisheries, forestry, or general agriculture), main objective of the systematic review, number of original publications used for the analysis, year the systematic review was published, open access status, funding for the study, local authorship (i.e., whether lead author or at least one of the authors has local affiliation in Nigeria) and the implied or derived policy implications based on the motivation and conclusion of the review. A study is classified as having policy implication if the authors stated this clearly in the article or if the motivation and conclusion of the study are relevant for policy making.

Results

General Description of Studies

The twenty systematic reviews and meta-analyses used for our analysis were published between 2016 and 2022 with an average of about three articles published per year (figure 2). Since 2019, four systematic reviews were published yearly. One of the articles included in this review (Ilesanmi and Akinmusola 2016) did not specifically mention systematic review/ meta-analysis, but the described analytical approach fulfils the same conditions as a systematic review; hence the study was included. The systematic reviews were conducted using between 12 and 351 original studies. Out of all the twenty articles, eleven (55%) were published as open access. Further, in four of the articles (Fitz *et al*. 2022; Odeniran *et al*. 2021; Okon *et al*. 2021; Onyeneke *et al*. 2020), systematic literature review or meta-analyses was not the sole, but part of methods used by these studies. With regards to broad themes in the studies, five of the 20 systematic reviews discussed climate change, two on natural resource depletion, and all the nine livestock articles discussed the prevalence and spread of animal diseases and parasites (Table 1).

On authorship, some authors were lead in more than one of the systematic reviews; Onyeneke in two, Karshima in three, and Odeniran in three of the reviews. On local affiliation of the authors, 15 (75%) of the twenty reviews have locally affiliated authors as the first author although 95% of the twenty studies have at least one local author involved in the study. Similarly, for 17 of the twenty reviews where information on funding was available, 10 (i.e., about 60%) were not funded. In the rest of the funded studies, only one (Oruma *et al.*, 2021) had funding from a local, government organisation whereas the rest were foreign, multi-lateral or international nongovernment organisations (Table A, Appendix).
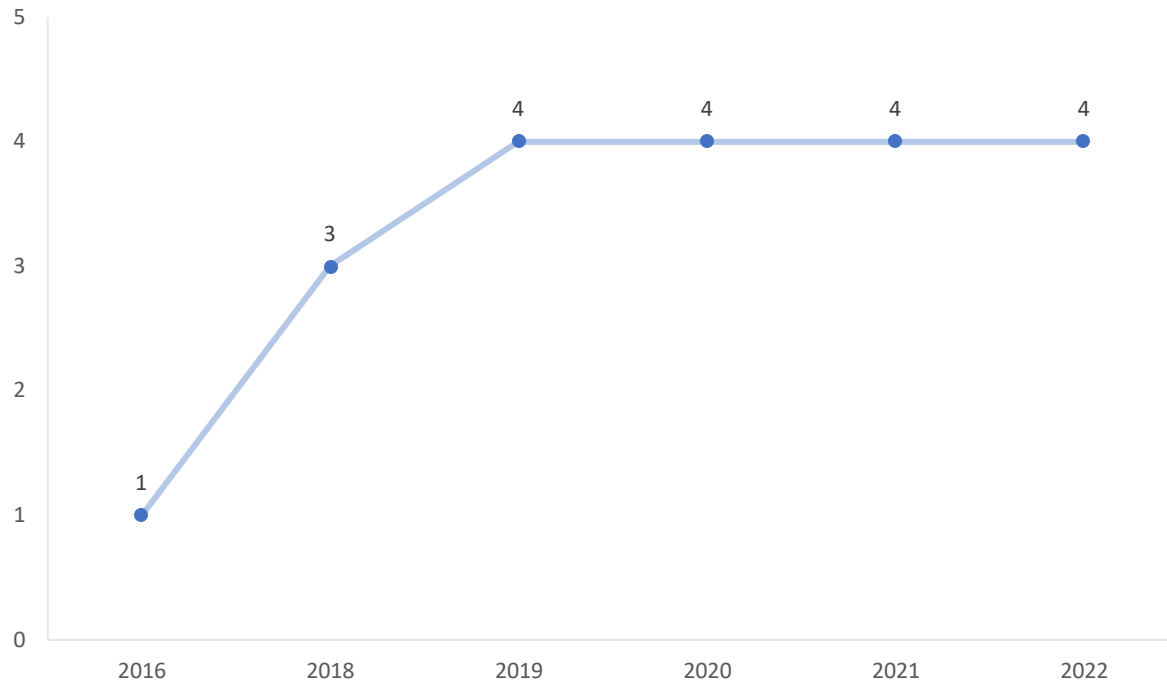
Figure 2 Number of systematic reviews and meta-analyses published per year

Systematic Reviews by Agriculture Sub-sector

Of the 20 systematic reviews, 9 were on livestock (de Gier *et al.* 2020; Esonu *et al.* 2022; Karshima 2019; Karshima *et al.* 2018; Karshima *et al.* 2020; Odeniran and Ademola 2018; Odeniran and Ademola 2019; Odeniran *et al.* 2021; and Oloso *et al.* 2018), 5 on general agriculture (Anugwa *et al.* 2022; Begho *et al.* 2022; Okon *et al.* 2021; Onyeneke *et al.* 2019; Onyeneke *et al.* 2020), 4 on crop (Ikehi *et al.* 2020*;* Ilesanmi and Akinmusola 2016; Morse 2020; Oruma *et al.* 2021), and 1 each on fisheries (Amadi *et al.* 2017) and forestry (Fitz *et al.* 2022) (figure 3). Although all these studies have implications for future research, in some it is unclear what the policy implications are. The studies mostly provide implications for future research although some also offer policy implication. For example, Anugwa *et al.* (2022) recommended gender-disaggregated effects of climate change on agriculture and gender-sensitive agricultural policies. Similarly, Esonu *et al.* (2022) highlighted the research gap on the economic impacts of Peste des Petits Ruminants and proposed strategies to control and eradicate the disease.

Out of the four systematic reviews that were crop-related, two of these were on yam; one on the factors limiting the adoption of a yam cultivation technique (Ilesanmi and Akinmusola 2016) and the other on the cost, revenue, and technical efficiency of yam production (Morse 2020). Ilesanmi and Akinmusola (2016) found that the adoption rate of Yam Minisetts was low due to farmers' low awareness, socio-economic status, and technical ability and recommended integrated farmer advisory (instead of only face-to-face extension) and reducing the cost of adopting the cultivation technique. On the other hand, Morse (2020) reported a technical efficiency of yam production in Nigeria of 0.6-0.8 and highlighted the importance of both inputs and farmer knowledge and experience. The two other studies discussed a road map to achieve fourth industrial revolution in crop farming through technology (Oruma *et al.* 2021) and the effects of

climate change-induced temperature and rainfall changes on agribusiness income in the Niger Delta (Ikehi *et al.* 2020).
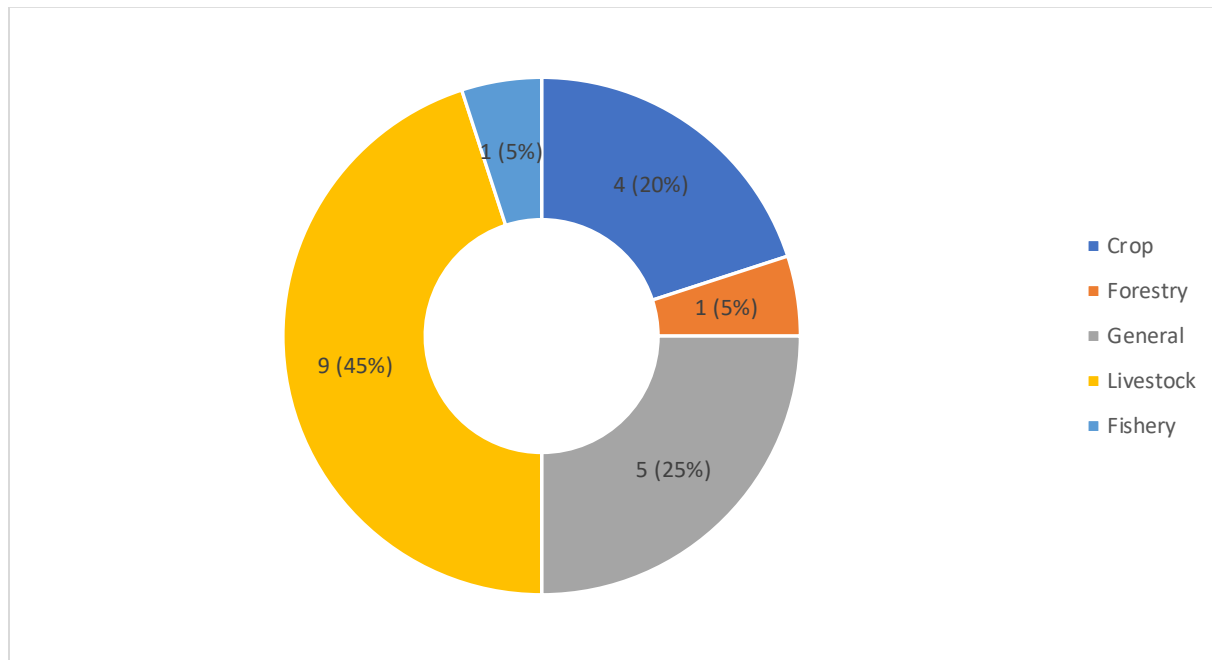

Figure 3 Areas of agriculture that the systematic reviews focus on

The only study on fisheries/aquaculture (Amadi *et al.* 2017) was on the streams in the Lower Guinea Forest of southern Nigeria. The authors reported that the previously rich local fish biodiversity is being depleted due to high level of deforestation, pollution, and aquaculture. Similarly, only one systematic review was on forestry (Fitz *et al.* 2022), specifically on the fragmentation of the forest in the protected Cross River National Park due to human activities (agriculture and logging) and subsequent impact on protected species and ecosystem services. They highlighted that current management practices have not achieved their objectives and recommended inclusion of local actors in subsequent conservation efforts.

All the nine studies on livestock discussed parasites and diseases: from distribution to economic impact and antimicrobial resistance (Table 1) although only few discussed the economic impact of these parasites and diseases. Most of these studies provided prevalence and geographic distribution data with the aim of informing control measures. The rest two were on antimicrobial resistance in livestock and the economic impact assessment of a small ruminant disease.

The general agriculture systematic reviews discussed agriculture and climate change: how gender is studied in this kind of research (Anugwa *et al.* 2022), how adaptation is measured (Onyeneke *et al.* 2019), and how vulnerability is measured (Onyeneke *et al.* 2020). Authors recommended that climate vulnerability research are disaggregated by gender, that policies addressing risks and welfare of farmers consider geographic and socio-economic differences, and investment in climate change research and resilience.

Table 1 Systematic reviews published on agriculture-related topics in Nigeria.

Area of the Article	Authors (Publication Year)	Article Title	No of Studies Accessed	Open Access	Study Motivation	Policy Implication/ recommendation
Crop	*Ikehi et al 2020*	Econometrics of climate change variables on the net income of agribusinesses in the Niger Delta region of Nigeria	129	No	The study aimed to understand the effects of climate change-related changes in rainfall and temperature on the net income from crop production in the Niger Delta area of Nigeria	Finding that as temperature increases and rainfall decreases income from crop production will decrease, study recommends climate change adaptation measures and setting up of climate change impact assessment committees at the local, state and federal levels
	Ilesanmi and Akinmusola (2016)	Factors limiting the yam minisett technique adoption: A review	56	Yes	The aim of this review was to understand the factors that has limited the adoption of Yam Minisetts technique by farmers around Nigeria.	Having found that that the adoption rate of the cultivation technique is affected by farmers' awareness, socio-economic status, and technical ability, authors recommended integrated farmer advisory more than just face-to-face and deploying technology to reduce cost of adopting the technique
	Morse (2020)	A meta-analysis of the technical efficiency of yam production in Nigeria	40, 26, and 28[a]	No	The authors aimed to produce the first meta-analysis of ware and seed yam production in Nigeria, factors influencing production, technical efficiency, and cost and revenue implications.	Author recommends more meta-analyses given the few already existing but also reports on the technical efficiency of yam production and the cost and revenue implications of growing yam in Nigeria
	Oruma et al. (2021)	Agriculture 4.0: An Implementation Framework for Food Security Attainment in Nigeria's Post-Covid-19 Era	91	Yes	Presentation of a road map/ implementation framework for the pursuit of Agriculture 4.0 (fourth agriculture revolution achieved through the adoption of technology and	Road map for the implementation of fourth agricultural revolution including the roles of each stakeholder in the achievement of the revolution.

					commercialisation of agriculture)	
Fisheries/ aquaculture	*Amadi et al. (2017)*	Freshwater fishes of Lower Guinean Forest streams: Aquaculture heavily impacts the structure and diversity of communities	16	No	The study, given the limited information on forest streams in the Niger river basin of southern Nigeria, the authors sought to produce information on the fish community, standard method for describing riverine fish biodiversity, and a baseline upon which future studies on changes in the ecosystem may be advanced	Although the authors found that the previously high fish biodiversity forest streams are being eroded because of deforestation, pollution, and competition of local species with foreign ones introduced through aquaculture, they do not state policy recommendations. The article was also thirty-seven pages with several tables and figures
Forestry	*Fitz et al. (2022)*	Increasing signs of forest fragmentation in the Cross River National Park in Nigeria: Underlying drivers and need for sustainable responses	16	Yes	Systematic literature review is part of two methods used in studying forest fragmentation and its drivers in a protected national park, knowledge of which was lacking according to the authors.	The study sought to contribute to nature conservation and management by providing knowledge on the state of Cross River National Park and factors responsible for forest fragmentation in the area. The study recommended further study, but highlighted the failure of current management practice and the reasons for the failure
Livestock	*de Gier et al. (2020)*	The continental atlas of tsetse and African animal trypanosomosis in Nigeria	133	No	There is no comprehensive nationwide database on tsetse and African animal trypanosomosis distribution are lacking which has implication for evidence-based disease control. Hence the study sought to bridge the identified gap	Continental atlas developed for Nigeria as a temporary planning and disease intervention tool as well as for assessment of effectiveness and impact of control measures (in the absence of more-recommended national atlas)
	Esonu et al. (2022)	Epidemiology of Peste des Petits	37	Yes	The aim was to summarise peer-reviewed literature on the	To inform the design and control strategies of the viral

	Ruminants in Nigeria: A Review			epidemiology of the viral disease called *Peste des petits ruminants* and identify research gaps.	disease. The authors identify research gaps (such as lack of information on the economic impact of the disease and lack of data in some areas in the country) and made recommendations on strategies to control and eradicate the disease.
Karshima (2019)	Helminths of zoonotic importance in slaughtered food animals in Nigeria: a systematic review and meta-analysis	42	No	The aim of the study was to consolidate information on animal-transmitted worms with public health implications and contribute to its control policies and ensure food safety	The study provided information on epidemiology and prevalence of livestock-transmitted worms in the geopolitical zones and recommended disease control policies related to agriculture and public health
Karshima et al. (2018)	Helminths of veterinary and zoonotic importance in Nigerian ruminants: a 46-year meta-analysis (1970–2016) of their prevalence and distribution	44	Yes	The aim of the study was to consolidate information on helminths of veterinary and human importance to assist in policies that control the parasites and reduce the economic losses from them	The study provided information on the prevalence of worms of veterinary and human importance in Nigeria and recommended disease control policies related to agriculture and public health
Karshima et al. (2020)	Toxoplasma gondii infections in birds, companion, food and recreational	28	No	The study aimed to understand the prevalence and geographical distribution of a parasite that causes diseases spread between humans and animals. Although the study assessed the parasite's prevalence in birds, companion, recreational, and food animals,	The study recommended integrated control strategies such as adequate sanitation and public enlightenment. The study highlighted limited studies/data in some regions.

				implications in sheep and goats include reproductive issues like abortion, stillbirth, and neonatal mortalities, which poses economic losses.	
Odeniran and Ademola (2018)	A meta-analysis of the prevalence of African animal trypanosomiasis in Nigeria from 1960 to 2017	74	Yes	To fill the gap of lack of national estimates for African animal trypanosomiasis and tsetse infection rate in Nigeria and provide data useful for assessing the success of the disease's control programmes	Recommendation was "use of PCR could give a higher prevalence due to its sensitivity."
Odeniran and Ademola (2019)	Epidemiology of Cryptosporidium infection in different hosts in Nigeria: A meta-analysis	64	No	This study aimed to understand the prevalence on a parasite that causes diarrhoea in both humans and animals. Though the protozoa affects both humans and animals, this study highlighted the parasite's prevalence in some livestock (cattle, sheep, goat, pig, and rabbit).	While the study reported prevalence in livestock and the parasite has implications on livestock, the focus is preventing transmission to humans. Hence, authors recommended continuous assessment and reporting of identified parasites and good management and sanitation practices.
Odeniran et al. (2021)	Economic impact assessment of small ruminant fasciolosis in Nigeria using pooled prevalence obtained from literature and field epidemiological data	12	No	Meta-analysis was part of the methods the authors used to study small ruminant fasciolosis vis-à-vis its epidemiology and financial loss implication in Nigeria	The authors computed the total estimated loss from the disease and recommended "strategic control measures and improved diagnostics" for early detection of the disease.
Oloso *et al* (2018)	Antimicrobial resistance in food animals and the environment in Nigeria: A review	59	Yes	The authors aimed to consolidate studies on antimicrobial residue and resistance in food animals/livestock (such as goat,	The authors proposed the standardisation of methods in reporting anti-microbial resistance, a multi-sector, one-health approach to promote

					cattle, poultry, pig, and fish) and the environment and drew implication for human health through a one health mechanism.	good practices and antimicrobial stewardship, animal production regulation, and improvement of biosecurity management.
General	Anugwa *et al.* (2022)	Gender perspectives in vulnerability of Nigeria's agriculture to climate change impacts: a systematic review	13	No	The study aimed to understand how gender is researched in the climate-induced agricultural vulnerability scholarship in Nigeria.	Apart from recommending more research on disaggregated effects of climate change vulnerability on agriculture to aid decision making, it also recommended a gender-sensitive agricultural policy
	Begho et al. (2022)	What do we know about Nigerian farmers' attitudes to uncertainty and risk? A systematic review of the evidence	39	Yes	The aim of the authors was to synthesise the literature on farmer risk and produce a holistic understanding of how risks affect farmer decision making	Finding that farmers' risk behaviour may differ by geographic, socio-economic, and household factors, authors noted that one-size-fits-all policy approach may be inefficient in addressing farmer risk or welfare issues. They also noted that since risk behaviour influence adoption of inputs and technology, reducing the source of risk through measures like insurance may be needed.
	Okon *et al* 2021	Systematic review of climate change impact research in Nigeria: implication for sustainable development	351[b]		Need for a climate change research database to facilitate knowledge-based approach to building resilience against climate change impacts and identify research gaps. The study assessed the status of CC impact research in Nigeria. The study combined systematic review with bibliometric	This qualitative systematic review comprehensively outlines the current state and trends of research on climate change in Nigeria and identified research gaps and government interventions needed to advance resilience towards climate change. The policy recommendations

				review. It was a study of general climate change research (categorised into agriculture, human, environment, and multi, but some emphasis placed on agriculture	include investment in research, ecosystem restoration, and reward for environmentally friendly practices as well as monitoring the impact of current strategies.
Onyeneke et al. (2019)	Climate change adaptation in Nigerian agricultural sector: A systematic review and resilience check of adaptation measures	95	Yes	To review climate change adaptation practices in Nigerian agriculture	The study reviews climate change adaptation practices in the agriculture sector in Nigeria but with unclear policy implication
Onyeneke et al. (2020)	Progress in Climate–Agricultural Vulnerability Assessment in Nigeria	20	Yes	Systematic literature review was part of the two methods used to understand how climate vulnerability vis-à-vis agriculture is studied and operationalised and their contribution to policy decisions.	The implication of this study is more for researchers than for policymakers

[a] Three different meta-analyses were conducted in one study using different numbers of studies for each.

[b] Although the study reported using 701 total original studies for their review, only 355 of them were related directly to agriculture

Discussion

Despite the potentials of systematic reviews in decision making, there is evidence that they are currently under-utilised (Vale *et al*. 2015). Their status in a developing context like Nigeria or in a sector like agriculture is also not well known which is why this research sought to understand the current state of systematic reviews that focus on agriculture and Nigeria.

The few peer-reviewed systematic reviews and meta-analyses studies retrieved from database searches may be an indication of low popularity of such type of evidence in Nigeria. Although it is beyond the scope of this research to answer if systematic reviews are used by policymakers, it can be argued that not enough systematic reviews currently exist in the peer-reviewed literature for each of the sub-sectors of agriculture in Nigeria. For instance, despite that yam, casava, rice, and beans are staples in Nigeria, only yam production is currently systematically reviewed with two studies in total. Morse (2020) highlighted this scarcity of systematic reviews in Nigeria in his meta-analysis for yam production and recommended that more such studies be conducted given the importance of agriculture in the country. Also, only about two-third of the studies were published as open access which may limit accessibility of policymakers to this resource. Accessibility is a commonly reported barrier to evidence use for policymakers (Cherney *et al*. 2015; Oliver *et al* 2014; Williamson *et al*. 2019), so publishing systematic reviews as open access may help address this.

Another point worth noting is that several of the systematic reviews are not funded and the few once funded are not by local/government organisations. According to Siddaway *et al*. (2019), systematic reviews are conducted either as an academic requirement in preparation for new studies or to synthesize the literature on a particular issue and draw conclusion. Furthermore, systematic reviews are either commissioned or curiosity driven (Haddaway and Pullin, 2014). However, about two-third of the systematic reviews retrieved in this study received no funding (Table 2, appendix) and only one of the five that received funding (Oruma *et al*. 2021) was from an agency of the government. Two others (de Gier *et al*. 2020; Esonu *et al*. 2022) received funding through multilateral and non-governmental organisations. This brings up the question of whether the production of systematic reviews is demand driven. It is possibly the case that government does not fund much systematic reviews on agriculture in Nigeria or that government-funded once are not published in the peer-reviewed literature. Further research is needed to understand if policymakers in Nigeria are aware of, interested in, fund, and use systematic review studies.

As noted in Siddaway *et al*. (2019), a systematic review should offer implications for policy and practice. Most of the systematic reviews and meta-analyses implicitly or explicitly drew implications for research while some do not offer clear implication for policy. The systematic reviews also hardly discuss economic implications even though some researchers (such as South and Lorenc 2020) have noted that this kind of information may be of importance to policymakers. It is essential that researchers who conduct systematic reviews make effort to enhance their usability by making sure it is relevant to policymakers. The evidence-based policy literature as also stressed the importance of relationships between researchers and policymakers (Tricco *et al*. 2015) as a facilitator of evidence use since it creates legitimacy and trust. Since usefulness and relevance of product of research are often stated as barriers to use of evidence to influence policymaking (South and Lorenc 2020; Wallace *et al* 2014) relationship may also facilitate discussion between the two group so that researchers are aware of and can focus on the priorities of policymakers when conducting systematic reviews. In many African countries, the presence of political will and need for evidence has been shown to facilitate evidence use in agricultural policymaking (Delgado *et al* 2019).

Producing systematic review is already a resource and time-consuming endeavour (Haddaway and Pullin 2014; Thomas-Walters *et al*. 2021) whereas policymakers do not have time and need to make quick

decisions (Buffardi *et al.* 2020; Newman *et al.* 2015). To increase the likelihood of use of systematic reviews by policymakers, some researchers (e.g., South and Lorenc 2020; Wallace *et al* 2014) have encouraged targeted messaging and summarising of key message of the review. One way of doing this is providing a page executive summary of key findings and implication for decision making (South and Lorenc 2020; Tricco *et al.* 2015). Others have also encouraged contextualising and tailoring of the evidence to the needs of the people and environment such reviews are produced (Tricco *et al.* 2015).

Conclusion

Systematic reviews are produced through a replicable and less biased process and can reduce the tendency for political and selective use of evidence in the policy process. Although they are currently being under-utilised by policymakers due to certain barriers, there is evidence that policymakers are interest in their use to inform policymaking. We have shown that there are currently limited peer-reviewed, agriculture-related systematic reviews and meta-analyses in Nigeria despite the contribution of agriculture to the economy. Even though this type of evidence may be one of several considerations in the policy process and may not be appropriate in all cases, they still present an objective way of summarising and making sense of the body of evidence to make more informed decision. In Nigeria, the policymakers may need to pay attention to and fund more of this kind of evidence as researchers also improve their relationship with policymakers, present the evidence to fit the needs of policymakers, and diversify on the areas of agriculture that is currently researched. Future study may extend the databases to include grey, unpublished, and non-peer reviewed articles to better understand availability of systematic reviews. Likewise, further research may be needed to ascertain the perception of policymakers about systematic reviews and their interest in using them in the decision-making process.

Appendix

Table A - Funding and authorship for each of the studies reviewed.

Area of the Article	Authors (Publication Year)	Funding	Lead Author Locally Affiliated	Any author locally affiliated
Crop	*Ikehi et al. (2020)*	*No funding information provided*	*Yes*	*Yes*
	Ilesanmi and Akinmusola (2016)	*No funding information provided*	*Yes*	*Yes*
	Morse (2020)	*Not funded*	*No*	*No*
	Oruma et al. (2021)	*National Information Technology Development Agency (NITDA); Covenant University Centre for Research, Innovation and Discovery (CUCRID)*	*Yes*	*Yes*
Fisheries/ aquaculture	*Amadi et al. (2017)*	*Institute for Development, Ecology, Conservation and Cooperation, Rome Italy*	*Yes*	*Yes*

Forestry	*Fitz et al. (2022)*	*University of Bern International 2021, Initiative of the Vice-Rectorate Development, University of Bern, Switzerland*	*No*	*Yes*
Livestock	*de Gier et al. (2020)*	*Food and Agriculture Organization of the United Nations Programme Against African Trypanosomosis and Regular Volunteer Programme*	*No*	*Yes*
	Esonu et al. (2022)	*African Livestock Productivity and Health Advancement (ALPHA) Initiative, co-funded by the Bill and Melinda Gates Foundation (BMGF) and Zoetis*	*Yes*	*Yes*
	Karshima (2019)	*Not funded*	*Yes*	*Yes*
	Karshima et al. (2018)	*Not funded*	*Yes*	*Yes*
	Karshina et al. (2020)	*Not funded*	*Yes*	*Yes*
	Odeniran and Ademola (2018)	*UK Government Commonwealth Scholarship (also University of Edinburgh Library provided database access)*	*Yes*	*Yes*
	Odeniran and Ademola (2019)	*Not funded (but acknowledged University of Edinburgh for library access because first author is a commonwealth scholar there)*	*Yes*	*Yes*
	Odeniran et al. (2021)	*Not funded*	*Yes*	*Yes*
	Oloso et al. (2018)	*University of Pretoria for the Doctoral Research Support Scholarship*	*No*	*Yes*
General agriculture	*Anugwa et al. (2022)*	*No funded*	*Yes*	*Yes*
	Begho et al. (2022)	*No funding information provided*	*No*	*Yes*
	Okon et al. (2021)	*Not funded*	*Yes*	*Yes*
	Onyeneke et al. (2019)	*Not funded*	*Yes*	*Yes*
	Onyeneke et al. (2020)	*No funded*	*Yes*	*Yes*

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