

Bibliometric Insights Into Agriculture And Artisanal Mining In Rural Communities

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Abstract.

Agriculture has become the focus of rural communities' livelihood, alongside artisanal mining. This study analyzes previous literature both three. The bibliometric method and VOSviewer software were used to analyze metadata from the Scopus database which the publication pattern tends to increase. Galvin Hilson is the most influential, prolific, and cited. The United Kingdom and the United States produced the most documents and had the highest citations. There are correlation between country, journal, and dominant topic. This article is limited to the Scopus database until early 2023. Further studies are recommended to micro topics on other types of artisanal mining in the global south.

Keywords: *Artisanal and small-scale mining, bibliometric analysis, rural livelihood, Scopus and VOSviewer*

I. INTRODUCTION

Agriculture tends to be one of the focuses of livelihood in rural communities. The government and policymakers consider this sector as a strategy to overcome poverty in several rural areas, including Africa (Hilson, 2012b, 2012a), India (Kesavan & Iyer, 2014; Kesavan & Swaminathan, 2008; Mukherjee et al., 2020; Paul et al., 2020), and Indonesia (Li, 2007, 2014; Rachman, 2011). However, many small farmers live at the subsistence level and are unable to support their households. Some are forced by "agricultural poverty" to diversify incomes and switch to non-agricultural economies, particularly artisanal mining (Eng, 2014; Hilson, 2012a; Hilson, 2016b, 2016c; Hilson et al., 2009; Manolache & Viorica Bedrule-Grigoruță, 2014). Artisanal mining is an unlicensed small-scale mining with simple technology managed by local communities (Hilson & Mcquillen, 2014). It is viewed negatively by the general public, triggering some condemnations for its activities (Hilson, 2016a). For example, mining is closely related to poverty, has a negative environmental and health impact, produces social conflicts, and does not support development programs. However, it holds a large amount of labor, generates substantial incomes for the poor, and is related to subsistence agriculture in rural areas (Buxton, 2013; Maconachie & Hilson, 2016). Agriculture and artisanal mining have an important relationship with rural communities. How did previous literature studies review it? This bibliometric study aims to bridge the use of software to find the gaps that could be of global scale relevance in mapping existing studies. Bibliometrics on this issue is limited. Morante-Carballo et al. (2022) conducted a bibliometric analysis of artisanal and small-scale mining but did not consider its relevance to agriculture.

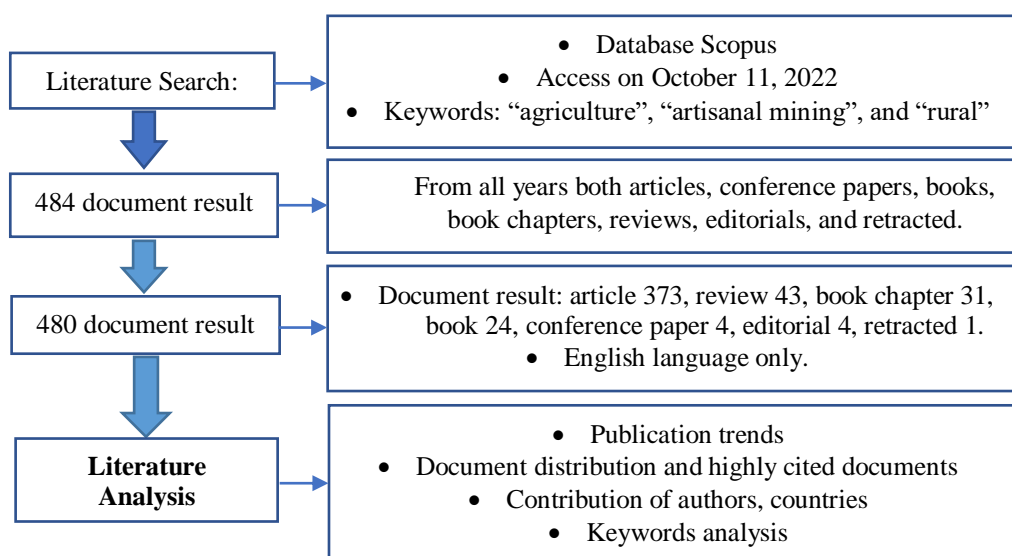
The *International Journal of Educational Research and Social Sciences* only published one bibliometric article, but it was outside the scope of this issue and analysis was limited (Kresnha Reza & Susanti, 2022). Although there have been bibliometric studies using VOSviewer (Cancino et al., 2017; Sun & Yuan, 2020; Wang et al., 2017), it does not cover this topic and the sources were mostly from Web of Science (Aleixandre-Tudó et al., 2018; Cancino et al., 2017; Liu et al., 2017; Sun & Yuan, 2020). This may be the first study to use bibliometric methodologies and VOSviewer to examine agriculture and artisanal mining in rural areas. The article could be a referral for researchers, policymakers, or science practitioners in

decision-making and planning for future studies or networking with authors related authors. This paper highlights the novelty of the current development in the subject of agriculture and artisanal mining and opportunities for further research, as well as bibliometric analysis of Scopus-indexed articles by integrating visualization analysis from VOSviewer software. This study aims to analyze the general trend of agriculture, artisanal mining, and rural publications in the Scopus database. It will answer a few questions, including “What are the publication trends in agriculture, artisanal mining, and rural studies?”, “Who are the influential authors on this topic?”, “Which documents are influential and contributing?”, “What keywords are predominantly used?”, and “What are the opportunities for the next topic of study?”.

II. METHODS

The bibliometric approach, which is a quantitative method specifically for document studies, was adopted (Waltman & Noyons, 2018). It evaluated a study and determined publications’ quality through citation statistical indicators (Onsunkentan, 2021; Padrós-Cuxart et al., 2016). So this research and development are useable for researchers, policymakers, and other stakeholders (Nandiyanto et al., 2020). This study started with a data search using the keywords “agriculture”, “artisanal mining”, and “rural” on October 11, 2022, across the Scopus database, as shown in *Figure 1*. The database was used because it tends to be a reference for literature searches with a high impact factor. Search criteria, which are limited to the English language only, are carried out on all publications, types of documents, and entire fields of science.

Fig 1. Retrieval process



The processing process used VOSviewer 1.6.16 software to analyze the literature. VOSviewer helps to mine large amounts of metadata, which is displayed as a visualization of bibliometric networks with the “Visualization of Similarity” (VOS) technique (van Eck & Waltman, 2014). This visualization validates a correlation as well as effectively conveys messages quickly and interestingly, thereby making information easier for readers to understand and remember (Ranjbar-Sahraei & Negenborn, 2017). It is in the form of network, overlay, and density visualization.

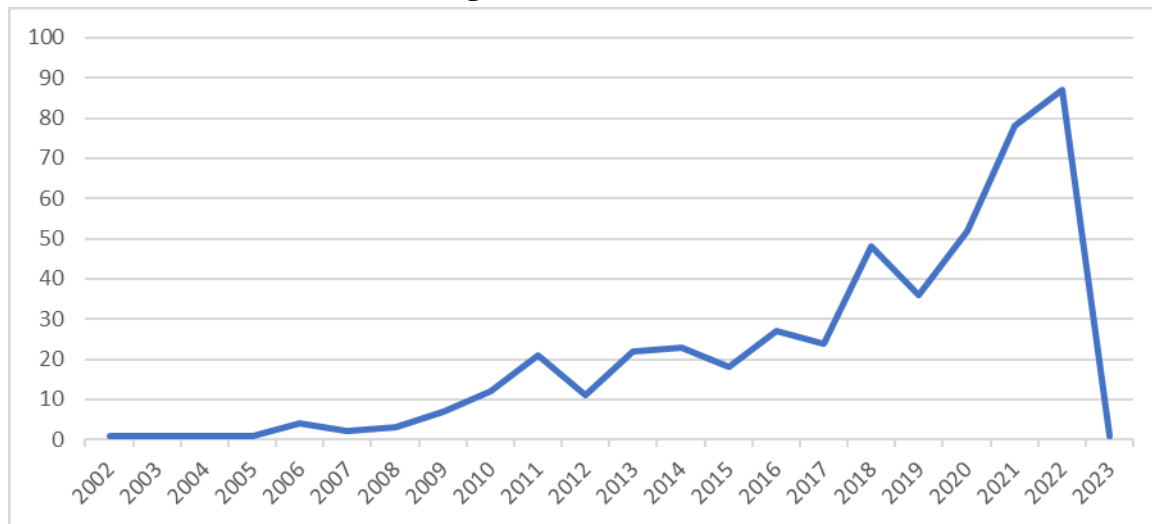
III. RESULT AND DISCUSSION

a. Publication trends

Scientific articles publications still dominated searches on agriculture, artisanal mining, and rural study by 78%, with a sample size of n=373. Other publication types are review (9%; n=43), book chapter (6%; n=31), book (5%; n=24), conference paper (1%; n=4), editorial (1%; n=4), and retracted (0%; n=1). A search on this topic returned 480 documents. Furthermore, the first publication by Scopus was by Mwanza & Kabamba (Mwanza & Kabamba, 2002) under the article “Poverty and rural marginalization in Africa South of the Sahara”. Even though the filter in the Scopus database only selected English-language studies, the

discussion of this study was in Belgian, and its title was English-based. The last publication was in 2023 with the work of Blanco et al. (Blanco et al., 2023) on “The impacts of mining on the food sovereignty and security of indigenous peoples and local communities: A global review”. It analyzed 403 studies to explain the combination of mining, social inequality, and weak environmental stewardship adversely affecting food sovereignty. Despite the fluctuations, the application of this topic seems to have increased. In 2022, 87 documents were produced from a study, as shown in **Figure 2**. This indicates that there are positive opportunities for discussion and publication of similar related topics.

Fig 2. Publication trends



b. Influential sources

The top 10 sources can be ranked based on the number of publications and citations. Most publications are in the form of scientific studies whose journals have all been indexed in the Scimago Journal and Country Rank (SJR) with Quartile 1 and 2 ratings. The *Extractive Industries and Society* (n=44; 877 citations), as well as the *Resources Policy* journals (n=27; 708 citations), occupy the first and second positions as the most published and also highest citation rates, as shown in **Table 1**.

Table 1. Influential journal by number of articles

Rank	Source	Q	H-index	Articles (A)	Citations (C)	Average (C/A)
1	Extractive Industries and Society	Q1	37	44	877	19,93
2	Resources Policy	Q1	80	27	708	26,22
3	Journal of Rural Studies	Q1	114	14	399	28,5
4	World Development	Q1	192	12	400	33,33
5	Journal of International Development	Q2	69	11	310	28,18
6	Land Use Policy	Q1	125	11	207	18,82
7	Environmental Science and Policy	Q1	126	11	149	13,55
8	Journal of Cleaner Production	Q1	232	10	250	25
9	Geoforum	Q1	125	8	230	28,75
10	Journal of Development Studies	Q1	93	7	199	28,43

c. Citation

Scientific journal articles dominate citations based on sources. A total of 9 out of the top 10 highly cited documents were scientific articles published between 2004 and 2018, as shown in **Table 2**. Froude & Petley (2018) have 557 citations, which is the highest, but it has no network. This is likely because fewer than 50 citations per document are published in a Scopus-indexed journal. This study reviews human disturbances, such as illegal mining and hill logging, those trigger landslides rather than climate change.

Table 2. Top 10 highly cited documents

Rank	Document	Title	Citations	Link
1	Froude M.J. (2018)	Global fatal landslide occurrences from 2004 to 2016	557	0
2	Bridge G. (2004)	Contested terrain mining and the environment	362	2
3	Lancy D.F. (2015)	The anthropology of childhood: Cherubs, chattel, changelings	313	1

Rank	Document	Title	Citations	Link
4	Hilson G. (2005)	Structural adjustment and subsistence industry artisanal gold mining in Ghana	215	15
5	Esdaile L.J. (2018)	The mercury problem in artisanal and small-scale gold mining	188	2
6	Eagles-Smith C.A. (2018)	Modulators of mercury risk to wildlife and humans in the context of rapid global change	166	3
7	Hilson G. (2014)	Four decades of support for artisanal and small-scale mining in Sub-Saharan Africa: A critical review	162	9
8	Hilson G. (2009)	Small-scale mining, poverty, and economic development in Sub-Saharan Africa: An overview	161	10
9	Schueler V. (2011)	Impact of surface gold mining on land use system in Western Ghana	157	3
10	Maconachie R. (2007)	Farming miners or mining farmers diamond mining and rural development in post-conflict Sierra Leone	151	14

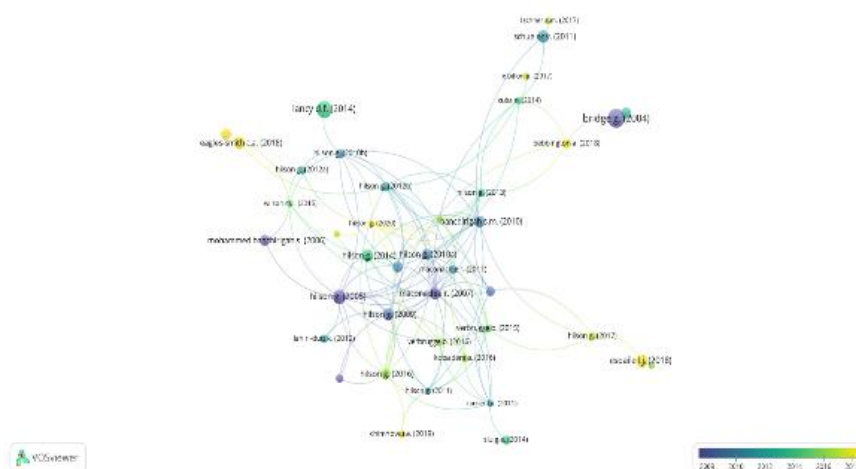
“The anthropology of childhood cherubs, chattel, changelings” by David F. Lancy (2015) is the only book in the top 10 highly cited documents. It contains a review of the children’s involvement in Bolivia mining and other countries to increase the income of low-income families, which impacts their low health level. In addition, many babies have died due to poor breast milk as a result of promiscuity in South African mining concessions. Regarding citations, see **Table 4.**, Galvin Hilson has the highest citation references and the most networks. Galvin Hilson’s three studies (Hilson, 2005; Hilson, 2009; Hilson & Mcquilken, 2014) focused on artisanal and small-scale gold mining in Sub-Saharan Africa.

Table 3. Top 10 prolific authors based on the number of citations

Rank	Author	Article (A)	Citation (C)	Average (C/A)
1	Hilson, Galvin	45	2220	49.3
2	Maconachie, Roy	13	598	46.0
3	Verbrugge, Boris	7	267	38.1
4	Lahiri-Dutt, Kuntala	6	194	32.3
5	Jønsson, Jesper Bosse	5	189	37.8
6	Hirons, Mark	10	162	16.2
7	Bryceson, Deborah Fahy	6	144	24.0
8	Van Bockstael	5	129	25.8
9	Fisher, Eleanor	6	129	21.5
10	Perks, Robert	5	96	19.2

The overlaid visualization of cited documents in **Figure 3.** validates the results of **Table 2.** Numerous citation references are represented in the form of a bigger circle for those below 2010. This view is limited to a minimum of 50 citations per document, resulting in 51 items not being networked with each other.

Fig 3. Overlay visualization by cited documents



The similarity of the references illustrates their strength and quality. From 55,170 cited references, five meet the threshold with a minimum of 20 citations, as shown in **Table 3.** Eleanor Fisher (2007) occupied the top spot as a joint reference among writers. Galvin Hilson (Banchirigah & Hilson, 2010; Hilson, 2005)

with Banchirigah (2008; Banchirigah & Hilson, 2010) has two studies included in the reference with Eleanor Fisher. Furthermore, *Journal Development and Change* is the widest choice of publication references compared to the *Extractive Industries and Society*.

Table 4. Top 5 highly co-citation by cited references

Rank	Authors	Cited Reference	Citations	Link
1	Fisher, E.	Occupying the margins: Labour integration and social exclusion in artisanal mining in Tanzania. <i>Development and Change</i> , 2007, 38 (4), pp. 735-760	37	44
2	Hilson, G. and Potter, C.	Structural adjustment and subsistence industry: Artisanal gold mining in Ghana. <i>Development and Change</i> , 2005, 36 (1), pp. 103-131	30	26
3	Tschakert, P. and Singha, K.	Contaminated identities: Mercury and marginalization in Ghana’s artisanal mining sector. <i>Geoforum</i> , 2007, 38, pp. 1304-1321	23	25
4	Banchirigah, S.M.	Challenges with eradicating illegal mining in Ghana: A perspective from the grassroots. <i>Resources Policy</i> , 2008, 33 (1), pp. 29-38	22	34
5	Banchirigah, S.M. and Hilson, G.	De-agrarianization, re-agrarianization and local economic development: Re-orientating livelihoods in African artisanal mining communities. <i>Policy Sciences</i> , 2010, 43 (2), pp. 157-180	20	21

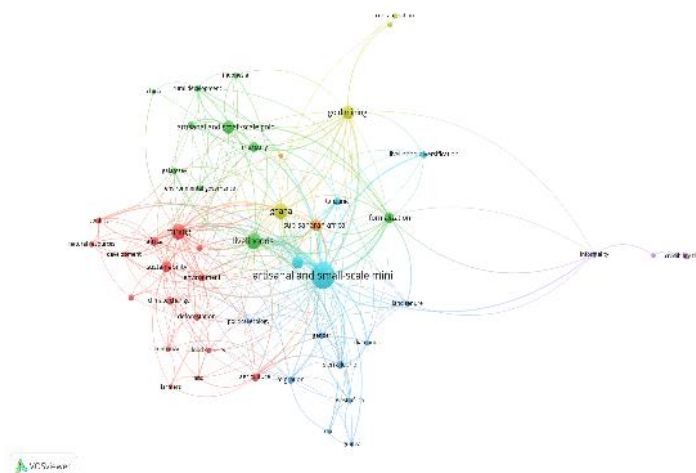
d. Productive country

There are 80 co-authorship countries with the United Kingdom (147 documents; 4,865 citations; 107 links) and the United States (87 documents; 2,342 citations; 83 links) producing the most documents, the highest citation rate, and the total link strength. Global North countries, such as the United Kingdom, United States, Canada, and Germany, dominate the production of the highest publications and referrals. From a total of 80 countries, 32 are interconnected. Authors from Indonesia (16 documents; 290 citations; 15 links) have a network with the United States, Australia, Canada, Brazil, Germany, Japan, and the United Kingdom. Meanwhile, Japan only networked with writers from Indonesia.

e. Hot issues and study trends

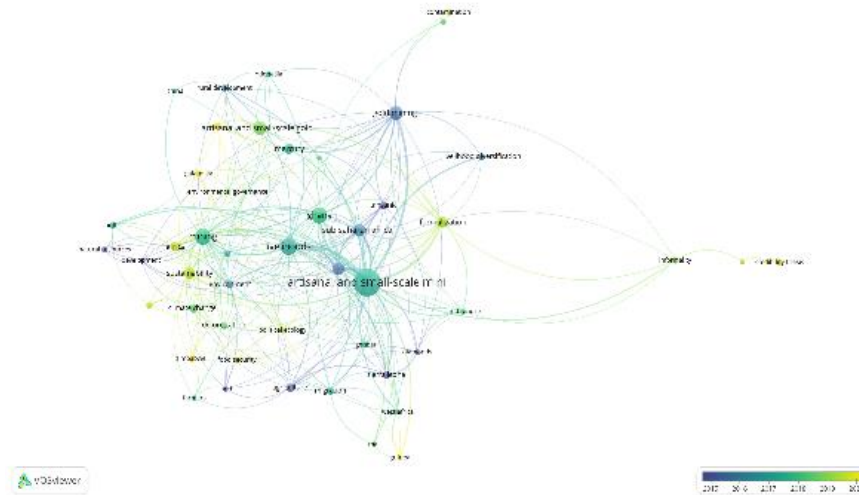
There are 1,202 keywords from the 480 documents. The minimum number of keyword occurrences was limited to 5, with 49 meeting the threshold and being divided into 7 clusters with close relationships, as shown in *Figure 4*. The red cluster has the most nodes, including Africa, Zimbabwe, agriculture, climate change, conflict, deforestation, development, environment, farmers, food security, land, mining, natural resources, resources extraction, sustainability, and sustainable development. The green clusters include artisanal and small-scale gold mining, Burkina Faso, China, environmental governance, formalization, galamsey, Indonesia, livelihoods, mercury, and rural development. Furthermore, the dark blue clusters include diamonds, gender, Guinea, land tenure, Mali, migration, political ecology, Sierra Leone, and West Africa. The Most Used Keywords Are “Artisanal And Small-Scale Gold Mining (Asgm)” With 115 Occurrences, 42 “Livelihoods”, And 41 “Ghana”. The Visualization Is Visible From The Magnitude Of Its Most Significant Nodes.

Fig 4. Network visualization author’s keywords



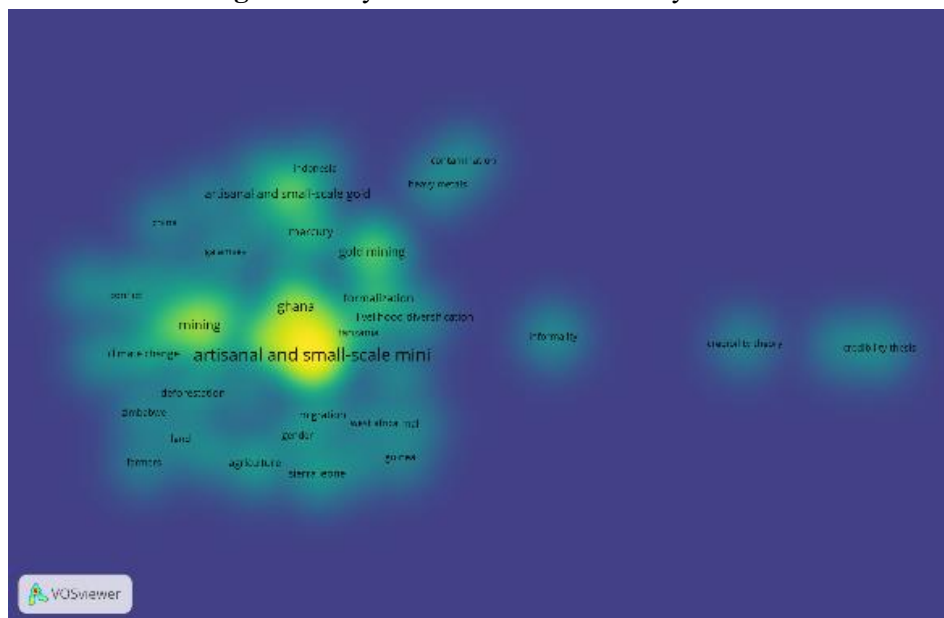
The development of this topic’s keyword usage is displayed through overlay visualization, as shown in **Figure 5**. Purple keywords, such as natural resources, development, land, agriculture, diamonds, Sierra Leone, and Tanzania, were topics around 2015. Meanwhile, current topics from 2020 and beyond are yellow, such as credibility thesis, institutional function, food security, gamamsey, Burkina Faso, Zimbabwe, and Guinea. The topic is still limited in the Scopus-indexed literature.

Fig 5. Overlay visualization author’s keywords



Density visualization indicates the density of this study topic, as shown in **Figure 6**. A more concentrated yellow color indicates that many studies using these keywords. The literature on agriculture, artisanal mining, and rural generally discussed artisanal and small-scale gold mining in Ghana, Africa. Furthermore, the discussion of artisanal mining is limited to gold and diamond mines. There are opportunities for further studies to discuss other types of artisanal mining, such as oil, tin, coal, or sand.

Fig 6. Density visualization author’s keywords



The keywords help map out common issues that have been and are rarely discussed on the topics of agriculture, artisanal mining, and rural. The focus of the study area and the next discussion include rural development, sustainable development, institutional function, political ecology, environmental pollution, natural resources, land tenure, livelihood diversification, food security, and Indonesia, whose narrative is still limited. Identifying keywords cannot capture the discussion of how each issue is explained and intertwined with each other. For example, the concepts of agriculture, livelihood diversification, and land tenure cannot reveal the type of agriculture practiced by the rural communities, either food or non-food-based, which further affects changes in the living system and its strategy. On the basis of keyword visualization, the

problems related to this topic are estimated in the structural order but do not capture or understand the cultural issues of society. This study did not show the landscape of colonial history and regimes of power arrangement in agricultural production and mining discourse. Furthermore, rather than focusing solely on questions of legality, the identities, values, and meanings of agriculture and artisanal mining in rural communities need to be discussed. Several African countries, including China and Indonesia, appear in keyword searches.

This is contrary to the global north countries, which are influential in publications, citation rates, and author affiliation countries on this topic. The implication is that the global south countries are still the domain of study objects by the global north. Agriculture and artisanal mining are still important livelihoods for rural communities in the global south in reducing unemployment and poverty rates (Bockstael, 2014; Buxton, 2013; Hilson et al., 2019). Therefore, viewing artisanal mining only as a production activity lacking legality permits for the state's income (foreign exchange) is inappropriate. It is quite difficult for the global south country to outperform the level of publications and citations. This is because the global north country has a track record and historicity related to study, infrastructure, funding, and publishing (Mongeon & Paul-Hus, 2016). According to Larivière et al. (2015), this country is also home to major commercial publishers, such as Sage Publication, Springer, and Elsevier. Currently, several global south countries, such as Indonesia, are attempting to enhance the quantity and quality of publications by providing incentives to studies successfully published in scientific journals of national and international repute. The requirements for career advancement and study graduation also require scientific publication in reputable journals. On average, writing and publishing scientific studies is shorter than publishing a scientific book. According to Larivière et al. (2015), books do not have a ranking, as with scientific journals. However, the reference requirements used for the past decade are considered less relevant for social science studies, whose development is slower in sciences. The most referenced and cited studies on this topic also showed the relevance of those published before 2010. This also makes scientific studies the prima donna of publication destinations compared to books and other works.

These influential countries tend to produce prominent writers as well. For example, Galvin Hilson, Mark Hirons, and Deborah Fahy Bryceson are from the United Kingdom. Borni-Dutt and Eleanor Fisher are from Australia, while Roy Maconachie is from England. These authors have more opportunities for publication and citations. The traces of experience conducting studies and the authors' position in reproducing knowledge also increased their bargaining position and public recognition. For example, Galvin Hilson, a Professor, and Chair of Sustainability in Business at the University of Surrey, United Kingdom, is the chief editor of the prestigious journal the *Extractive Industries and Society*, indexed by Scopus with a Quartile rating of 1. In this sphere, the circle of knowledge is constantly produced and reproduced through the power of hegemony.

IV. CONCLUSION

This study analyzed 480 bibliographies from all Scopus databases on agriculture, artisanal mining, and rural. The first publication was recorded in 2002 through the work of Mwanza and Kabamba, while the most recent 2023 was from Blanco et al. (2023). Scientific studies occupied the position of the most types of publications, influential, and cited documents. Froude and Petley (2018) and Bridge (2004) are the most cited articles, while Lancy (2015) is the only book in the top 10 cited category. The most influential author was Galvin Hilson, with numerous achievements in this topic, such as excelling in publication, citation rate, total link strength, and co-citation by cited references. This study showed that the prominent authors are positively correlated with influential countries. Furthermore, the United Kingdom and the United States are the most productive countries in terms of publications, high citation rates, and numerous networks. This study showed a positive relationship between influential countries, publications, and citations.

Elsevier, the publisher of the most reputable journals, also made the United Kingdom an influential country in this study topic. Similarly, the *Extractive Industries and Society* and the *Journal Resources Policy* are the most sources of publication and the highest citations. The most commonly used keywords are "artisanal" and "small-scale gold mining", with a locus of study in Africa. Furthermore, there are still limited

studies on other types of artisanal mining in the global south with more micro issues. Further studies can discuss rural and sustainable development, livelihood diversification, food security, and artisanal mining studies in Indonesia. This bibliometric method contributes to mapping of publication trends, hot issues, prolific authors, documents, sources, and influential countries. However, it is limited in answering “how” and “why” questions. Further studies are required to enrich the explanation of the results with content analysis and critical perspectives to complement this study. Comparative studies of other bibliometric analyses using different software and data sources are also recommended.

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