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by Krisna Murti

A Bibliometric Analysis of Scientific Literature on Livelihood Adaptation in ASEAN Countries During the COVID-19 Pandemic

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ABSTRACT

COVID-19 has significantly impacted people's livelihoods, affecting not only health but also economic and living conditions. This research aims to survey scientific literature to uncover general trends and analyse livelihood indicators during 2019. Employing a bibliometric methodology, this paper draws upon data from the Scopus database up until 2022 and visualises the data using VOSviewer. During the COVID-19 period, the study identified 101 articles penned by authors from ASEAN countries on the topic of livelihood. The findings suggest that the most influential article is "Livelihood and COVID-19 in ASEAN Countries," authored by Wang C. and Harris J. Moreover, the most influential author is Wang C., who wrote "The Impact of the COVID-19 pandemic on the Physical and Mental Health of Asians: A Study of Seven Middle-Income Countries in Asia" in 2021, which has garnered 102 citations within the research topic. By mapping the linkages between keywords, this study discovered that a significant body of research on this topic continues to focus on environmental issues related to human interaction. Therefore, this study encourages scholars to delve deeper into livelihoods based on food security, as many individuals struggle to find food during regional restrictions imposed due to COVID-19, and to broaden research into the most recent livelihood adaptations in relation to their social environment.

1. INTRODUCTION

COVID-19 has caused significant economic disruption [1] as businesses and day-to-day activities have ground to a halt [2]. People are urged to stay indoors and maintain social distancing when procuring essential items [3, 4]. The stark contrast between the monthly living costs and earnings in Laos and Singapore, ranging from US$ 119 to US$ 3,547 [5], illustrates the socioeconomic disparities among ASEAN residents. Comprehensive fiscal measures are necessary to combat the disease, as the ability to endure economic disruption heavily depends on the social and economic aspects of ASEAN members [6, 7].

Since the first confirmed case of COVID-19 in March 2020, the impoverished communities of South Asia have been particularly vulnerable [8]. Lower-income populations are believed to have weaker immune systems and reside in densely populated areas, increasing their infection risk [9]. The Southeast Asian nations of Brunei, Burma (Myanmar), Cambodia, Timor-Leste, Indonesia, Laos, Malaysia, the Philippines, Singapore, Thailand, and Vietnam are grappling with a health crisis due to COVID-19. Their governments have strategies to respond and mitigate risks, along with vaccination guidelines for their populations [10].

This article emphasizes a concept of critical relevance in ten ASEAN nations: community livelihood (CL). The notion of 'livelihoods' originated in the early 1990s in international development literature, following the pioneering research on Sustainable Rural Livelihoods by Chambers [11]. The paradigm has evolved to encompass poverty reduction, increased participation, and sustainable development advancement [12]. As the concept of sustainable livelihoods gained traction in the late 1990s, numerous organizations, including UNDP, FAO, the World Food Program, DFID, CARE International, and Oxfam, advocated for sustainable livelihoods [13, 14]. The 1992 United Nations Conference on Environment and Development adopted three elements (social, economic, and environmental) as the overarching goals for sustainable livelihoods [15].

While various definitions of sustainable livelihoods exist, there is consensus that the concept encompasses social, economic, and environmental factors. The notion of livelihoods is defined as "the means of earning a living" [16], while incorporating the aspect of sustainability [17], implying sustainable livelihoods consider the capacity to adapt to and recover from stressors and shocks, and maintain or enhance resources and capabilities.

Literature has shown that sustainable livelihoods are crucial for community development [17], focusing on alleviating poverty and pursuing sustainable development goals [16]. For

Aboriginal communities in Northern Australia, livelihood [18] and livelihood strategies [19] facilitate analysis of community perspectives on the use of water rights and identification of intra- and inter-community issues. South Africa's national park-dependent communities are marginalized due to the Namibian government's intent to foster tourism-based economic benefits [20]. This literature underscores the vulnerability of indigenous populations, which impacts their lifestyle [21].

The aim of this study is to explore the bibliographic characteristics and content of the articles [22]. Bibliometric analysis refers to a statistical evaluation of published scientific papers, books, or book chapters, and is an effective method for determining a publication's impact in the scientific community [23-25]. This paper investigates the presence of the first paper published in 2020 up to the most recent paper published in 2022 in ten ASEAN countries that conducted research on community livelihood during COVID-19. This paper focuses on three keywords: community livelihood, COVID-19, and ASEAN countries. Hence, the objective of this study is to survey scientific literature to uncover general trends and analyse indicators related to community livelihood during COVID-19. This study also serves as a foundation for future research on community livelihood during COVID-19.

2. METHODS

Descriptive research method was used in this article using bibliometric analysis [26, 27] and content analysis [28, 29] to analyze scientific literature [30, 31]. This study also stressed numerical data or figures used in descriptive research to establish the significance of the topic overview under examination. In this scenario, the data obtained includes all of the metadata supplied in the article as well as the Scopus database's literature sources (see Figure 1). Scopus was chosen because it had more indexed texts. This bibliometric study analyzed trends and visualized the findings using Excel and VOSviewer [31]. Although VosViewer is useful, it has limitations and relies on data from external sources (e.g., Web of Science, Scopus) to generate bibliometric networks. The quality and coverage of the bibliographic data can affect the accuracy and comprehensiveness of the resulting networks. Inaccuracies in the data can lead to biassed or incomplete visualisations.

The search strategy is used to identify publications in the Scopus database with a Boolean operator search operation as follows: (1) keyword "livelihood" AND "covid", (2) countries: 10 ASEAN countries, (3) type of documents: article, conference paper, and book chapter, (4) language: English. The data for this paper were obtained from the Scopus database on the 10th of Mei 2022 because Scopus is the most commonly used database for bibilometric analysis and provides broad interdisciplinary coverage [32]. In the first stage, the words or phrases "livelihood" and "COVID-19" were found in the titles, abstracts, and keywords of the documents, generating 933 articles. The following stage was to limit publication categories as articles, books, book chapters, and proceedings by synthesizing only in 10 ASEAN countries: Indonesia, Malaysia, Singapore, Thailand, Philippines, Viet Nam, Cambodia, Myanmar, Lao PDR, and Brunei Darussalam (101 documents were obtained in the 2nd stage) (see Figure 1). Furthermore, this study looked at the overall trend of publication and analyzed key indicators such as journal distribution, the impact index of influential journals, highly cited articles, the average number of articles, the average number of citations per year, influential countries, and influential authors. In addition, VOSviewer software was utilized in this article to analyze and display the citation network across journals, author network among nations, and keyword co-occurrence network [31].
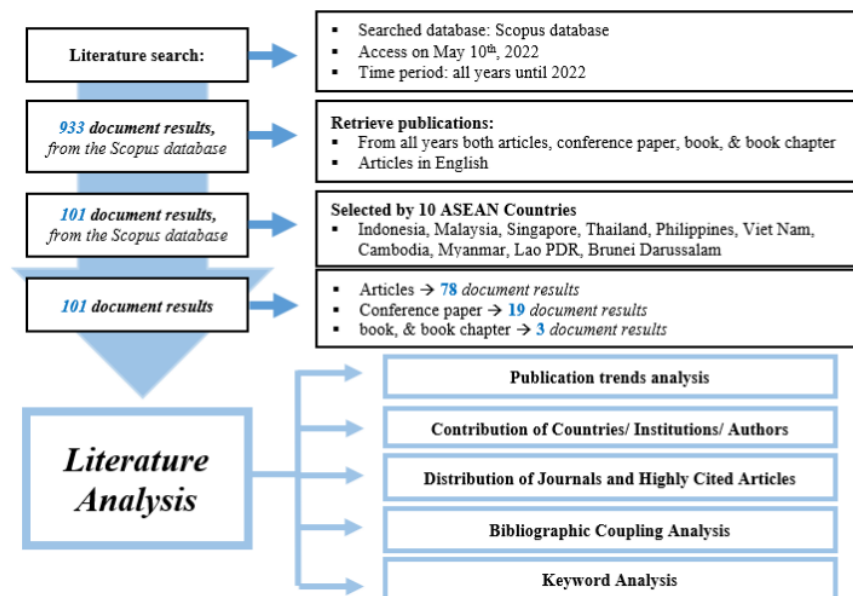

Figure 1. The study's retrieval procedure

3. RESULT AND DISCUSSION

3.1 Publication trend

The bibliographic analysis of 101 livelihood during COVID-19 pandemic articles revealed on the Scopus database that the first article was published in 2020 or one year after COVID-19 spread worldwide (see Figure 2). In 2021, a lot of publication related to livelihood was written by researcher (75 articles) and until May 2022, around 13 articles were written in 10 ASEAN Countries.

3.2 Distribution of journals and highly cited articles

The sample in this paper was drawn from ASEAN country search results for the keywords "livelihood" and "COVID-19," and it included 101 articles with 721 citations. The most influential journals in this paper are defined as the top 11 journals in two categories: the journal with the most articles (Table 1) and the journal with the most citations (Table 2). The top rank, as well as the appearance of several journals in these two categories, are the emphasis of this research. PLoS ONE

(United States), Parks (Switzerland), Asian Fisheries Science (Malaysia), Marine Policy (United Kingdom) and Ocean and Coastal Management (United Kingdom) as the Five journals delivering competent research which regularly featured in the two categories of the most important journals. Furthermore, the results obtained using the VOS Viewer analysis were nearly identical. The network considers PloS ONE as a significant journal. The five journals were extracted from distinct clusters, with each cluster being represented by one journal (see Figure 3).
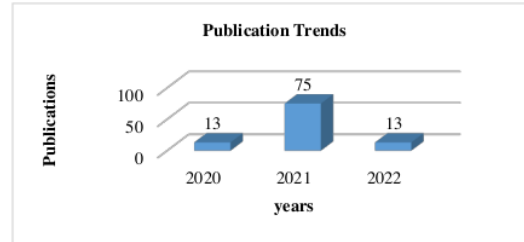

Figure 2. Publication trends

Table 1. Influential journals based on number of articles

Rank	Name of Journal/Book	Country Publisher	Number of Articles (A)	Number of Citations (C)	Average (C/A)	Quartile	H-Index	SJR 2021 Impact
1	IOP Conference Series: Earth and Environmental Science	United Kingdom	12	3	0.25	non Q	34	0.2
2	Sustainability	Switzerland	5	7	1.40	Q1	109	0.66
3	Forest and Society	Indonesia	4	6	1.50	Q2	10	0.45
4	Parks	Switzerland	4	96	24.00	Q2	16	0.74
5	Marine Policy	United Kingdom	3	20	6.67	Q1	104	1.17
6	Advances in Food Security and Sustainability	Singapore	2		0.00	Book Chapter, Elsevier		
7	Agricultural Systems	United Kingdom	2	10	5.00	Q1	118	1.55
8	Asian Fisheries Science	Malaysia	2	21	10.50	Q3	9	0.3
9	E3S Web of Conferences	France	2	4	2.00	non Q	28	0.24
10	Ocean and Coastal Management	United Kingdom	2	28	14.00	Q1	90	0.97
11	PLoS ONE	United States	2	104	52.00	Q1	367	0.85

Table 2. Influential journals based on number of citations

| Rank	Name of Journal/Book	Country Publisher	Number of Articles (A)	Number of Citations (C)	Average (C/A)	Quartile	H-Index	SJR 2021 Impact
1	PLoS ONE	United States	2	104	52.00	Q1	367	0.85
2	Parks	Switzerland	4	96	24.00	Q2	16	0.74
3	Food Security	Netherlands	1	66	66.00	Q1	56	1.39
4	Energy Policy	United Kingdom	1	63	63.00	Q1	234	2.13
5	Chaos. Solitons and Fractals	United Kingdom	1	62	62.00	Q1	147	1.65
6	One Health	Netherlands	1	56	56.00	Q1	29.00	1.15
7	Ocean and Coastal Management	United Kingdom	2	28	14.00	Q1	90	0.97
8	Aquaculture Reports	Netherlands	1	27	27.00	Q1	27	0.61
9	Asian Fisheries Science	Malaysia	2	21	10.50	Q3	9	0.3
10	Marine Policy	United Kingdom	3	20	6.67	Q1	104	1.17
11	Applied Economic Perspectives and Policy	United States	1	19	19.00	Q1	52	1.52
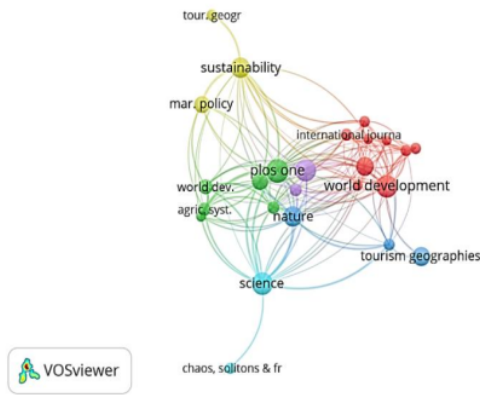
Figure 3. Citation network among journals (links)
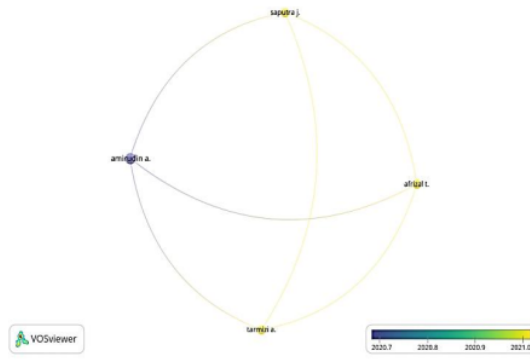

Figure 4. Overlay visualization of co-authorship

Table 3. Most highest author's paper

No	Author	Institutions	Number of Document	Number of Citation	Quality of Paper
1	Amirudin A.	Department of Anthropology, Faculty of Humanities, University of Diponegoro	3	5	1.67
2	Lau J.	School of Medicine, National University of Singapore, Singapore	3	21	7.00
3	Afrizal T.	Faculty of Social and Political Sciences, Universitas Diponegoro, Indonesia	2	5	2.50
4	Saputra J.	Economics and Social Development, Faculty of Business, Universiti Malaysia Terengganu, Malaysia	2	5	2.50
5	Tarmizi A.	Faculty of Social and Political Sciences, Universitas Islam Riau, Indonesia	2	5	2.50
6	Aditya B.	Faculty of Geography, Universitas Gadjah Mada, Indonesia	2	5	2.50
7	Amri I.	Faculty of Geography, Universitas Gadjah Mada, Indonesia	2	5	2.50
8	Pitoyo A.J.	Center for Population and Policy Studies, Universitas Gadjah Mada, Indonesia	2	5	2.50
9	Kasan N.A.	Institute of Tropical Aquaculture and Fisheries, Universiti Malaysia Terengganu, Malaysia	2	27	13.50
10	Muawanah U.	Agency of Marine and Fisheries Research and Human Resources Development, Ministry of Marine Affairs and Fisheries, Indonesia	2	37	18.50
11	Sugardjito J.	Centre for Sustainable Energy and Resources Management, Universitas Nasional, Indonesia	2	6	3.00

Table 4. Most highest author's citation

No	Author	Institutions	Number of Document	Number of Citation	Quality of Paper
1	Wang C.	Institute of Cognitive Neuroscience, Faculty of Education, Huaibei Normal University, China	1	102	102.00
2	Harris J.	World Vegetable Center, Thailand	1	66	66.00
3	Hoang A.T	Institute of Engineering, Ho Chi Minh City University of Technology (HUTECH), Viet Nam	1	63	63.00
4	Asamoah J.K.K.	African Institute for Mathematical Sciences, Accra-Ghana	1	62	62.00
5	Shrestha N.	Department of Biostatistics and Epidemiology, University of North Texas Health Science Center, United States	1	56	56.00
6	Hockings M.	School of Earth and Environmental Sciences, University of Queensland, Australia	1	56	56.00
7	Spenceley A.	School of Tourism and Hospitality, University of Johannesburg	1	27	27.00
8	Campbell S.J.	Research Centre for Social Systems, Shinshu University, Japan	1	27	27.00
9	Waiho K.	Institute of Tropical Aquaculture and Fisheries, Universiti Malaysia Terengganu, Malaysia	1	27	27.00
10	Liverpool-tasie I.S.O.	Department of Agricultural, Food, and Resource Economics, Michigan State University, United States	1	19	19.00
11	Basset H.R.	School of Aquatic and Fishery Sciences, University of Washington, United States	1	18	18.00

3.3 Influential author

The technique of co-authorship analysis is used to determine the collaborative ties that exist between authors, affiliated institutions, and countries. The 101 papers in the dataset were written by 575 different authors. The fractional counting approach was used to construct a visual map of co-authorship, with the minimum number of articles for an author set to two and eleven authors reaching the criteria. Figure 4 depicts five networks of authors who have collaborated on the publication of papers on the topic. Although co-authorship analysis can uncover collaborative links, it may not offer comprehensive insights into the nature or quality of these partnerships. To gain a deeper understanding, supplementary qualitative analysis may be necessary.

Table 3 shows that the eleven most influential authors are divided into two groups. The author influencer related to highest document on community livelihood research in ASEAN countries are Muawanah U form Japan were the QP is 18.50, The second influencer author is Kasan N.A from Malaysia were the QP is 13.50 and third author is Lau j. from Singapore. Moreover, the five most-cited authors were Wang, C., Harris, J., Hoang, A.T., Asamoah, J.K.K. (see Table 4).

3.4 Author's contributions based on their countries of origin

According to the database, fifteen ASEAN countries are conducting COVID-19-related livelihood research. In terms of international cooperation, a visual map of nation co-authorship linkages was created to demonstrate partnership patterns and nations with the most publications on the subject. To create a more informative map, partial counting methods were used, with the minimum number of publications for each nation set at three. Eleven of the 72 nations in the sample satisfied the requirements. As illustrated in Figure 5, the United States is the biggest node, signifying the country with the most articles.

Furthermore, the map is divided into two clusters of countries where scholars collaborated on publications: (i) Australia, Canada, Indonesia, Kenya, Singapore, the United Kingdom, and the United States; and (ii) Bangladesh, China, India, Malaysia, Myanmar, the Philippines, and Vietnam. These clusters imply increased collaboration within continents and decreased collaboration across geographical borders.
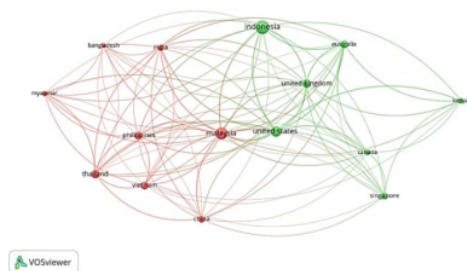
Figure 5. Co-authorship analysis network map on countries

But if we identify the majority of the author's research related community livelihood during COVID-19 in ASEAN Countries came from Indonesia, there are around 39 publications in the Scopus database, and Malaysia is the second most prolific author with 31 papers (Figure 6).
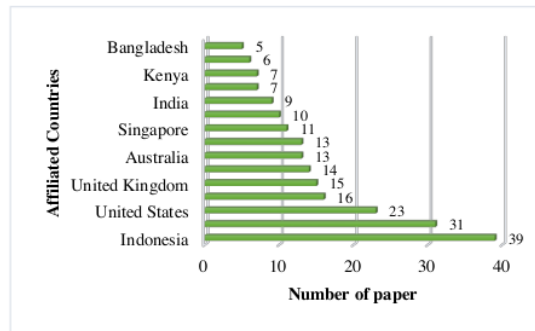
Figure 6. Stick bar graph author country publisher

3.5 Bibliographic coupling analysis

This sort of study looks at the bibliographic patterns of one article that is cited by two others. The purpose of bibliographic coupling is to acquire a more accurate picture of the present status of the study topic [33]. This set of bibliographies looks at four analytical units: publications, articles references, and organization.

Wang et al. [34] have written the article title "The impact of COVID-19 pandemic on physical and mental health of Asians: A study of seven middle-income countries in Asia" in the years of 2021 in PLoS ONE which has 102 citations. The second most cited article by Hoang et al. [35] was "Impacts of COVID-19 pandemic on the global energy system and the transition to renewable energy: Opportunities, challenges, and policy implications" in 2021 in Energy Policy journal, which has 63 citations and Harris et al. [36] has 66 cited in 2020, which article title is "food system disruption: initial livelihood and dietary effects of COVID-19 on vegetable producers in India" (see Table 5).
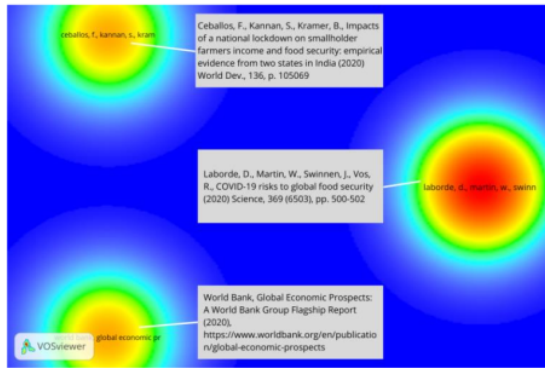
3.6 Co-citation analysis

The conceptual structure of a research subject is mapped out using co-citation analysis, which is based on the interconnection of cited authors, sources, and references [37]. The citation analysis, in particular, takes into account the references indicated in the 101-paper sample. As a consequence, a co-citation link shows that both things are referenced in the same text.

Due to the tiny sample size of the current study, co-citation analysis is effective in finding significant publications, journals, and authors in the research domain. The analysis of 760 cited references yielded 12 that met the threshold using the full counting method and a minimum number of citations for a cited reference of two (see Figure 7). The three most frequently cited references were: Ceballos, F., Kannan, S., Kramer, B. [38] (total link strength: 3); Laborde, D., Martin, W., Swinnen, J., Vos, R. [38] (2) and World Bank [39] (2).
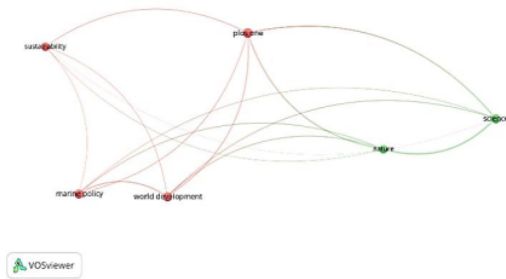
In terms of cited journals, a co-citation analysis was performed using a full counting method. A co-citation analysis of referenced journals was done using a complete counting approach. The minimum number of citations required for a journal was set at 25, resulting in six cited journals and a more relevant network analysis of the referenced journals. Figure 8 shows that the most cited journals were Nature (124 citations), Science (109), and PloS One (105).

Table 5. Top 15 articles on "community livelihood during COVID-19" with the most citations

Rank	Author	Title	Year	Source Title	Scopus Quartile	Document Type	Total Citations	TC/Y
1	Wang C.	The impact of COVID-19 pandemic on physical and mental health of Asians: A study of seven middle-income countries in Asia	2021	PLoS ONE	Q1	Article	102	102.00
2	Harris J.	Food system disruption: initial livelihood and dietary effects of COVID-19 on vegetable producers in India	2020	Food Security	Q1	Article	66	33.00
3	Hoang A.T.	Impacts of COVID-19 pandemic on the global energy system and the shift progress to renewable energy: Opportunities, challenges, and policy implications	2021	Energy Policy	Q1	Article	63	63.00
4	Asamoah J.K.K.	Global stability and cost-effectiveness analysis of COVID-19 considering the impact of the environment: using data from Ghana	2020	Chaos, Solitons and Fractals	Q1	Article	62	31.00
5	Shrestha N.	The impact of COVID-19 on globalization	2020	One Health	Q1	Article	56	28.00
6	Hockings M.	COVID-19 and protected and conserved areas	2020	Parks	Q2	Article	56	28.00
7	Spenceley A.	Tourism in protected and conserved areas amid the COVID-19 pandemic	2021	Parks	Q2	Article	27	27.00
8	Campbell S.J.	Immediate impact of COVID-19 across tropical small-scale fishing communities	2021	Ocean and Coastal Management	Q1	Article	27	27.00
9	Waiho K.	Potential impacts of COVID-19 on the aquaculture sector of Malaysia and its coping strategies	2020	Aquaculture Reports	Q1	Article	27	13.50
10	Liverpool-Tasie L.S.O.	Essential non-essentials: COVID-19 policy missteps in Nigeria rooted in persistent myths about African food supply chains	2021	Applied Economic Perspectives and Policy	Q1	Article	19	19.00
11	Bassett H.R.	Preliminary lessons from COVID-19 disruptions of small-scale fishery supply chains	2021	World Development	Q1	Article	18	18.00
12	Paul A.	Psychological and Livelihood Impacts of COVID-19 on Bangladeshi Lower Income People	2021	Asia-Pacific Journal of Public Health	Q3	Article	16	16.00
13	Belton B.	COVID-19 impacts and adaptations in Asia and Africa's aquatic food value chains	2021	Marine Policy	Q1	Article	15	15.00
14	King C.	Reimagining resilience: COVID-19 and marine tourism in Indonesia	2021	Current Issues in Tourism	Q1	Article	13	13.00
15	Bondad-Reantaso M.G.)	Viewpoint: Sars-cov-2 (the cause of COVID-19 in humans) is not known to infect aquatic food animals nor contaminate their products	2020	Asian Fisheries Science	Q3	Article	11	5.50

Figure 7. Density visualization of the co-citation analysis on cited papers

Figure 8. Co-citation analysis network map on cited journals
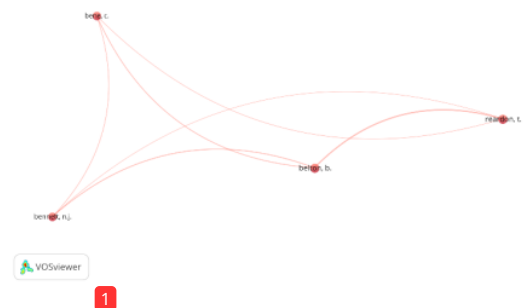
**Figure 9.** The co-citation analysis on authors' network map

In terms of co-cited authors, all of the authors cited in the sample of 101 papers were subjected to a co-citation analysis. The minimum number of citations for an author was set at 16, resulting in a four-author co-citation network (see Figure 9). Belton (64 citations), Reardon, T. (44 citations), Bennet, N.J. (29 citations), and Bene, C. (27.)

3.7 Keywords analysis

3.7.1 Author keyword analysis

Author keywords are keywords that scholars provide that best represent the main idea of an article [40]. As a consequence, an analysis of the prevalence of author keywords was performed in order to appreciate the emphasis of the studies and concerns addressed in the COVID-19 study on community livelihood. The complete counting approach was utilized, and each keyword's occurrence was set to two,

resulting in 338 author keywords, 38 of which fulfilled the keyword criterion.
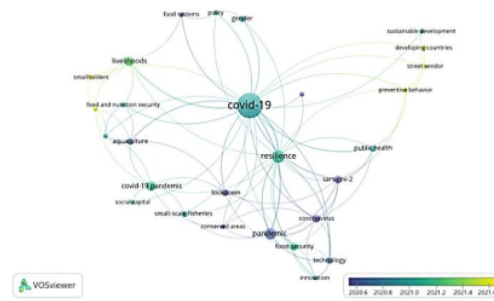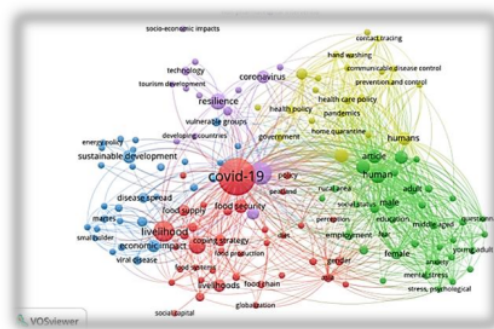

Figure 10. Overlay visualization of the occurrence of author keywords

3.7.2 Co-occurrence of keyword analysis

By finding the links between terms and the frequency of two or more keywords that appear together in the same literature, keyword co-occurrence analysis can be used to understand the research status and trends in a certain topic. The full counting method was used for keyword co-occurrence analysis (including both author and index keywords), yielding 830 keywords, of which 152 were chosen for analysis.

In network visualization (Figure 10), community livelihood during COVID-19 in ASEAN nations literature was divided into 5 clusters based on chronological order, with cluster 1 (red) being the most closely connected to the theme of community livelihood during COVID-19 pandemic. The keywords in cluster 1 are: adaptive management, aquaculture, coping strategy, developing world, diet, economic aspect, epidemic, fishery, food and nutrition security, food availability, food chain, food production, food security, food supply, food system, gender, macroeconomics, natural resources, peat land, perception, policy, poverty, risk assessment, smallholder, social capital, spatiotemporal analysis, supply chain management, sustainability, value chain, vulnerability. Moreover, topic related to food become most prominent keyword related to livelihood during COVID-19 pandemic in ASEAN countries. The top five most popular keywords in terms of total link strength were COVID-19 (occurrences: 63; total link strength: 382), pandemic (23, 382), livelihood (20; 121), resilience (12; 72) and human (11; 211).

Figure 11. Network visualization of the occurrence of author keywords

Four groups are revealed by the visual map of keyword co-occurrence (see Figure 11). The size of the nodes indicates the keyword weight; the connections between nodes represent keyword co-occurrence; and the thickness of the linkages and the distance between two nodes show the frequency of keyword co-occurrence. According to Figure 12, the next future related to community adaptation during COVID-19 is divided into four clusters. The future research relate to community adaptation were classified become 4 cluster for future research.
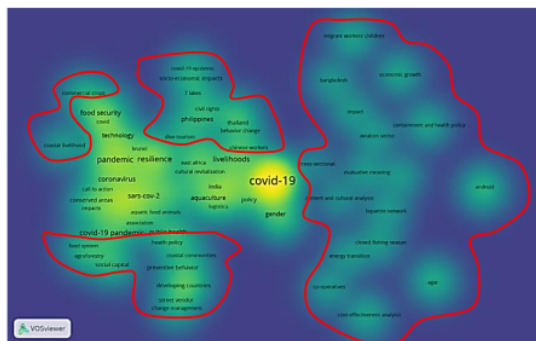
Figure 12. Density visualization of keyword co-occurrence

The first cluster related to 13 keywords: migrant worker's children, economic growth, impact, aviation sector, containment and health policy, evaluating meaning, android, content and cultural analysis, bipartite network, closed fishing season, energy transition, co-operatives, agar, cost-effectiveness analysis. The second future research cluster related to 7 keywords: COVID-19 epidemic, socio-economic impacts, 7 lakes, civic right, behavior change, Chinese workers, dive tourism. Third future research cluster related to 5 Keywords, there are commercial crops, coastal livelihood, food security, technology, pandemic resilience. The fort future research related to 9 keywords, there are social capital, agroforestry, food system, health policy, coastal communities, preventive behavior, developing countries, street vendor, change management.

4. CONCLUSIONS

This study conducts a bibliometric analysis of works pertaining to communal livelihood and COVID-19, providing a picture of the present research state and intellectual structure in the topic. This SLR demonstrates the community's ability to endure during the COVID-19 epidemic by a summary of the selected publications' findings.

As we explained before, the paper by Ceballos et al. became the most cited reference because it explained how the effects of a nationwide shutdown on the income and food security of smallholder farmers in India could happen in ASEAN Countries. Moreover, Laborde et al. suggest that policymakers need to pay attention to the impact of disruptions in food supply chains on the economy.

It is, moreover, not without limitations. For starters, the study relied on data from a small sample of 101 publications. Second, the search was limited to peer-reviewed journal publications in English. Third, Scopus was chosen as the investigation's sole data source. Scopus is widely regarded as the most comprehensive collection of abstracts and citations for a wide range of peer-reviewed literature [41]. Fourthly, VOSviewer was used to do the bibliometric analysis [42, 43] however, the use of VOSviewer and a descriptive analysis of Scopus data was sufficient to answer the research questions. Future research should replicate this finding with a bigger sample size and over a longer period of time. Despite the aforementioned limitations, the co-citation analyses performed in this study on the cited authors, papers, and journals also evaluated the references of the 101 selected articles, which may compensate for the small sample size and single data source.

Existing research is restricted in a number of ways, necessitating more investigation. First, cross-continental research evaluating community livelihoods during COVID-19 appears to be insufficient. Furthermore, research partnerships between experts from other nations, particularly emerging and developed ones, are encouraged in order to provide diverse viewpoints on such global challenges. Third, despite a dramatic increase in the number of studies on community livelihood following the outbreak of COVID-19, there is still a scarcity of empirical research examining a specific community's underlying strategy to adapt to the COVID-19 pandemic in relation to its social environment. In order to comprehend the complexities of health crises in the context of livelihood, it is necessary that the prominent articles include more interdisciplinary research undertaken cooperatively by researchers in the social sciences and agriculture.

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