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Analysis of Free Breakfast Policy Variables on Sustainable Food Security Using Bibliometric Analysis

Chahayu Astina
Program Studi Ekonomi Syariah, Fakultas Ekonomi dan Bisnis Islam , IAIN Langsa
Email: chahayu.astina@iainlangsa.ac.id

Tajul Ula
Program Studi Ekonomi Syariah,Fakultas Ekonomi dan Bisnis Islam, IAIN Langsa

Muhammad Reza Amanda
Program Studi Ekonomi Syariah,Fakultas Ekonomi dan Bisnis Islam, IAIN Langsa

Abstract
Indonesia is the largest archipelagic country in the world with more than 17,000 islands and the population of Indonesia in 2024 is 281,603,800 people, making Indonesia the fourth most populous country in the world. This large population is directly proportional to the issue of stunting. Based on data from the Ministry of Health, the stunting rate in Indonesia in 2023 was recorded at 21.5 percent, only down 0.1 percent from the previous year which was 21.6 percent, while the national target is 14% in 2024. The elected Presidential Candidate, Prabowo, in his campaign raised the main issue of ending stunting through free lunch and milk programs. The free lunch policy that was previously changed to free breakfast has reached an agreement with the Prabowo-Joko Widodo government transition team to allocate funds of around IDR 71 trillion for the free nutritious meal program in the 2025 State Budget draft. The purpose of this study is to analyze the variables of the Free Breakfast Policy on sustainable food security using bibliometric analysis so that it can provide an overview of best practices in implementing the policy. The method used in this study is a literature review using bibliometric analysis by VosViewer software. The results of the visualization map of 150 documents from 2014-2024 show that there are 34 author network clusters and 23 keyword clusters. The author with the most research based on the number of author network strengths (links) is Chun, Yung; Jabbari, Jason and Chiota, s; Eigenbrod, F is the one with the most network strength. The most dominant keywords that appear include "system, regency, plan, province, India, School". Potential future research can use keywords that have not been widely used such as "aspect, sustainable food production, implementation". With bibliometric analysis on density visualization showing low strain and intensity, it shows that research on Free Breakfast Policy on Sustainable Food Security related to sustainable food production and policy implementation is still relatively low, this makes research on this topic still very broad to be studied.
Keywords: Free Meals; Stunting; Food Security; Bibliometric Analysis; Sustainable Development Goals (SDGs)

Introduction

The campaign of presidential candidate Prabowo Subianto, who was elected in Indonesia's most recent presidential election, has attracted attention

by making the eradication of stunting one of the main agendas. As part of his campaign, Prabowo proposed a free meal program as a strategic step to address the significant problem of malnutrition in Indonesia. The program was initially designed as a free lunch program, but was later changed to free breakfast, with a significant allocation of funds reaching IDR 71 trillion in the 2025 State Budget (APBN).

Indonesia, as a country with a large population and a complex archipelagic structure, faces serious challenges in the health sector, especially the problem of stunting. Stunting, or failure to grow, is one of the main health problems in Indonesia. Data from the Ministry of Health shows that the prevalence of stunting in 2023 is 21.5 percent, only a slight decrease from the previous year which reached 21.6 percent. This shows that despite mitigation efforts, the stunting rate is still far from the national target of 14 percent in 2024, the stunting rate is still high, despite various mitigation efforts, becoming a major concern for the government and society. This condition shows a gap in fulfilling children's nutrition, which has an impact on their physical growth and cognitive development.

Stunting is not only an individual health problem, but also a problem of a country's food security. The availability of sufficient, diverse, and nutritious food is an important factor in preventing stunting. Free breakfast policies, if well designed, can contribute to improving community food security, especially at the household level. Given the still high stunting rate in Indonesia despite various interventions, the main problem is how the free breakfast policy can be effective in reducing the prevalence of stunting. This study needs to identify whether the free breakfast program actually contributes to improving the nutritional status of children and reducing stunting rates, or whether there are shortcomings in its implementation that hinder the achievement of these goals.

The free meal program, including free breakfast, according to the elected Presidential candidate, Prabowo, is designed to improve children's nutritional intake and reduce stunting rates in Indonesia. However, there are concerns about the effectiveness of this program in achieving these goals. The main issue is whether the large allocation of funds and the change in the scheme from free lunch to free breakfast will actually have a significant positive impact on the nutritional status of children and reduce the prevalence of stunting. There are concerns that the free breakfast policy may not be fully aligned with the principles of sustainable food security. The issue that arises is how this policy relates to food.

Sovereignty variables such as inclusiveness, food security, nutritional adequacy, local production, collective action, and sustainable finance. Research needs to evaluate whether this policy takes these aspects into account and supports the long-term goal of food security. The change in policy from free lunch to free breakfast raises questions about the reasons behind this change and its impact on the effectiveness of the program. These issues include analyzing whether the change in the scheme has an impact on the implementation and outcomes of the policy, and whether this decision reflects an adequate

understanding of the economic conditions and needs of the community. Also, programs designed with very large allocations of funds may not fully consider local economic conditions and practical challenges in implementing programs in various regions. Questions arise about the extent to which this policy reflects a deep understanding of the economic conditions and real needs on the ground. The implementation of the free meal policy, especially in the form of free breakfast, requires effective coordination between the central and local governments.

There are concerns about potential problems in the implementation of the program, such as food quality, equitable distribution, and adequate supervision. Problems related to implementation include the possibility of wasting funds, inaccurate distribution, and the effectiveness of supervision that can affect the final results of the policy. One important issue is the long-term impact of the free breakfast policy on sustainable food security. This program must be integrated into a broader food security policy framework to ensure that nutritional interventions are not just temporary, but contribute to the sustainability of food security as a whole. The issue is whether this policy takes into account the principles of sustainability, including inclusiveness, food security, local production, and the country's economy. This study needs to explore how existing research links food security policies with sustainability and whether there are gaps in the related literature. Using bibliometric analysis, it is necessary to determine research trends and best practices that can be applied to improve free breakfast policies in the context of sustainable food security.

There is a need to involve various competent parties or organizations in the implementation of free meal policies. This issue includes how involving relevant parties can increase the effectiveness of policies and ensure that program implementation not only runs smoothly but also has a positive impact on food security and stunting eradication

By understanding and addressing these issues, this study is expected to provide in-depth insights into the role of free breakfast policies in overcoming stunting and their contribution to sustainable food security. This study aims to analyze the variables in free breakfast policies in the context of sustainable food security. Specifically, this study will: Analyze the development of food security policy research using bibliometric analysis and Assess the alignment of food security policies with sustainability with a focus on food sovereignty variables

Method

Data Sources

In practice, bibliometric analysis is an application that uses quantitative and statistical paradigms and analysis for publications such as journal articles and their companions, including analysis of the number of citations. (Reuters, 2008) To achieve the research objectives in the form of analysis related to the direction, trend and development of research discussing knowledge management, several

methods can be used for literature review, one of which is Bibliometric scopus from the Mendeley application as the main source of article search. The process of collecting, classifying and mapping various research sources through the Scopus database is carried out objectively by carrying out a series of in-depth search and review procedures through various filtering steps/stages. The selection of research sources/databases from the Mendeley application is based on the idea that the Mendeley application is relatively one of the global research databases in the world that is relatively broad in scope and is a reference for research as a reference source

Data Collection

The search and collection of literature and downloading of literature data were carried out on August 28, 2024. Details of the literature search strategy using strings based on: TITLE (policy, stunting, food security and sustainable food). Articles were filtered for the last 10 years, namely 2014 to 2024. The filtering process in the last 10 years was intended to clearly see the latest developments in the research focus of the Analysis of Free Breakfast Policy on Sustainable Food Security and its relationship to other research focuses, without eliminating the essence of previous developments.

Data Extraction

Based on the collection and classification process, 34 studies were obtained which were taken from the Mendeley application database according to the retrieval strategy above. The selected research is open access research and the types of documents selected are conference papers, articles, and reviews. Documents are saved as ris files. The file includes citation information, bibliographical information, abstract & keywords, and references provide comprehensive information about the literature for more detailed analysis in the next study stage.

Analysis Using VOSviewer

VOSviewer is a freely available computer program developed to create and view bibliometric maps (Van Eck & Waltman, 2010). The version used in this study is VOS 1.6.20. In VOSviewer software, each node represents a different parameter, such as country/region, journal, author, keyword, and so on. Parameters, such as the number of articles published, the number of citations, or the frequency of occurrence, determine the size of the node, and the higher the weight, the larger the node. The cluster to which the node belongs and the line determine its color, with nodes of the same color acting as clusters and different clusters distinguished by different colors. The distance between nodes indicates the proximity and similarity between the subject terms, and the lines between nodes indicate links. Bibliometric analysis using VOSviewer consists of co authorship analysis and co-occurrence analysis. Co-authorship analysis is an analysis of author networks. While co-occurrence analysis is a keyword analysis or co-word analysis. Co-word analysis is a technique that examines the actual content of the publication itself.

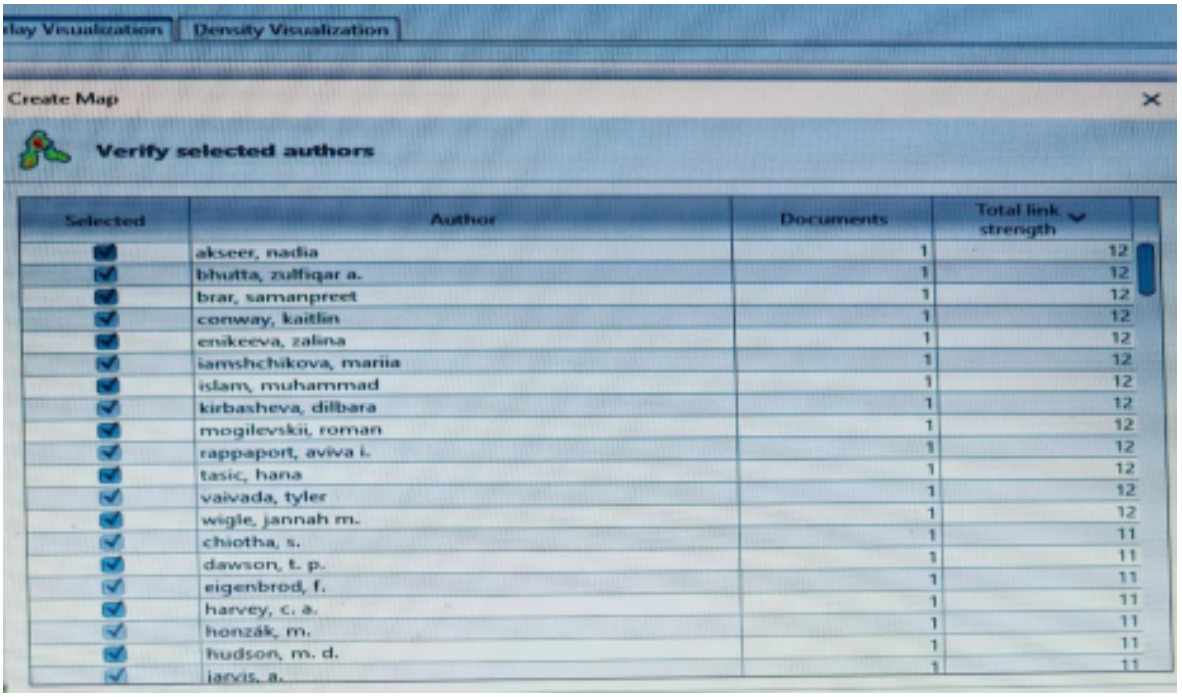
Words in co-word analysis often come from "author keywords" (Donthu, 2021).

Results

Map of the Development of Publication of Research on Free Meal Policy, Stunting, Food Security, and Food Sustainability Based on Authors (Co authorship).

After the dataset is saved in the RIS (Research Information Systems) type using the Publish or Perish metadata, the dataset is then analyzed using the Vosviewer application by selecting the 'data create a map based on bibliographic data' option. The method used to calculate the dataset is full counting with the aim of calculating as is according to researchers who have taken the topics of free meals, food security, food security, stunting, and government policies in their research. Based on Figure 1, the minimum number of documents for each author is set at 1 document, and the mapping that is visualized is only researchers who have relationships with other researchers.

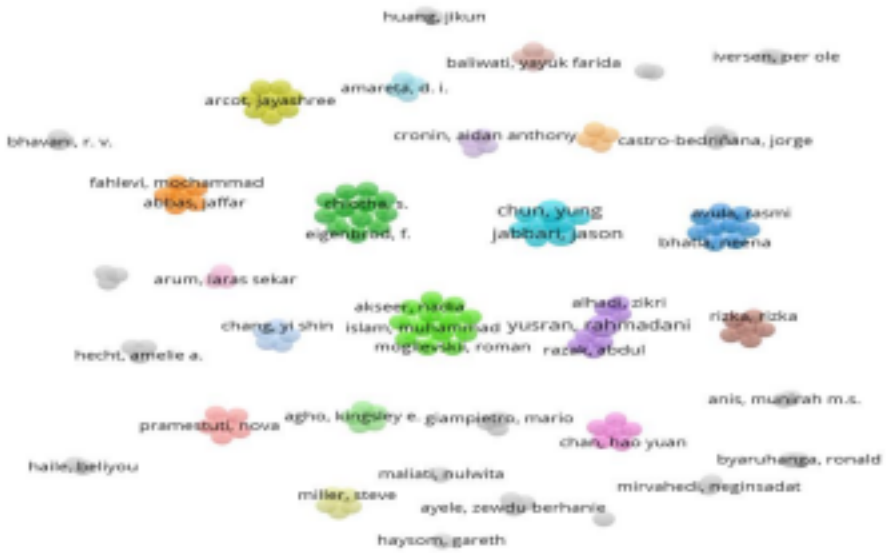
Figure 1. List of authors of research on free meals, food security, food resilience, stunting, and government policy on Vosviewer



Selected	Author	Documents	Total link strength
☑	akseer, nadia	1	12
☑	bhutta, zulfiqar a.	1	12
☑	brar, samanpreet	1	12
☑	conway, kaitlin	1	12
☑	enikeeva, zalina	1	12
☑	iamshchikova, mariia	1	12
☑	islam, muhammad	1	12
☑	kirbasheva, dilbara	1	12
☑	mogilevskii, roman	1	12
☑	rappaport, aviva i.	1	12
☑	tasic, hana	1	12
☑	vaivada, tyler	1	12
☑	wigle, jannah m.	1	12
☑	chiotha, s.	1	11
☑	dawson, t. p.	1	11
☑	eigenbrod, f.	1	11
☑	harvey, c. a.	1	11
☑	honzák, m.	1	11
☑	hudson, m. d.	1	11
☑	jarvis, a.	1	11

Source: Vosviewer (2024)

Figure 2. Network visualization on co-authorship



Source: Vosviewer (2024)

In this study, there are 150 authors who are eligible to be visualized. Based on the output from VOSviewer, there are 34 different author clusters characterized by different colors with a total of 388 links. There are 6 large clusters. Based on Figure 2, there is a cluster with the largest number of authors in the cluster, namely 13 (thirteen) authors. Based on the number of network strengths (links), Akser, Bhuta, Brar, Conway, and so on are the ones with the most network strengths

Figure 3. Overlay visualization of co-authorship

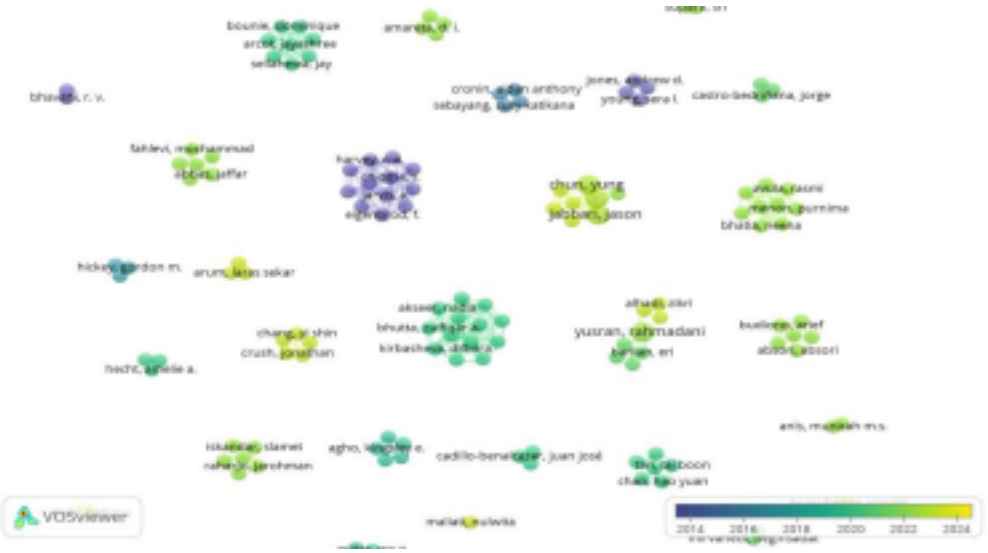
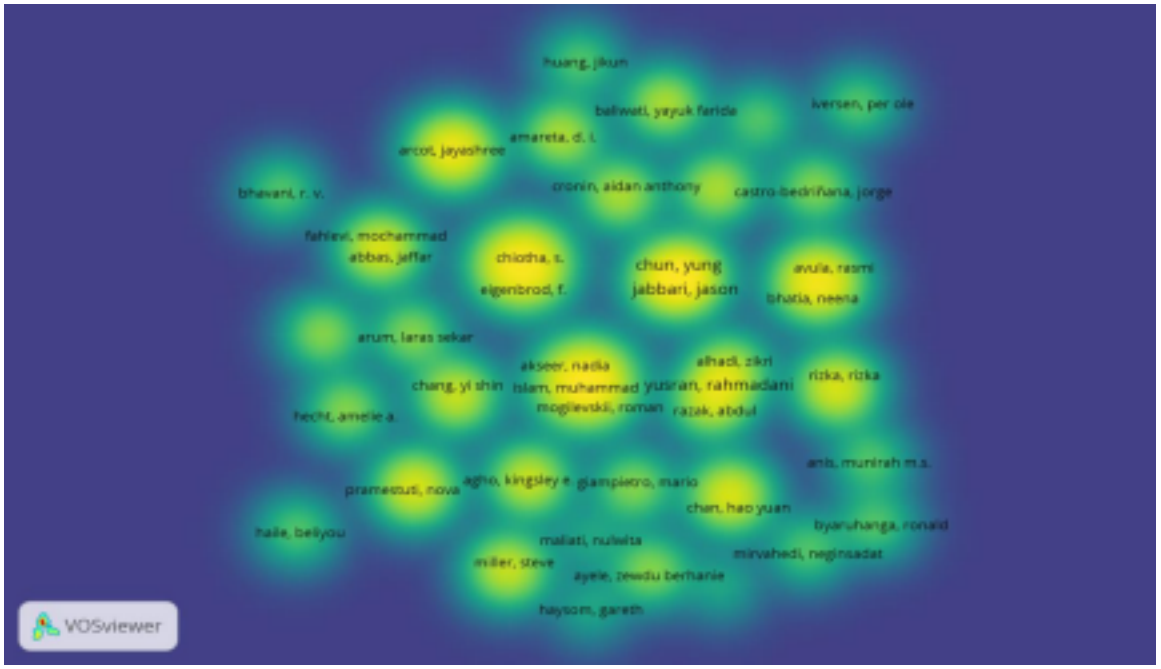


Figure 3. shows an Overlay visualization that maps the Author's historical footprint in research on free meal policies, stunting, food security, and food sustainability, this mapping is marked by the presence of nodes that have varying colors and edges that connect one researcher to another. The dark color on the node indicates research that has been conducted in the past from a predetermined time period. For example, in the image, the darkest node color (purple) represents the year 2014 and the lightest (yellow) represents the year 2024.

Figure 4. Density visualization of co-authorship



Source: Vosviewer (2024)

From the density visualization results shown in Figure 4, it can be identified that there is density or emphasis on the node which means that the group of researchers who are researching free meal policies, stunting, food security, and food sustainability have a relationship with each other. In addition, the level of node saturation in density visualization is indicated by the number of studies involving other studies by citing the author. As shown

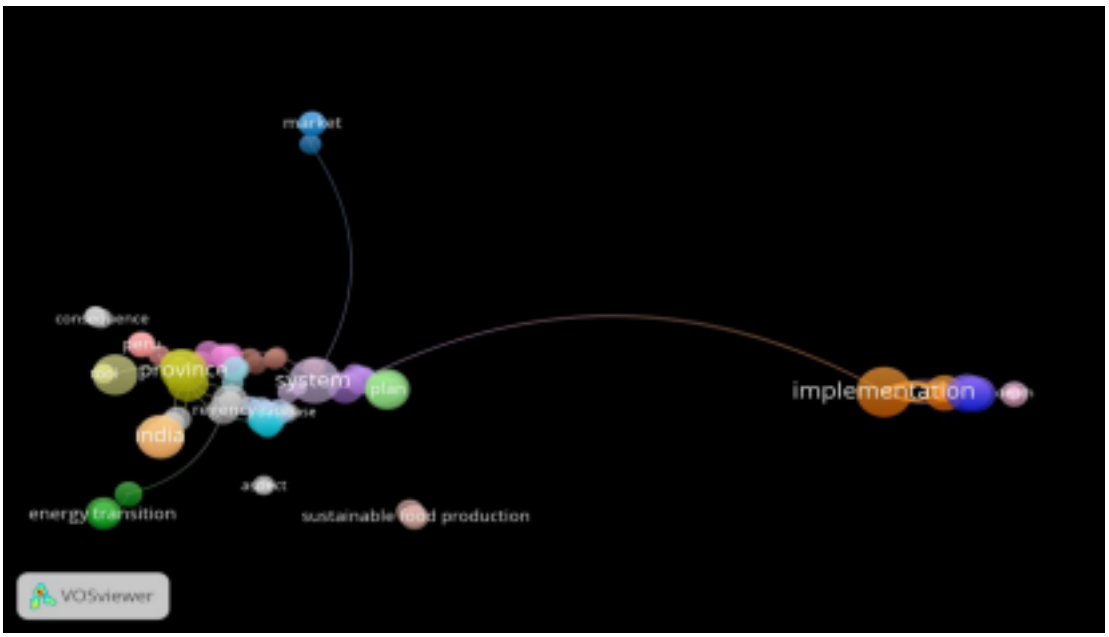
by the research by Chun, Yung; Jabbari, Jason and Chiota, s; Eigenbrod, F which shows the brightest node density color, in other words the author conducted the research by citing several studies beside it as a form of research collaboration in the field of free meal policies, stunting, food security, and food sustainability.

Map of Information Architecture Research Publication Development Based on Keywords (Co-Occurrence)

After the dataset is saved in the RIS (Research Information Systems) type using the Publish or Perish metadata, the dataset is then analyzed using the Vosviewer application by selecting the 'create a map based on text data' data option, with the aim of creating a network or relationship of terms based on text data. The fields of terms are extracted based on the title and abstract while the method used to calculate the dataset is full counting with the aim of calculating as is according to research related to free meal policy research, stunting, food security, and food sustainability that has been carried out. The minimum number of occurrences in a term is 1 document, resulting in 839 documents that have an occurrence relationship.

Bibliometric analysis is done by creating visualizations in the form of networks, Overlays, and densities which aim to determine the bibliometric network between articles or online publications from downloaded metadata. The bibliometric network consists of nodes in the form of circles or circles that represent keywords, while the edges or network nodes represent the relationship between pairs of nodes. Mapping and Clustering in bibliometric analysis through Vosviewer software are complementary, meaning they complement each other. This mapping can be used to obtain a detailed picture of the structure of a bibliometric network (Waltman et al., 2010, p. 630). In addition, clustering is used to show a picture or insight into bibliometric grouping.

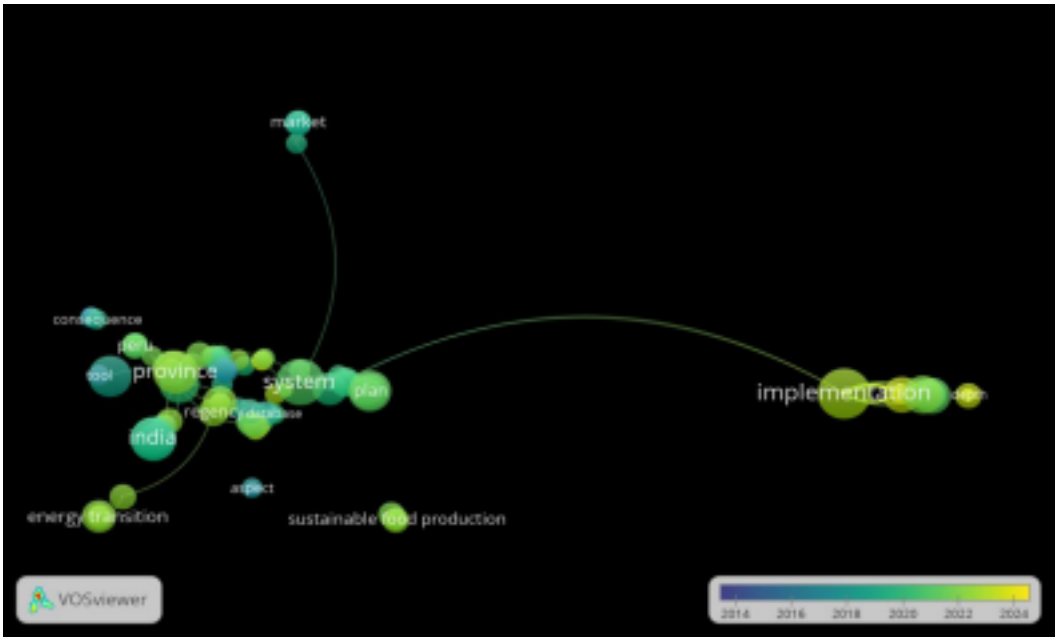
Figure 5. Network visualization of co-occurrence



Source: Vosviewer (2024)

Figure 5 shows a network visualization of co-occurrence that explains the network or relationship between one term and another in research on free meal policies, stunting, food security, and food sustainability in the period 2014-2024. Of the 839 articles indexed by Scopus (a database from Mendeley), they can be grouped into 23 clusters that can be identified through the color of the nodes of each keyword.

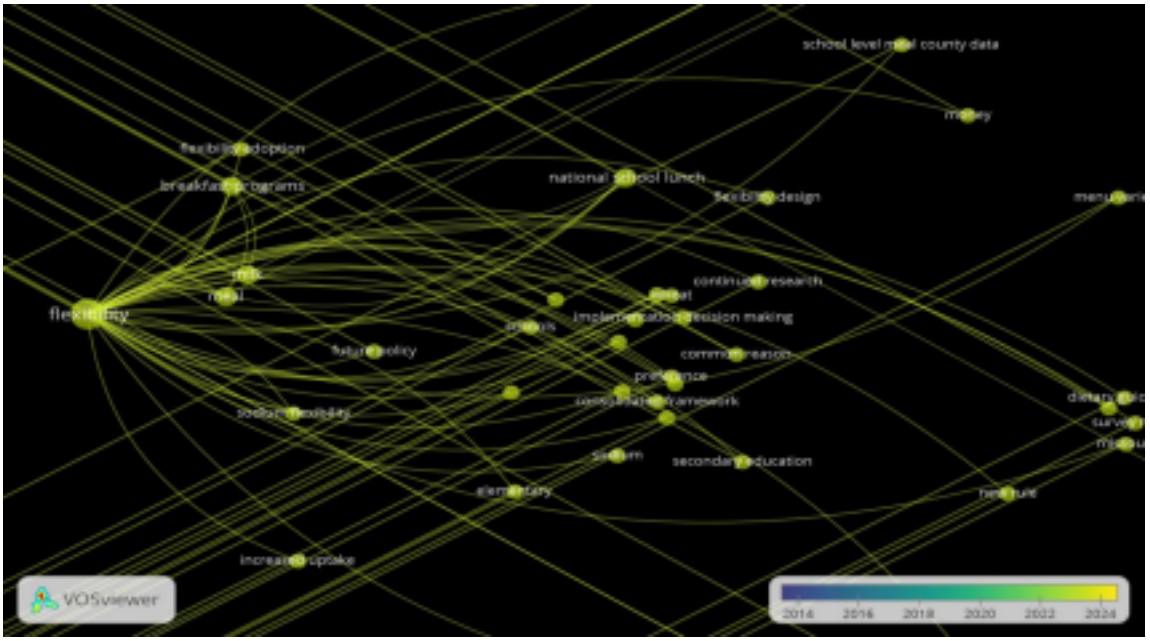
Figure 6. Overlay visualization of co-occurrence



Source: Vosviewer (2024)

After identifying the mapping and clustering of free meal policy research, stunting, food security, and food sustainability using network visualization, the next step is to map and cluster the research trends of free meal policy, stunting, food security, and food sustainability based on the historical footprint or year of publication of the research. The information obtained from the results of the Overlay visualization in Figure 6 can be used as a reference to identify and detect free meal policies and sustainable food security from research conducted in the period 2014 - 2024. From the results of the bibliometric analysis through Scopus metadata imported into the Vosviewer software, an Overlay visualization was produced. In this visualization, the color of the node represents the keyword that indicates the year of publication.

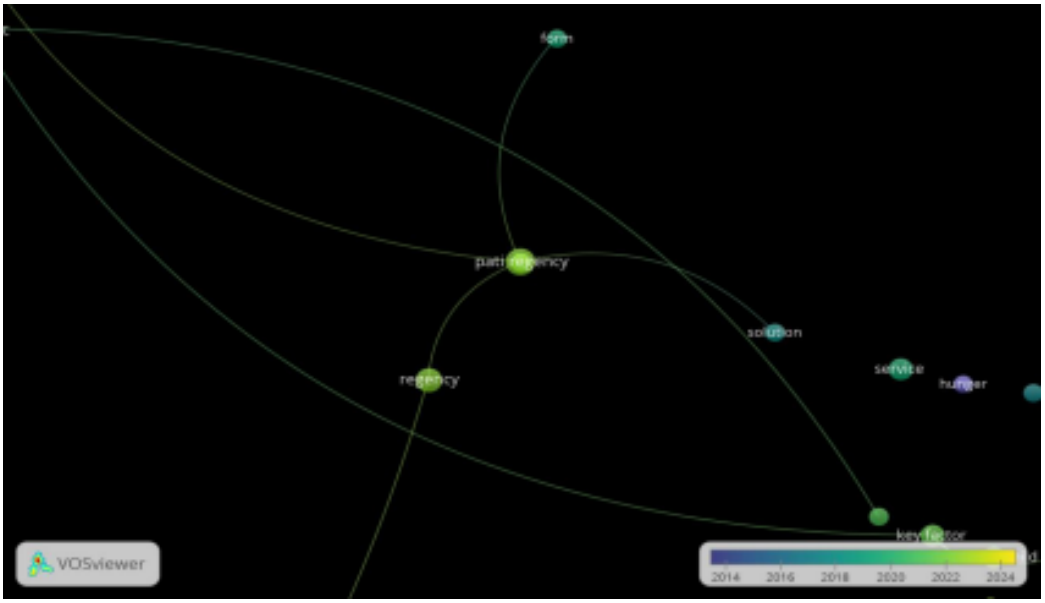
Figure 6. Example Yellow node's Overlay visualization of co-occurrence



Source: Vosviewer (2024)

For example, the keyword 'Flexibility' has a yellow node, which means that articles containing the keyword were only discussed in 2022-2024. Another example is the term 'system' which in the Overlay visualization is depicted as having a light green node, this means that research containing the keyword has been published from 2020-2022

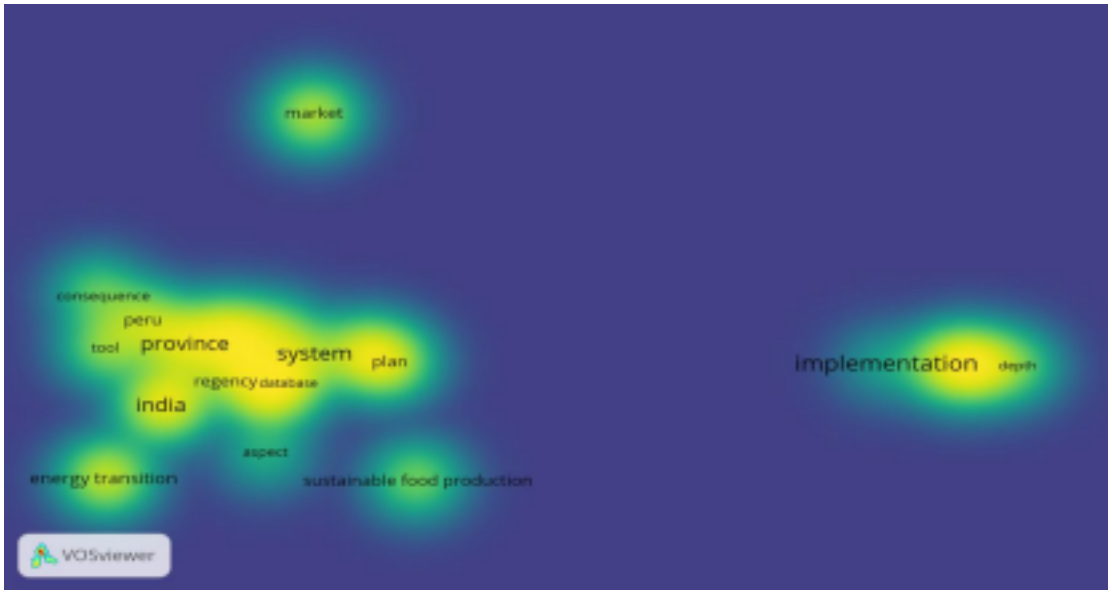
Figure 7. Research with old publication year on Overlay visualization of co occurrence



Source: Vosviewer (2024)

Another example is the keyword 'solution' which has a blue node color. The term 'solution' has indeed been attached to research on free meals and food security, namely solutions to overcome stunting and food security in a region. Therefore, the keyword 'solution' in the research was used much earlier by researchers in conducting the Free Breakfast Policy Analysis on Food Security research.

Figure 8. Density visualization of co-occurrence



Source: Vosviewer (2024)

Next is the bibliometric analysis using density visualization. From the visualization results shown in Figure 8, it can be identified that there are dense areas or areas with high density at one node with another node. The level of saturation identified in the number of keywords marked in yellow means that the area is a topic that has been widely researched and indexed by Scopus, for example the keywords system, province, regency, School, plan. While the nodes marked in dark colors indicate that these topics have not been widely researched.

This can foster opportunities to conduct research or studies with these topics, for example the keyword "Sustainable food production", which is related to sustainable food production in the research title "Food production & availability - Essential prerequisites for sustainable food security" and the keyword "implementation" which is connected to government policy, the title of the article is "Implementation of Flexibilities to the National School Lunch and Breakfast Programs", "Their Impact on Schools in Missouri and Critical factors in local food development policies, farming" and "coping mechanisms mothers with stunting children in Jember". With bibliometric analysis on density visualization showing low strain and intensity, it shows that research on Free Breakfast Policy on Sustainable Food Security related to sustainable food production and policy implementation is still relatively low, this makes

research on this topic still very broad to be studied

Discussion

The bibliometric mapping of co-authorship highlights that research on free meal policies, food security, and stunting remains fragmented into 34 clusters with limited collaboration between scholars. Only a few authors such as Chun, Yung; Jabbari, Jason; Chiota, and Eigenbrod emerge as central nodes with significant network strengths. This indicates that the development of the field is still highly dependent on individual scholars and small research groups rather than large, cohesive research teams. According to Russell (2015), bibliometric indicators are more robust at higher levels of aggregation, suggesting that increasing cross-country and cross-disciplinary collaboration could strengthen this research field.

In terms of keyword co-occurrence, dominant terms such as "system, regency, plan, province, and school" suggest that much of the literature still focuses on descriptive or structural aspects rather than on policy effectiveness and sustainability outcomes. Emerging keywords such as "flexibility," "solution," "sustainable food production," and "implementation" only appear in recent years, showing that the research field is beginning to expand into areas that are more closely related to long-term policy impact. Donthu (2021) emphasizes that bibliometric analysis not only reveals quantitative growth but also thematic shifts, and in this case, the shift towards sustainability-oriented terms represents a crucial opportunity for future research.

The findings also raise important questions about the alignment between the free breakfast policy and the principles of sustainable food security. While the program has been promoted as a solution to reduce stunting, the bibliometric evidence suggests that there is still little research explicitly connecting free meal policies with sustainable food production systems and local economic empowerment. Devos (2011) and Velasco (2012) note that bibliometric patterns can reveal structural gaps in a field of study, and here it is clear that the connection between policy implementation and sustainable food systems is still underexplored. Without stronger integration into broader food sovereignty strategies, such as inclusiveness, local production, and sustainable financing, the free breakfast initiative risks being only a short-term nutritional intervention.

Methodologically, this study demonstrates the value of VOSviewer in mapping both co-authorship and co-occurrence networks (Van Eck & Waltman, 2010). However, the approach also has limitations, particularly in terms of database coverage and time frame. The reliance on Scopus-indexed publications retrieved via Mendeley means that some relevant grey literature and regional policy evaluations may be overlooked. As Reuters (2008) highlights, bibliometric indicators should be complemented with qualitative assessments to provide a more comprehensive picture of policy effectiveness.

From a policy perspective, the findings imply that the Indonesian government should not only allocate substantial funding for free breakfast but also ensure that the program is embedded within local food production systems. This could strengthen its sustainability while simultaneously supporting local farmers

and small enterprises. As De-Moya-Anegon (2004) argues, bibliometric indicators can provide insight into the maturity of a scientific field, and in this case, the limited thematic density around “sustainable food production” signals that the policy community and researchers must collaborate more closely to develop robust, evidence-based strategies.

Finally, the results open promising avenues for future research. Scholars could expand the analysis by combining bibliometric mapping with content analysis of highly cited works to better understand best practices and implementation challenges. Comparative studies across countries with similar school meal policies may also provide valuable insights. In addition, longitudinal evaluations of the free breakfast program’s impact on stunting, nutritional adequacy, and local food security are urgently needed. Such research would enrich the literature while also contributing to achieving the Sustainable Development Goals (SDGs), particularly in the areas of zero hunger and good health.

Conclusion

Bibliometric analysis using VOSViewer and Scopus database on research on the topic of Free Breakfast Policy Analysis on Sustainable Food Security successfully produced a visualization map depicting author network analysis (co authorship) and keyword analysis (keyword co-occurrence). The visualization map of 150 documents from 2014-2024 shows that there are 34 author network clusters and 23 keyword clusters. The author with the most research based on the number of author network strengths (links) is Chun, Yung; Jabbari, Jason and Chiota, s; Eigenbrod, F is the one with the most network strength. The most dominant keywords that appear include "system, regency, plan, province, India, School". Potential future research can use keywords that are not widely used such as "aspect, sustainable food production, implementation".

Based on these findings, research that focuses on the concept of implementing sustainable food production is still very open and very interesting to be developed with other concepts along with a wider range of methods and variables.

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