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THE INSTITUTIONAL MARKET FOR THE ACQUISITION OF FOOD FROM FAMILY FARMING: A BIBLIOMETRIC ANALYSIS

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ABSTRACT

Family farmers in general fall into the most vulnerable communities in developing countries, the main challenge faced is economic dominance. To this end, in recent decades a set of public policies have been outlined for family farming, with emphasis on institutional markets for food and nutritional security programs. The research method is classified as exploratory and descriptive, characterized as a bibliometric study with a quantitative approach. The database consulted was the *Web of Science*, between 1978 and 2023. The bibliometric analysis allowed us to visualize the indicators, analyze, characterize and evaluate the process of scientific production about institutional markets. The analysis of the previous results exposes the scientific production, the relevance of the authors, identification of relevant themes and hot *topics* related to the institutional market and family farming. It is concluded that the theme of analysis gained relevance from the 1990s onwards, showing the relevance that the theme took on in academia.

Keywords: Institutional Market. Family Farming. Bibliometric analysis.

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Revista ARACÊ
ISSN: 2358-2472

INTRODUCTION

Policies related to rural development, food and nutritional security can play a prominent role in combating poverty and the social scourge of hunger (Dias; Oliveira, 2019). An example in Brazil is the Food Acquisition Program (PAA), launched in 2003 under the Zero Hunger Program, which allows the purchase of food without bidding, in order to enable farmers' access to the government procurement market, while meeting the needs of populations in situations of food insecurity. The PAA represented an advance, uniting objectives of promoting family farming and Food and Nutrition Security (FNS).

With the creation of the PAA, institutional markets gained momentum in Brazil, standing out as an innovation in public policy. This market is a specific configuration where exchange networks assume a particular structure, being determined by norms, where the State is the central role, through public purchases (Grisa; Schneider, 2015). It is noteworthy the creation of state PAAs, based on state laws that established their own public procurement programs in their respective jurisdictions, such as the Agricultural Production Acquisition Program (PAPA-DF) (Sambuichi; Silva, 2023).

In relation to family farmers, the main challenges faced are included in the economic domain, in which they face turbulent uncertainty about the commercialization of products, how and at what price to sell, harming family income and social security (Fuchigami et al., 2021), where institutional markets can be a marketing option.

This study presents a bibliometric analysis of scientific production between the years 1978 and 2023, identifying the publications with the greatest impact, the relevance of the authors and their scientific production, and the relevant research topics on institutional markets and family farming.

THEORETICAL FOUNDATION

In the 1990s, with the restructuring of production, in the midst of the advance of agro-export activities, it restricted the search for alternative mechanisms of production and commercialization of small rural producers, as well as requiring a more proactive reaction to the market economy. Following the model in parallel, small producers established alternative development models, such as: associative, collaborative and cooperative production (Dias; Oliveira, 2019).

Family farming, a social and political category, began to be recognized by the Brazilian State in the mid-1990s. The 1988 Constitution encouraged the adoption of new

Revista ARACÊ
ISSN: 2358-2472

spaces for social participation and recognition of rights. The creation of the National Program for the Strengthening of Family Agriculture (Pronaf) in 1995 triggered the emergence of new public policies directly for rural development (Grisa; Schneider, 2015; Silva et al., 2021).

The strengthening and consolidation of local-regional markets for family farming were established through the implementation of public policies in the early 2000s, which generated new forms of relationship between the State, market and society (Dias; Oliveira, 2019).

In this study, the institutional market is understood as a market configuration, in which exchange networks act in a structure previously determined by norms. They are negotiated by actors and organizations, with the State playing a central role, through public procurement (Grisa, 2010). Among the public policies aimed at strengthening family farming in Brazil, the following stand out: the National Program for the Strengthening of Family Farming (Pronaf), created in 1995; the Food Acquisition Program (PAA), in 2003; and the National School Feeding Program (PNAE) in 2009 (Silva et al., 2021).

The Food Acquisition Policies of family farming aim to encourage this segment, and simultaneously, includes the distribution of agricultural products to people in a situation of food insecurity, aimed at families that fit into Pronaf (Brasil, 2003).

The National School Feeding Program (PNAE) is a complementary mechanism, guaranteeing the purchase of part or all of the production from family farming, for the purpose of feeding students (Silva et al., 2021). Article 14 of Law No. 11,947/2009 establishes that of the total financial resources transferred by the National Fund for the Development of Education (FNDE), within the scope of the PNAE, at least 30% (thirty percent) must be used to purchase foodstuffs directly from family farming (Brasil, 2009).

Institutional purchases encourage the commercialization of products, connecting the producer with the final consumer in the context of the agri-food system, with the State as the main buyer and definer of the rules of this market (Sousa; Beraldo, 2023). Food purchases foster short agri-food chains and can rebuild relationships between family farmers and institutional consumers (Silva et al., 2021).

MATERIALS AND METHODS

The research is classified as exploratory and descriptive, allows a familiarity with the problem and the construction of hypotheses and the description of the phenomenon itself,

Revista ARACÊ
ISSN: 2358-2472

respectively (Marconi; Lakatos, 2021; Marconi; Lakatos, 2022). It is characterized as a bibliometric study with a quantitative approach, as its purpose is to visualize the indicators, analyze, characterize and evaluate the process of scientific production about institutional markets, through bibliometric analysis.

BIBLIOMETRIC ANALYSIS

Bibliometrics is a quantitative and statistical technique to measure the rates of production and dissemination of scientific knowledge. In which it makes it relevant in the analysis of scientific production, since its indicators portray the behavior and development of a certain area of knowledge (Araújo, 2006; Araújo; Alvarenga, 2011), and helps to identify trends in knowledge growth, proactive authors and institutions, relevance of journals, among other analyses (Soares et al., 2016).

When bibliometric analysis has the scientific fields as its object of analysis, it is usually called scientometrics or scientometrics. It is defined as the study of the measurement and quantification of scientific progress, and research is based on bibliometric indicators (Silva; Bianchi, 2001; Araújo; Alvarenga, 2011).

DATA COLLECTION AND ANALYSIS

The analysis material from the *Web of Science database was chosen*, the searches were carried out in November 2023. It is accessed via Periodicals of the Coordination Foundation for the Improvement of Higher Education Personnel (CAPES), with the credentials of a student from the University of Brasilia, in the Federated Academic Community Network (CAFe).

To search the database, he used the Boolean operators, with the search terms: (*institut** AND *market**) OR (*public** AND *purchas**) OR (*govern** AND *purchas**) AND (*famil* farm**) OR *smalholder** OR *peasant** OR (*smal* farm**). The terms were searched in: Article; Conference article; Review article; Data article; and Book chapters. No limitations of date and language and filtered into areas: *Economics or Agricultural Economics Policy or Agriculture Multidisciplinary or Development Studies or Multidisciplinary Sciences or Regional Urban Planning or Sociology or Area Studies or Business or Management or Social Sciences Interdisciplinary or Urban Studies or Political Science or Public Administration or Business Finance or Humanities Multidisciplinary or Law or Materials*

Revista ARACÊ
ISSN: 2358-2472

Science Multidisciplinary or Women S Studies or Family Studies or Social Sciences Biomedical or Cultural Studies or Behavioral Sciences or Ethnic Studies or Social Work.

The search on November 23, 2023 retrieved 1,455 articles. The data were exported from *the Web of Sciences* in *export*, TXT, CSV and BibTex format. After export, he performed the bibliometric analysis using the *software*: *VOSviewer*, version 1.6.19; and R, version 4.3.2 *for Window, RStudio*, version 2023.09.1-494, for the installation of *Bibliometrix*. The R program does not have *Bibliometrix installed*, and it is necessary to perform the commands for installation: *install.packages ("bibliometrix")*; *library (bibliometrix)*; *biblioshiny ()*. After the commands, the page opens on the *web*, making it possible to import the data from the *Web of Sciences analysis base*.

The analysis criteria performed by the *VOSviewer software* were: authors, without and with restrictions; cited authors; organizations; countries; and keywords. Regarding bibliographic coupling: sources; Authors; Organizations; and countries. Those carried out by the *Bibliometrix software*: annual scientific production; relevance of authors; authors' production over the years; most cited documents; most cited references; essential sources by Brandford's Law; sources with the highest impact index; production of sources over time; map of collaboration with countries; and co-occurrence network.

The *VOSviewer software* is a computer program developed to create, visualize and explore bibliometric maps of science, and can be used to analyze various types of bibliometric network data (Eck; Waltman, 2011). Bibliometrix is a package developed in R language, assisting in scientific mapping and bibliometric studies. In bibliometric studies, it is common to combine data analysis and visualization tools (Terra et al., 2022).

In relation to the institutional market and family farming, the survey carried out the Hot Topics survey . Hirsch (2005) proposes a single number, as a way of simplifying and characterizing the scientific production of a researcher, the *h index*. The scientist has *h index* if the *h* of his numbers of articles published over *n* years (*Np*) has at least *h* citations each and the others (*Np – h*) must be greater than or equal to *h* citations. Measuring the cumulative impact of a scientist, particularly the quality of research and the size of the publishing community (Banks, 2006).

Banks (2006) applied the *h index* to the topical and composite case, calling it *the h-b index*, assuming that *hb* increases linearly with the number of years *n.* Chart 1 shows the classification of hot *topics*.

Revista ARACÊ
ISSN: 2358-2472

Table 1. Ranking hot topics.

Index m	Classification
0 < m < 0.5	It may be of interest to researchers in a specific field of research, encompassing a smaller community.
0.5 < m ≤ 2	It can become a "*hot topic*", if the community is large or the topic has interesting or notable characteristics.
m ≥ 2	It is considered a current "*hot topic*", with reach not only in its own area of research. It is probably a compound with unique application purposes or characteristics.

Source: Adapted from Banks (2006).

With the data obtained, the following analyses were selected and carried out: annual scientific production and the places of publications with the greatest impact and relevance; relevance of authors and scientific production over time; and identification of relevant research topics on institutional markets.

RESULTS

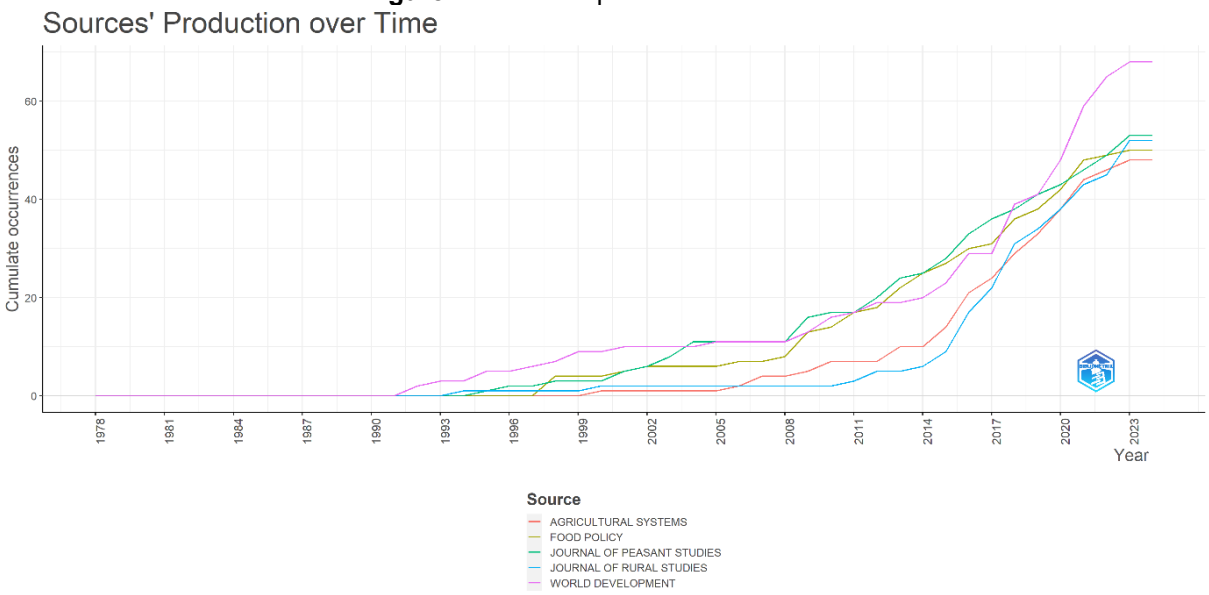
To perform the data analysis, the *VOSviewer software*, version 1.6.19 and R, version 4.3.2 *for Window, RStudio*, version 2023.09.1-494, were used to use *Bibliometrix*. For data analysis and compression, the section was subdivided into three subsections: Analysis of Scientific Production; Analysis of the Relevance of the Authors; Analysis of the Identification of Relevant Themes.

ANALYSIS OF SCIENTIFIC PRODUCTION

The first analysis carried out was in relation to scientific production over time and annual scientific production, presented in figures 1 and 2 below.

Revista ARACÊ
ISSN: 2358-2472

Figure 1. Scientific production over time.



Source: Survey data (2023).

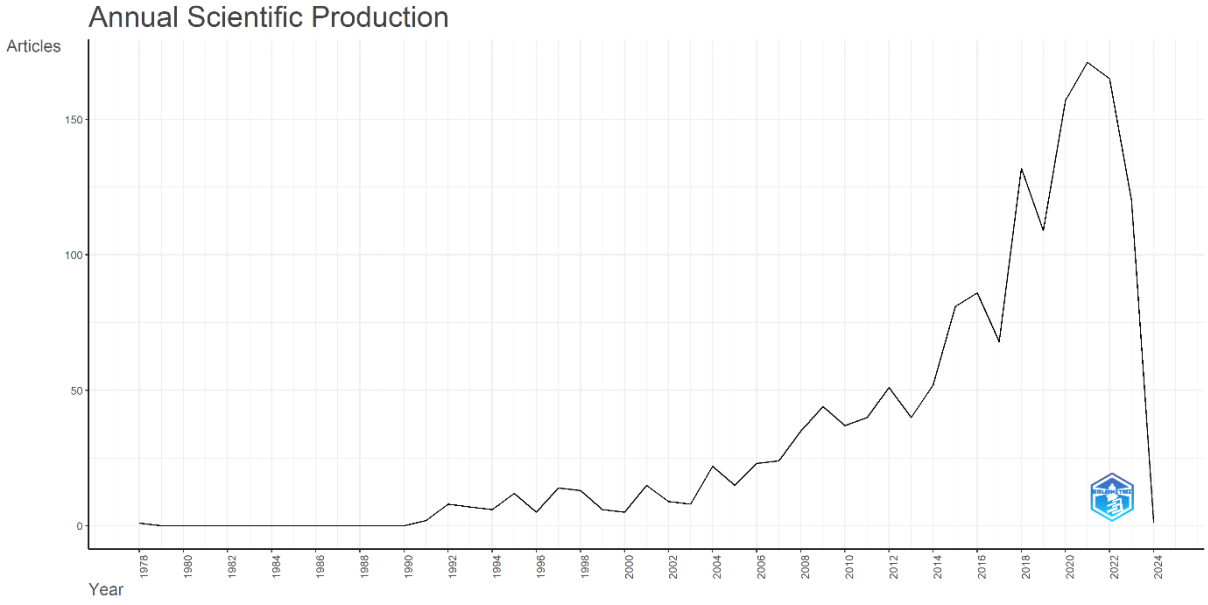
According to the *Bibliometrix software*, figure 1 presents the panorama of scientific production, in relation to the means of publication over time. It is inferred that *World Development*, an international *multidisciplinary journal* dedicated to the study of development of ways to improve the standard of living and the human condition in general (Elsevier, 2023). It has been the main journal, related to the main theme of the research, since 1978.

In the 1990s, publications began in the *Journal of Rural Studies*, *Journal of Peasant Studies*, *Food Policy* and *Agricultural Systems*, the journals focus on contemporary rural development and the family farmer. It can be seen that *World Development* achieved growth in publications in the same period. It is observed that publications intensified in the 2000s, the increase in publications is due to the recognition of family farming by the Brazilian State in the mid-1990s.

The sharp growth from 2014 onwards is noteworthy, due to the International Year of Family Farming (IYFF), which had the global objective of raising awareness and highlighting the contribution of family farming to food and nutrition security, in addition to helping to eradicate poverty (FAO, 2014).

Revista ARACÊ
ISSN: 2358-2472

Figure 2. Evolution of annual scientific production.

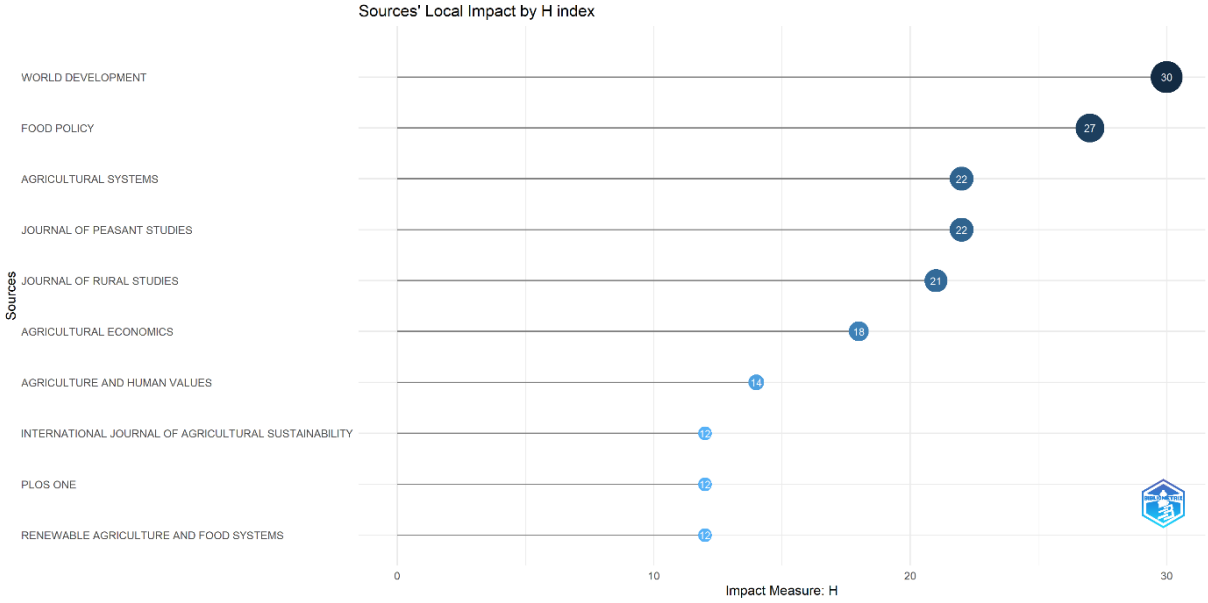


Source: Survey data (2023).

Figure 2 shows that the annual scientific production on researched terms began to gain relevance from the 1990s onwards, and from 2014 onwards all journals showed growth.

Between 2011 and 2017, the *Journal of Peasant Studies* and *Food Policy* surpassed *World Development publications*. In 2020, World Development's publications stand out in terms of publications, but it does not invalidate the relevance of the top five journals.

Figure 3. Sources with the highest impact index.



Source: Survey data (2023).

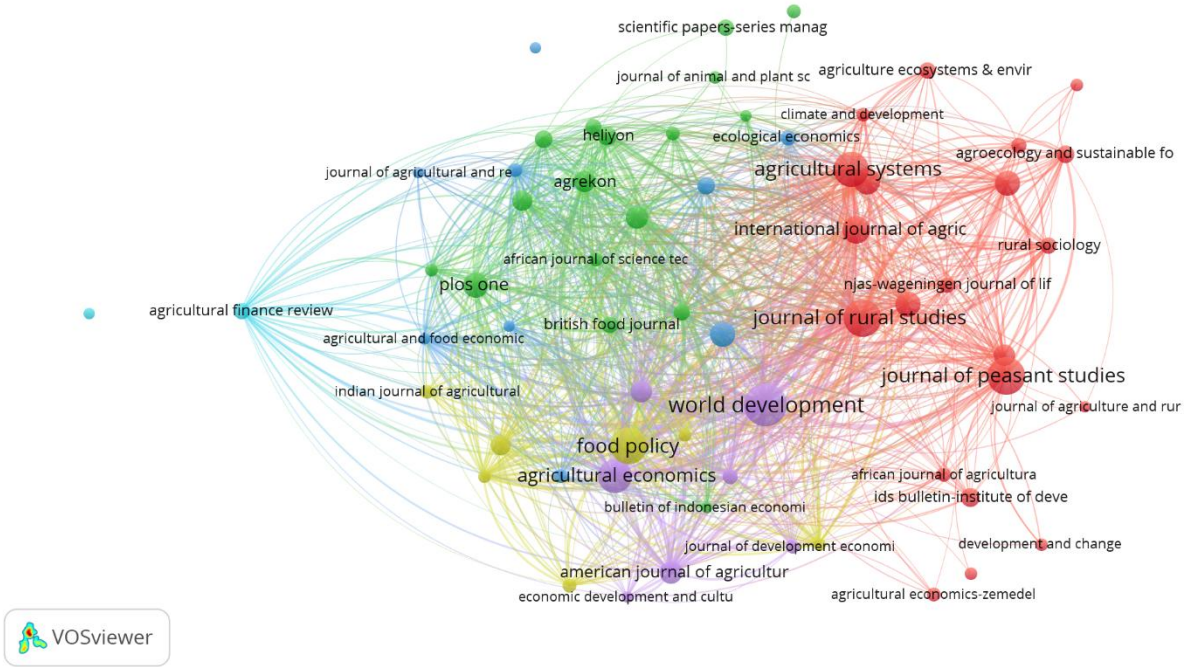
Revista ARACÊ
ISSN: 2358-2472

The sources are presented in figure 3, with emphasis on *World Development* and *Food Policy*. The impact index of *Agricultural Systems* and *Journal of Peasant Studies* are equal, followed by the *Journal of Rural Studies* and *Agricultural Economics*.

Scientific production over time is not equal, proportionally, to the sources with the highest impact index. Only *World Development*, stands out in both analyses, *Food Policy* in relation to the impact index, overlaps over *Agricultural Systems, Journal of Peasant Studies* and *Journal of Rural Studies*. Reaffirming the non-proportionality between production and impact index. Analyzing only the scientific production over time, it is not possible to observe this difference in relation to the impact.

For the bibliographic coupling, in relation to the scientific production of the journals, bibliographic *coupling was selected* in the VOSviewer *software*, using the sources analysis unit, observed in figure 4. Coupling allows you to analyze the interactions of journals and which ones have strong connections.

Figure 4. Connection of the magazines.



Source: Survey data (2023).

It can be seen in figure 4 that the same journals mentioned above are relevant and have a strong interaction connection, but there are also connections with other journals according to the research approach. The analysis of figure 4 solidifies the analyses of the

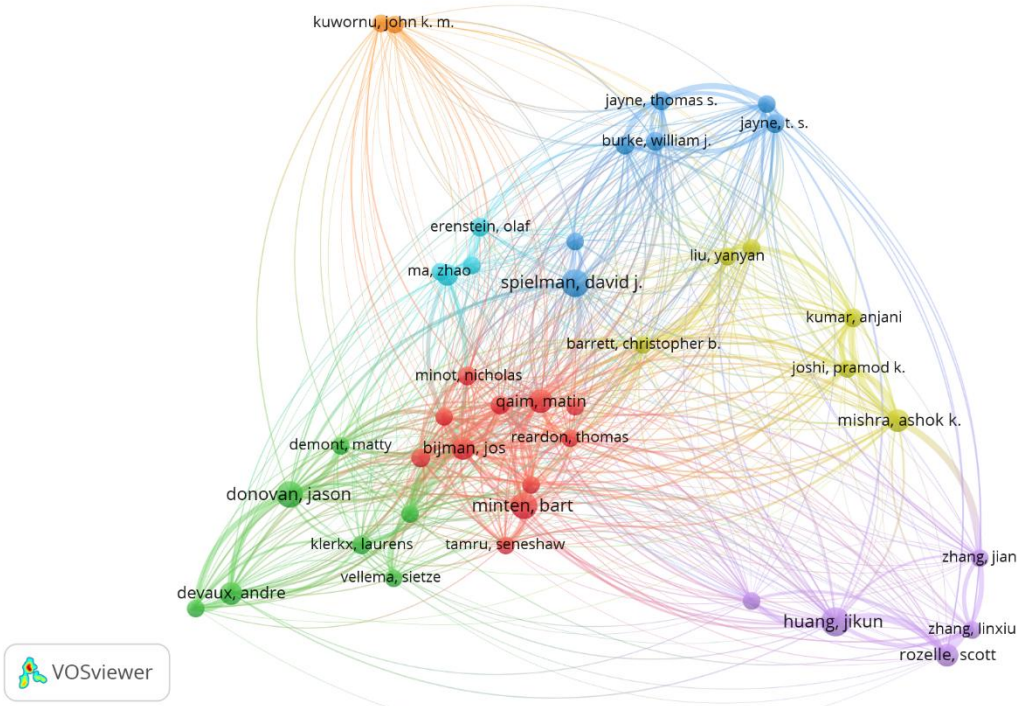
Revista ARACÊ
ISSN: 2358-2472

previous figures, demonstrating the importance and relevance of family farming and the institutional market.

ANALYSIS OF THE RELEVANCE OF THE AUTHORS

With the *VOSviewer software,* the search was carried out in *co-authorship*, using the analysis unit on authors. Co-authorship presents acceptable content validity as a measure of research collaboration (Ponomariov; Boardman, 2016). With the restriction, the number of authors decreases to three hundred and fifty-one (351), out of the total of four thousand one hundred and thirty-seven (4,137). The authors' analysis was generated, figure 5.

Figure 5. Related authors.



Source: Survey data (2023).

It is possible to analyze a highlight in the authors Huang, Jayne, Spielman and Donovan, but it does not overlap with the other authors who appear. Researcher Huang is involved in investigations on agricultural policies, food security, and rural development, with a focus on China (Peking University, 2023). Jayne's field of research encompasses food marketing and pricing policies, changes in land use patterns, sustainable intensification, employment, and rural transformation. The author is a board member of the Regional Network of Agricultural Policy Research Institutes in East and Southern Africa and was

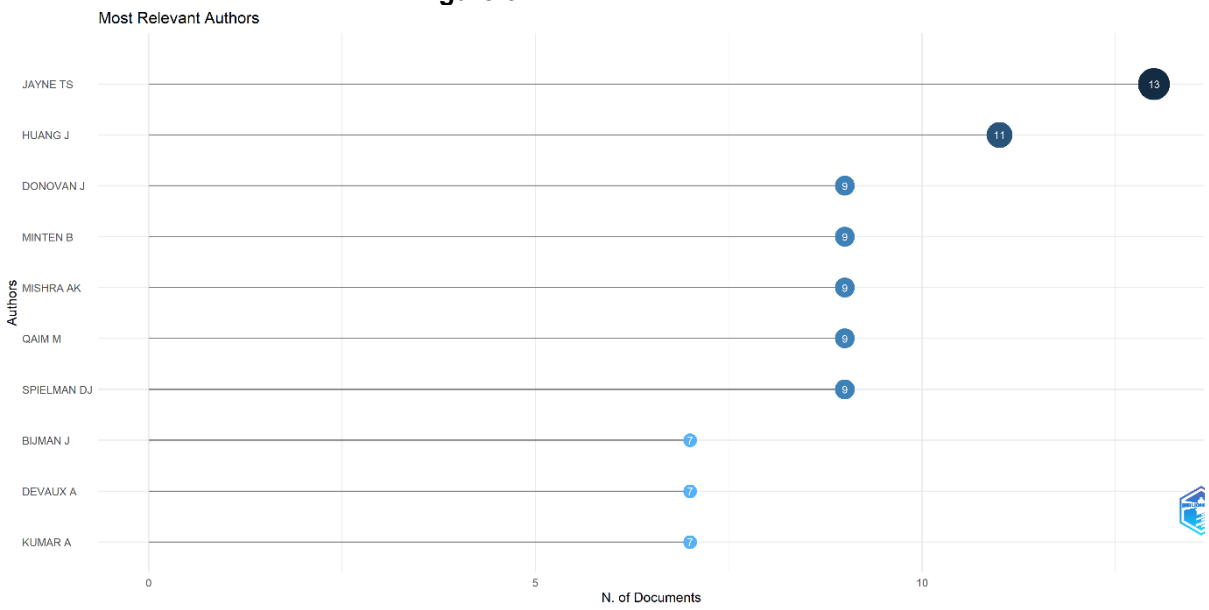
Revista ARACÊ
ISSN: 2358-2472

founding co-director of *the Indaba Agricultural Policy Research Institute*, the research focus is on Africa (Michigan State University, 2023).

Spielman's research agenda includes agriculture and rural development policy, technology and innovation, plant genetic resources, seed systems, and community-driven rural developments, his research has contributed in Asia, Africa, and Pakistan (IFPRI, 2023). Donovan's research principles are rural livelihoods, agricultural markets, food systems and agribusiness development, with a focus on Central America and the Andes region, with additional experience in Brazil, Malawi, Ghana and Kenya. Her research currently engages the private sectors in maize seed systems and the related implications for farmers, non-governmental organizations, and government agencies, with a focus on Mexico and East Africa (Cimmyt, 2023).

There is a small connection between the authors Jayne and Spielman. The connection between the authors occurs mainly through research focused on Africa. But, also through the rural development policy, the changes in land use patterns related to technology and innovation, aiming at the rural transformation of small properties. To identify the relevance of the authors, we also used the *Bibliometrix*, figure 6.

Figure 6. Relevance of Authors.



Source: Survey data (2023).

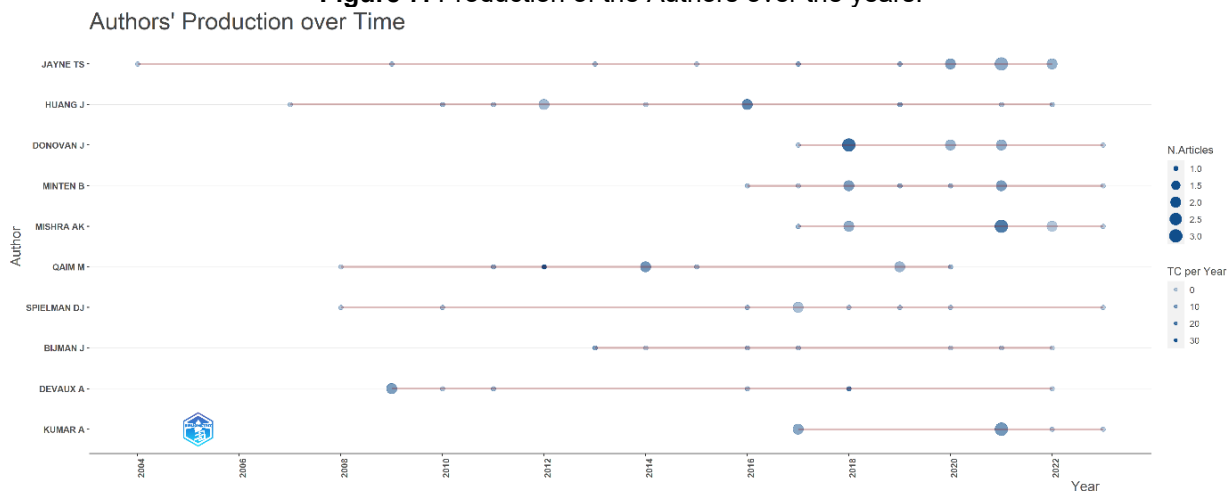
According to the number of articles published, the authors Jayne and Huang have greater relevance, Jayne 13 publications and Huang 11, confirming the VOSviewer analysis, figure 6. Spielman and Donovan, on the other hand, it is clear that the relevance

Revista ARACÊ
ISSN: 2358-2472

of the authors is not different, both have equal relevance. With this analysis, other authors gain prominence, such as Minten, Mishra and Qaim. Thus, explaining figure 6, in which the number of occurrences and calls of the authors are uniformly presented. There is no disproportionate overlap between the authors.

Figure 7 refers to the production of authors over the years, the larger blue circles represent authors who have more than one published article. The intensity of the color of the circles changes according to the total number of citations per year.

Figure 7. Production of the Authors over the years.



Source: Survey data (2023).

It is inferred that the author Jayne began to produce articles in 2004, being the most relevant, considered a seminal author on the subject, followed by Huang after 2006. This analysis explains the greater relevance of the authors, even if it is not discrepant, because they are the seminal ones on the subject, having a greater impact on the area of research analyzed.

The authors have practically the same variability in the number of article publications. With a high production of knowledge after 2008, it is possible to observe a linearity on the topic of study.

The following section will address the identification of relevant themes, according to the keywords of the articles analyzed.

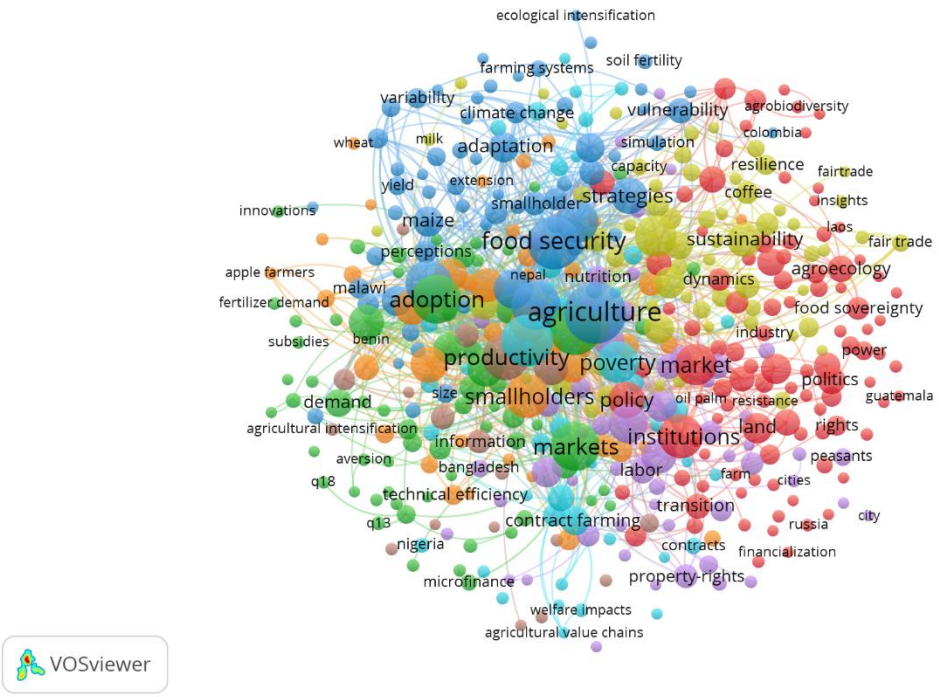
ANALYSIS OF THE IDENTIFICATION OF CO-OCCURRING THEMES

The analysis of the keywords, based on *the co-occurrence*, using the analysis unit all *keywords*. Figure 9 shows that among the keywords, the following stand out: *agriculture*;

Revista ARACÊ
ISSN: 2358-2472

food security; *market*; *adoption* and *institutions*. The analysis of the keywords on the theme is relevant to guide researchers in future research, improving the theme of study.

Figure 5. Keywords.



Source: Survey data (2023).

Relevant themes interact with each other, which aim to minimize food insecurity. People in a situation of food insecurity are served by the social assistance network of the public or philanthropic network, guaranteeing food through the Food Acquisition Program (PAA), in which food supply occurs through institutional purchases (Salgado; Delgrossi, 2022).

In the Chinese field of food security, Ding et al. (2015) highlight its importance, since China often presents moments of difficulty in food security. The direct agriculture program, initiated in 2008, represents one of the government's main initiatives to modernize the distribution of fresh fruits and vegetables and the improvement of food security, the program aims to establish a procurement relationship with more direct intensity towards agricultural communities.

For the analysis of the hot topics of this article, the keywords related to the research themes were selected. Chart 2 presents the data obtained and which hot topics were selected for the study.

Revista ARACÊ
ISSN: 2358-2472

Analyzing the m-index of the keywords, it points to the opportunity to explore the themes related to "institutions" and "governance" in future studies. The first word due to its higher hot topic indicator, with 2.3 m-index, and the second because of its relationship with the first, especially in approaches with an institutionalist focus (North, 2018).

Table 2. Top 30 Words *Hot Topics*

Ordem	*Keyword*	*Ocorrências*	*Ano 1ª*	*h-index*	*n*	*m-index*
1	*institutions*	74	1992	71	31	2,3
2	*markets*	91	1978	78	45	1,7
3	*impact*	103	1993	51	30	1,7
4	*systems*	68	1991	54	32	1,7
5	*land*	36	1993	48	30	1,6
6	*climate-change*	32	2008	24	15	1,6
7	*income*	34	1992	47	31	1,5
8	*food security*	106	1996	40	27	1,5
9	*management*	71	1992	45	31	1,5
10	*poverty*	67	1995	39	28	1,4
11	*growth*	49	1995	39	28	1,4
12	*technology*	41	1993	40	30	1,3
13	*quality*	35	1991	42	32	1,3
14	*productivity*	82	1992	40	31	1,3
15	*governance*	36	2001	28	22	1,3

Revista ARACÊ
ISSN: 2358-2472

Ordem	*Keyword*	*Ocorrências*	*Ano 1ª*	*h-index*	*n*	*m-index*
16	*strategies*	50	1992	39	31	1,3
17	*risk*	50	1994	33	29	1,1
18	*participation*	46	1996	30	27	1,1
19	*adoption*	94	1992	34	31	1,1
20	*sustainability*	43	1993	32	30	1,1
21	*constraints*	32	1992	32	31	1
22	*gender*	36	1998	25	25	1
23	*cooperatives*	39	1993	29	30	1
24	*contract farming*	32	1994	27	29	0,9
25	*collective action*	52	1998	22	25	0,9
26	*determinants*	52	1992	27	31	0,9
27	*performance*	33	1992	27	31	0,9
28	*behavior*	30	1994	23	29	0,8
29	*efficiency*	34	1992	24	31	0,8
30	*adaptation*	34	1994	21	29	0,7

Source: the authors (2023).

FINAL CONSIDERATIONS

It can be concluded that the theme of institutional markets for family farming gained relevance from the 1990s onwards, when family farming became visible. The seminal authors identified were Jayne and Huang. It should be noted that seminal authors do not focus on Brazil, only Donovan has additional experience in the country. Through the interaction of the relevant themes, the keywords, the importance of food security and governance for future studies is noticeable. The importance of institutional markets for the population that is in a situation of food insecurity was identified. Being a relevant and

Revista ARACÊ
ISSN: 2358-2472

growing topic, it needs more research and publications to reach the proportion expected by the theme.

Among the limitations of this research is the use of a sample of data from the *Web of Science*, and for a broader analysis it would be necessary to apply it to different databases, inserting productions from more recent years.

Revista ARACÊ
ISSN: 2358-2472

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