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THE ROLE AGRICULTURE COOPERATIVES FOR FARMER EMPOWERMENT: A LITERATURE REVIEW AND ITS IMPLICATIONS ON POVERTY

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Abstract
This study examines the role of agricultural cooperatives in empowering farmers and alleviating poverty in rural areas. Despite their potential, cooperatives face several challenges that hinder their effectiveness, especially in developing countries. This study aims to evaluate the contributions of agricultural cooperatives in improving farmers' access to finance, technology, and markets, and how they support integration into modern agricultural systems. A literature review approach based on the PRISMA method and bibliometric analysis was employed, identifying 157 relevant articles published between 2005 and 2024. The findings reveal that agricultural cooperatives significantly reduce multidimensional poverty in countries like China and Tanzania by improving material and social well-being. However, challenges such as low organizational capacity, uneven benefit distribution, and inadequate policy support persist. The study also highlights gaps in adapting cooperative models to local socio-economic contexts. Future research should focus on adapting suitable technologies, strengthening partnerships with smallholder farmers, and evaluating the role of government policies in fostering cooperative ecosystems. This study offers insights into the potential of cooperatives.as a tool for economic empowerment and offers suggestions for future research on inclusive and sustainable rural development.
Keywords: Agriculture, Cooperatives, Poverty.

Abstrak
Penelitian ini mengkaji peran koperasi pertanian dalam memberdayakan petani dan mengurangi kemiskinan di daerah pedesaan. Meskipun memiliki potensi besar, koperasi menghadapi berbagai tantangan yang menghambat efektivitasnya, terutama di negara berkembang. Penelitian ini bertujuan untuk mengevaluasi kontribusi koperasi pertanian dalam meningkatkan akses petani terhadap pembiayaan, teknologi, dan pasar, serta bagaimana koperasi mendukung integrasi ke dalam sistem pertanian modern. Pendekatan tinjauan pustaka dengan metode PRISMA dan analisis bibliometrik digunakan, yang mengidentifikasi 157 artikel relevan yang diterbitkan antara tahun 2005 hingga 2024. Hasil penelitian menunjukkan bahwa koperasi pertanian secara signifikan mengurangi kemiskinan multidimensi di negara-negara seperti China dan Tanzania dengan meningkatkan kesejahteraan material dan sosial. Namun, tantangan seperti kapasitas organisasi yang rendah, distribusi manfaat yang tidak merata, dan dukungan kebijakan yang kurang memadai masih tetap ada. Penelitian ini juga menyoroti kesenjangan dalam menyesuaikan model koperasi dengan konteks sosial-ekonomi lokal. Penelitian lebih lanjut sebaiknya difokuskan pada adaptasi teknologi yang sesuai, memperkuat kemitraan dengan petani kecil, dan mengevaluasi peran kebijakan pemerintah dalam mendukung ekosistem koperasi. Penelitian ini memberikan wawasan tentang potensi koperasi sebagai alat pemberdayaan ekonomi dan memberikan saran untuk penelitian masa depan mengenai pembangunan pedesaan yang inklusif dan berkelanjutan.
Kata Kunci: Pertanian, Koperasi, Kemiskinan.

INTRODUCTION

The United Nations has created the Sustainable Development Goals agenda to prioritize social and economic welfare while still paying attention to ecology.[1,2] Sustainable Development is formulated to realize humanity's dedication to addressing the issues caused by unsustainable practices., environmentally unfriendly strategies, or pollution caused by human activities.[3] In the Sustainable Development Goals, the first point stated as a priority is no poverty. This means indicating a global agreement to eliminate poverty in all its forms throughout the world.[4]

Poverty, viewed from an economic perspective, stems from the inequality of resource ownership caused by uneven income distribution, variations in human resource quality, and differing access to resources, access to capital, and low employment opportunities. High poverty rates are a sign of the role of society as a subject of development.[5]

Cooperatives, play an important role in the functioning of society. Most people are familiar with cooperatives. Although people interpret cooperatives differently, cooperatives have a relationship with the economy that favors the poor. This can be seen from the way cooperatives improve the welfare of their members. Cooperatives function as a forum to empower the poor by overcoming various socio-economic, cultural, and psychological barriers. Thus, fewer people suffer from a lack of basic needs (food, clothing, and shelter) and do not even cause problems for the national economy. In this case, cooperatives try to bridge the gap by providing basic services to the entire community, especially farmers.[6]

Agricultural cooperatives have a strategic role in empowering farmers and reducing poverty, especially in rural areas. Studies show that cooperatives can improve farmer's access to markets, financing, and technology, thereby strengthening their economic position. For example, in China, agricultural cooperatives have shown significant impacts in reducing the poverty

[1] S. A. Macht et al., "Management Research and the United Nations Sustainable Development Goals," *Journal of Management & Organization* 26, no. 6 (2020): 917–28, https://doi.org/10.1017/jmo.2020.36.

[2] D. Nyberg et al., *Organising Responses to Climate Change: The Politics of Mitigation, Adaptation and Suffering* (Cambridge University Press, 2022).

[3] M. F. Cordova and A. Celone, "SDGs and Innovation in the Business Context Literature Review," *Sustainability* 11, no. 24 (2019): 7043, https://doi.org/10.3390/su11247043.

[4] I. Ishartono et al., "Potret Orang Miskin Dari Perspektif Kekuatan," *Share: Social Work Journal* 7, no. 1 (2017): 46–53, https://doi.org/10.24198/share.v7i1.13816.

[5] M. D. Rifaldo and T. W. Rejekiningsih, "Analisis Ketimpangan Distribusi Pendapatan Di Indonesia Tahun 2015-2019," *Diponegoro Journal of Economics* 13, no. 2 (2024): 27–40, https://doi.org/10.14710/djoe.43258.

[6] A. P. A. Yekti et al., "The Effect of Paclobutrazol on the Development of Zebrafish (Danio Rerio) Embryos," *Zebrafish* 11, no. 1 (2014): 1–9, https://doi.org/10.1089/zeb.2013.090.

vulnerability of smallholder households through increasing social capital and collaboration among members.[7]

In developing countries such as Uganda and Nepal, cooperatives have become a strategic mechanism for empowering rural communities through access to new resources and economic opportunities. In Uganda, agricultural cooperatives have been able to create jobs and improve improving the quality of life through diversification of economic activities, such as integrating the agricultural sector with tourism.[8,9] However, challenges such as weak organizational capacity and lack of policy support often hinder the success of these cooperatives.[10]

Integrating cooperatives into rural development strategies worldwide can enhance the achievement of the SDGs, particularly in poverty reduction, minimizing social disparities, and improving the welfare of rural communities.[11] Thus, agricultural cooperatives are not only a tool for economic empowerment, but also an important instrument in driving social and environmental change. Globally, the integration of cooperatives into rural development strategies can support the achievement of SDGs, especially in poverty alleviation, reducing social disparities, and improving the welfare of rural communities.[12] Thus, agricultural cooperatives are not only a tool for economic empowerment, but also an important instrument in driving social and environmental transformation.

This article is divided into four sections. Section 2 details the design and methodology used for the literature review and article selection. Section 3 details the literature analysis of the selected articles, covering the classification of the articles, followed by a discussion of the content: Agricultural cooperatives as a tool for poverty alleviation, challenges faced by cooperatives, and the role of government in ensuring the sustainability of cooperatives. This section also discusses how cooperatives improve their members' welfare, as well as steps that can be taken to overcome operational and financial constraints often faced by cooperatives. The last section, Section 4 concludes this review by identifying existing research gaps, acknowledging the limitations of this

[7] S. Livia et al., "Assessment of Wastewater Reuse Potential for Irrigation in Rural Semi-Arid Areas: The Case Study of Punitaqui, Chile," *Clean Technologies and Environmental Policy* 22, no. 6 (2020): 1325–38, https://doi.org/10.1007/s10098-020-01874-3.

[8] M. Y. Yusliza et al., "A Structural Model of the Impact of Green Intellectual Capital on Sustainable Performance," *Journal of Cleaner Production* 249 (2020): 119334, https://doi.org/10.1016/j.jclepro.2019.119334.

[9] D. Dhakal and P. Mueser, "Agricultural Cooperatives and the Failure to Achieve Commercialization of Agriculture in Nepal: A Case Study of the Chitwan District," *Research in Globalization* 7 (2023): 100165, https://doi.org/10.1016/j.resglo.2023.100165.

[10] T. Thambiran et al., "Upgradation of Metering Infrastructure of Low Voltage Distributed Network in Nottingham Road, Kwa-Zulu Natal, South Africa," *IEEE Access* 12 (2023): 22687–706, https://doi.org/10.1109/ACCESS.2023.3335659.

[11] M. K. Datta, *Looking Beyond Demand Response: Barriers and Opportunities to Deploying Virtual Power Plants among Rural Electric Cooperatives in the United States* (2024).

[12] Datta, *Looking Beyond Demand Response: Barriers and Opportunities to Deploying Virtual Power Plants among Rural Electric Cooperatives in the United States*.

literature review, and providing recommendations for further research that focuses on strengthening the role of cooperatives in supporting sustainable development and poverty alleviation.

THEORITICAL

Studies on farmer engagement show that important criteria impacting participation in agricultural cooperatives frequently reflect underlying desires. These factors emphasize how personal preferences, resource availability, and socioeconomic conditions influence farmers' decisions to join and actively participate in cooperatives[13,14] with determinants such as age, education, marital status, health, family size, workforce size, and landholding size.

Examining the household's social and psychological conditions has identified implicit influencing factors[15,16,17] and analyzing the conditions of farmers' social networks, such as the number of clients, knowledge of production prices, maintenance of social capital, information acquisition, infrastructure, service support, and rural credit.[18,19] For instance Wossen et al.,[20] research has shown that as psychological security improves, households are more ready to participate in cooperatives in order to reap higher economic rewards. Furthermore, government support significantly increases households' desire to participate in agricultural cooperatives.[21,22]

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[13] E. Fischer and M. Qaim, "Linking Smallholders to Markets: Determinants and Impacts of Farmer Collective Action in Kenya," *World Development* 40, no. 6 (2012): 1255–68, https://doi.org/10.1016/j.worlddev.2011.11.018.

[14] D. Mojo et al., "Social and Environmental Impacts of Agricultural Cooperatives: Evidence from Ethiopia," *International Journal of Sustainable Development & World Ecology* 22, no. 5 (2015): 388–400, https://doi.org/10.1111/apce.12103.

[15] S. Dhahri and A. Omri, "Entrepreneurship Contribution to the Three Pillars of Sustainable Development: What Does the Evidence Really Say?," *World Development* 106 (2018): 64–77, https://doi.org/10.1016/j.worlddev.2018.01.008.

[16] Mojo et al., "Social and Environmental Impacts of Agricultural Cooperatives: Evidence from Ethiopia."

[17] P. S. Ward, "Transient Poverty, Poverty Dynamics, and Vulnerability to Poverty: An Empirical Analysis Using a Balanced Panel from Rural China," *World Development* 78 (2016): 541–53, https://doi.org/10.1016/j.worlddev.2015.10.022.

[18] M. Mabuza et al., "Collective Action in Small-Scale Mushroom Production in Swaziland: Does Organisational Form Matter?," *Development in Practice* 25, no. 7 (2015): 1025–42, https://doi.org/10.1080/09614524.2015.1070791.

[19] A. R. Quisumbing and L. Pandolfelli, "Promising Approaches to Address the Needs of Poor Female Farmers: Resources, Constraints, and Interventions," *World Development* 38, no. 4 (2010): 581–92, https://doi.org/10.1016/j.worlddev.2009.10.006.

[20] T. Wossen et al., "Impacts of Extension Access and Cooperative Membership on Technology Adoption and Household Welfare," *Journal of Rural Studies* 54 (2017): 223–33, https://doi.org/10.1016/j.jrurstud.2017.06.022.

[21] J. Ochieng et al., "Strengthening Collective Action to Improve Marketing Performance: Evidence from Farmer Groups in Central Africa," *Journal of Agricultural Education and Extension* 24, no. 2 (2018): 169–89, https://doi.org/10.1080/1389224X.2018.1432493.

[22] Quisumbing and Pandolfelli, "Promising Approaches to Address the Needs of Poor Female Farmers: Resources, Constraints, and Interventions."

Cooperatives can play a key role in fostering rural industrialization and boosting household productivity,[23] enhance market power by leveraging economies of scale through collective commercialization, and establishing new vertical marketing links. It has been found[24,25] unlike competitors, agricultural cooperatives offer their members more favorable and stable prices for a variety of products, Getnet & Anullo[26] they also act as market facilitators for both members and non-members, increasing product prices for buyers in the regions where they operate.[27]

Numerous studies have looked at the impact of cooperative membership on farmers. Agricultural cooperatives can significantly increase members' technology adoption in developing nations,[28,29,30,31] enhance market power by utilizing economies of scale through collective commercialization, creating new vertical marketing links, improving crop yields, and increasing farm revenue, while elevating efficiency and financial performance.[32,33] In some locations, cooperatives are created and managed by government agencies, focusing largely on the economic and political objectives of private firms and local elites, resulting in inadequate benefit for poorer

[23] H. Pamuk et al., "Decentralised Innovation Systems and Poverty Reduction: Experimental Evidence from Central Africa," *European Review of Agricultural Economics* 42, no. 1 (2015): 99–127, https://doi.org/10.1093/erae/jbu007.

[24] M. Hernández-Espallardo et al., "Farmers' Satisfaction and Intention to Continue Membership in Agricultural Marketing Co-Operatives: Neoclassical versus Transaction Cost Considerations," *European Review of Agricultural Economics* 40, no. 2 (2013): 239–60, https://doi.org/10.1093/erae/jbs024.

[25] S. L. Stattman and A. P. Mol, "Social Sustainability of Brazilian Biodiesel: The Role of Agricultural Cooperatives," *Geoforum* 54 (2014): 282–94, https://doi.org/10.1016/j.geoforum.2014.04.001.

[26] K. Getnet and T. Anullo, "Agricultural Cooperatives and Rural Livelihoods: Evidence from Ethiopia," *Annals of Public and Cooperative Economics* 83, no. 2 (2012): 181–98, https://doi.org/10.1111/j.1467-8292.2012.00460.x.

[27] T. S. Jayne et al., "Principal Challenges Confronting Smallholder Agriculture in Sub-Saharan Africa," *World Development* 38, no. 10 (2010): 1384–98, https://doi.org/10.1016/j.worlddev.2010.06.002.

[28] G. T. Abate et al., *Impact of Agricultural Cooperatives on Smallholders' Technical Efficiency: Evidence from Ethiopia*, 2013, https://doi.org/10.2139/ssrn.2225791.

[29] W. Ma and A. Abdulai, "IPM Adoption, Cooperative Membership and Farm Economic Performance: Insight from Apple Farmers in China," *China Agricultural Economic Review* 11, no. 2 (2019): 218–36, https://doi.org/10.1108/CAER-12-2017-0251.

[30] J. Manda et al., "Does Cooperative Membership Increase and Accelerate Agricultural Technology Adoption? Empirical Evidence from Zambia," *Technological Forecasting and Social Change* 158 (2020): 120160, https://doi.org/10.1016/j.techfore.2020.120160.

[31] Wossen et al., "Impacts of Extension Access and Cooperative Membership on Technology Adoption and Household Welfare."

[32] W. Ma et al., "Effects of Cooperative Membership on Financial Performance of Banana Farmers in China: A Heterogeneous Analysis," *Annals of Public and Cooperative Economics* 93, no. 1 (2022): 5–27, https://doi.org/10.1111/apce.12326.

[33] R. Qu et al., "Effects of Agricultural Cooperative Society on Farmers' Technical Efficiency: Evidence from Stochastic Frontier Analysis," *Sustainability* 12, no. 19 (2020): 8194, https://doi.org/10.3390/su12198194.

households,[34] low wages and perceived dangers of default frequently prevent them from accessing formal service channels.[35]

RESEARCH METHODS

This study adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines.[36] PRISMA offers clear instructions for conducting systematic literature reviews, aiming to enhance the quality of both reporting and methodology.[37] The articles were analyzed using bibliometrics. This analysis is accomplished using a systematic literature review approach that uses statistical measures to evaluate the knowledge of the examined articles.[38]

Bibliometric analysis is classified into four types: bibliographic linkages, co-citation analysis, co-author analysis, and co-word analysis.[39] This study focuses on bibliographic relationships, which involve analyzing citations to identify important references in articles, documents, and journals.[40] Co-author analysis investigates the authors, their countries of origin, and their affiliations within the same article.[41] Co-word analysis examines the conceptual structure of a topic by analyzing the key terms within a document.[42] Co-word analysis is important for exploring significant collaborations and keywords.

Literature Search Flow Chart

The research method employed a literature review, specifically a search for scientific research articles from 2005 to 2024 using the Scopus database. The search was conducted using the keywords "Cooperatives OR Cooperation" AND "Agriculture" AND "Poverty." This search yielded a total of 296,082 results To narrow down the findings, The search was restricted to articles

[34] Y. Liu et al., "Spatio-Temporal Patterns of Rural Poverty in China and Targeted Poverty Alleviation Strategies," *Journal of Rural Studies* 52 (2017): 66–75, https://doi.org/10.1016/j.jrurstud.2017.04.002.

[35] P. Seuneke et al., "Moving Beyond Entrepreneurial Skills: Key Factors Driving Entrepreneurial Learning in Multifunctional Agriculture," *Journal of Rural Studies* 32 (2013): 208–19, https://doi.org/10.1016/j.jrurstud.2013.06.001.

[36] D. Moher et al., "Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement," *BMJ* 339 (2009), https://doi.org/10.1016/j.ijsu.2010.02.007.

[37] E. Stovold et al., "Study Flow Diagrams in Cochrane Systematic Review Updates: An Adapted PRISMA Flow Diagram," *Systematic Reviews* 3, no. 1 (2014): 54, https://doi.org/10.1186/2046-4053-3-54.

[38] G. González-Alcaide, "Bibliometric Studies Outside the Information Science and Library Science Field: Uncontainable or Uncontrollable?," *Scientometrics* 126, no. 8 (2021): 6837–70, https://doi.org/10.1007/s11192-021-04061-3.

[39] M. Aria and C. Cuccurullo, "Bibliometrix: An R-Tool for Comprehensive Science Mapping Analysis," *Journal of Informetrics* 11, no. 4 (2017): 959–75, https://doi.org/10.1016/j.joi.2017.08.007.

[40] H. G. Small and M. E. Koenig, "Journal Clustering Using a Bibliographic Coupling Method," *Information Processing & Management* 13, no. 5 (1977): 277–88, https://doi.org/10.1016/0306-4573(77)90017-6.

[41] Aria and Cuccurullo, "Bibliometrix: An R-Tool for Comprehensive Science Mapping Analysis."

[42] Aria and Cuccurullo, "Bibliometrix: An R-Tool for Comprehensive Science Mapping Analysis."

published in English journals, excluding conference papers, book chapters, reviews, notes, books, conference reports, and editorials. This limitation was implemented to ensure comprehensive data collection. After applying these criteria, a total of 157 articles were selected for analysis, which will serve as the database for the bibliometric analysis stage.

Data Collection and Analysis

The data collection process employed the PRISMA diagram (Figure 1), with four distinct filtering stages (Utomo et al., 2018). The Scopus database was initially used for the first filtering stage, applying specific data restrictions. This step resulted in the identification of 157 articles, which then proceeded to a second filtering stage based on the criteria outlined in Table 2.

Figure 1. PRISMA *diagram*

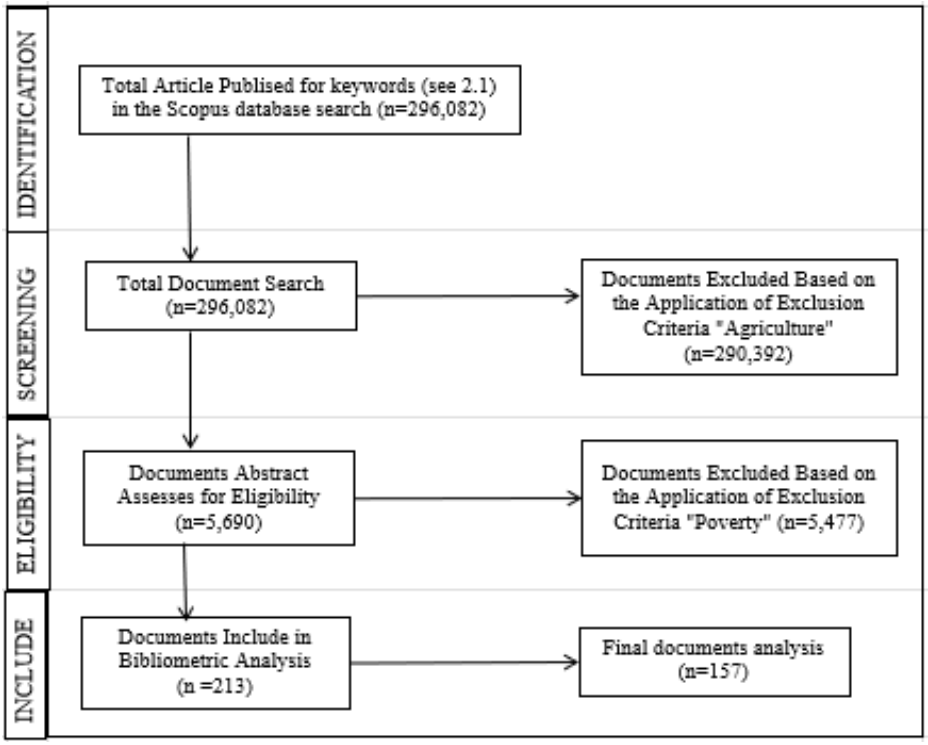


Table 1. Criteria for Selecting Articles

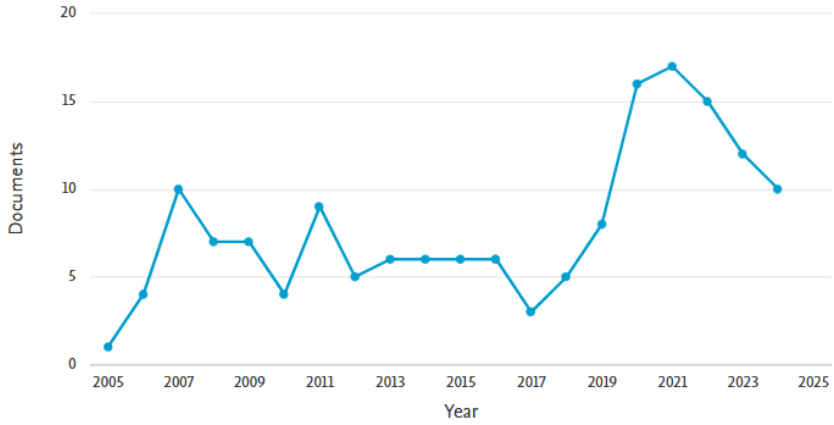
Eligibility Criteria	Elimination Criteria
Articles published in 2005-2024	All articles published before 2005
Journals selected according to research subjects	Discuss other things outside of agricultural cooperatives and poverty
Only discuss agricultural cooperatives and poverty.	Discuss other things outside of agricultural cooperatives and poverty
Abstracts and titles contain the keywords *"cooperatives OR cooperation + agriculture + poverty" "cooperatives OR cooperation + agriculture + poverty"*	Abstracts do not contain the keywords "*cooperatives OR cooperation + agriculture + poverty"*

According to the literature search, this can be explained as follows:: (1) the data search stage with the keyword *"cooperatives OR cooperation"* as many as 296,082 articles, (2) the identification stage, articles that do not contain the context of *"agriculture"* as many as 5,690 articles (exclusion) and articles that contain the context of *"agriculture"* as many as 290,392 articles (inclusion); (3) at the screening stage, articles that do not contain the context of *"poverty"* as many as 5,477 articles (exclusion) and articles that contain the context of *"poverty"* as many as 213 articles (inclusion), at the eligibility stage, articles under 2005 as many as 56 articles (exclusion) and articles from 2005 - 2024 as many as 157 items (inclusion) and abstracts containing the keywords *"cooperatives OR cooperation + agriculture + poverty"*. So 157 items were obtained that met the inclusion criteria to be analyzed intensively. Based on the search results, rural cooperatives can reduce poverty rates, according to case studies in several countries in the world.

RESULTS AND DISCUSSION

The quantity of publications and citations for articles on agriculture cooperative and poverty.

Figure 2. Number of articles published on agriculture cooperatives and poverty



A total of 157 articles related to agriculture, cooperative and poverty from 2005 to 2024 were analyzed (Figure 2). The number of articles began to increase significantly in 2005, with the first article from 2005 written by Orio Kuniyasu and Tatsuji Onimaru entitled “A new direction in international cooperation, utilizing Japan’s experience and expertise in the field of agricultural and rural development.” The article emphasized the need for international collaboration leveraging Japan’s knowledge and skills in agricultural and rural development. Its main focus was the development and adaptation of sustainable agricultural development methods for environmental conservation, with an integrated approach based on farmer participation.

Articles related to agriculture cooperatives and poverty have continued to increase from 2006 to 2024. In 2006 there were four articles. In 2021 there were seventeen articles published, and

in 2024 there were ten articles published. The number of articles published reached 157 articles. As seen in Figure 3, the United States is the country that publishes the most articles on agriculture cooperatives and poverty, with 36 articles in 2005–2024. Meanwhile, 19 articles were published in China, followed by 17 articles published in the United Kingdom. Several other articles came from Australia, India, Vietnam, Germany, South Africa, Canada, Ethiopia and Nigeria.

Figure 3. Categories of countries producing publications on agriculture, cooperatives and poverty 2005-2024.

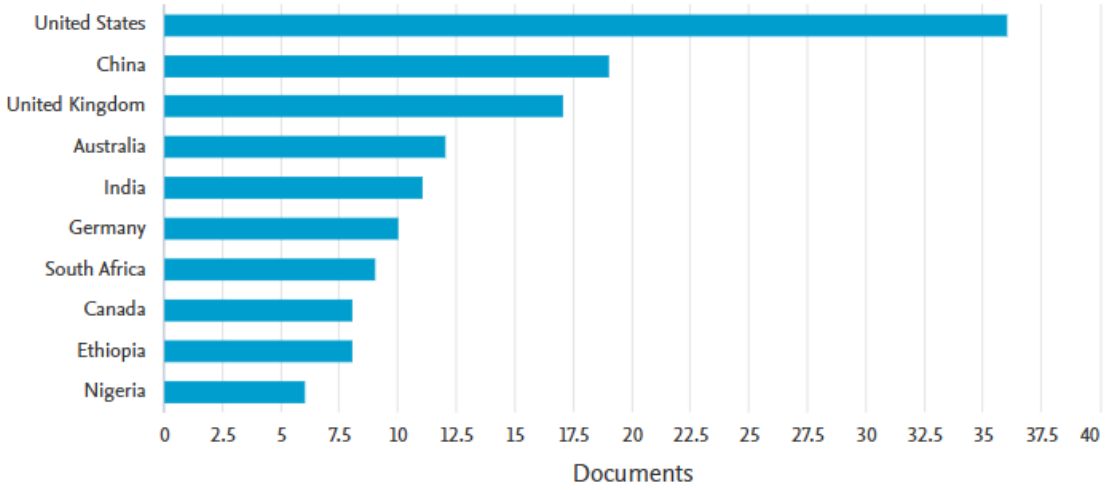


Table 2. Number of citations to articles on agriculture, cooperatives and poverty

Year	Citations	Percentage
2005	0	0%
2006	194	6%
2007	390	11%
2008	115	3%
2009	457	13%
2010	104	3%
2011	221	6%
2012	188	5%
2013	66	2%
2014	46	1%
2015	95	3%
2016	478	14%
2017	27	1%
2018	137	4%
2019	196	6%

Year	Citations	Percentage
2020	419	12%
2021	298	8%
2022	71	2%
2023	20	1%
2024	4	0%
Total	3526	100%

The number of citations of scientific articles from 2005 to 2024 on agriculture, cooperatives and poverty shows fluctuating figures every year. The growth is shown in Table 2. The table shows the number of articles published in 2014 showing the highest number of citations of 478 citations (14%) followed by the publication of articles in 2009 as many as 457 citations (13%) and in 2020 as many as 419 citations (12%).

Implications of the Role of Cooperatives in Poverty Reduction

The latest publication trends in agricultural cooperatives and poverty show a shift in research focus that is increasingly directed at integrating cooperatives with the agricultural sector as a tool for empowering the rural economy. Recent research emphasizes cooperative models that increase market access for farmers and optimize the use of technology to increase agricultural productivity. This is closely related to efforts to create cooperatives that do not only focus on short-term profits but also long-term desires. Thus, cooperatives become an important pillar in supporting sustainable agriculture that can contribute directly to poverty alleviation in rural areas.

The main concepts that have developed in the study of agricultural cooperatives and poverty focus on economic empowerment and financial independence. Cooperatives in agriculture are seen as one model that can strengthen farmers' bargaining power, by providing better access to various resources, training, technology, and wider markets. Farmers who are members of cooperatives have the opportunity to improve their production and get better prices for their agricultural products. In addition, with the existence of cooperatives, farmers can obtain broader information and knowledge, which allows them to compete more efficiently in the market. One concept that is increasingly popular in the context of agricultural cooperatives is economic resilience. Currently, cooperatives play a significant role in helping farmers overcome major challenges, such as climate change and falling market prices that can affect their incomes. Cooperatives provide support through training to adopt new technologies and facilitate access to capital needed to maintain production continuity. Thus, cooperatives do not only focus on short-term economic empowerment but also on strengthening farmers' economic resilience in the face of global threats.

The role of cooperatives in community economic empowerment, especially for farmer groups, is very significant in increasing their competitiveness. Cooperatives provide access to more efficient agricultural inputs, low-interest credit, and training that supports product quality improvement. As a collective entity, cooperatives also help reduce transaction costs and increase farmer's bargaining power over the selling price of their products. Moreover, cooperatives enable farmers to run production efficiently, reduce waste, and increase profits which in turn improve their economic well-being.

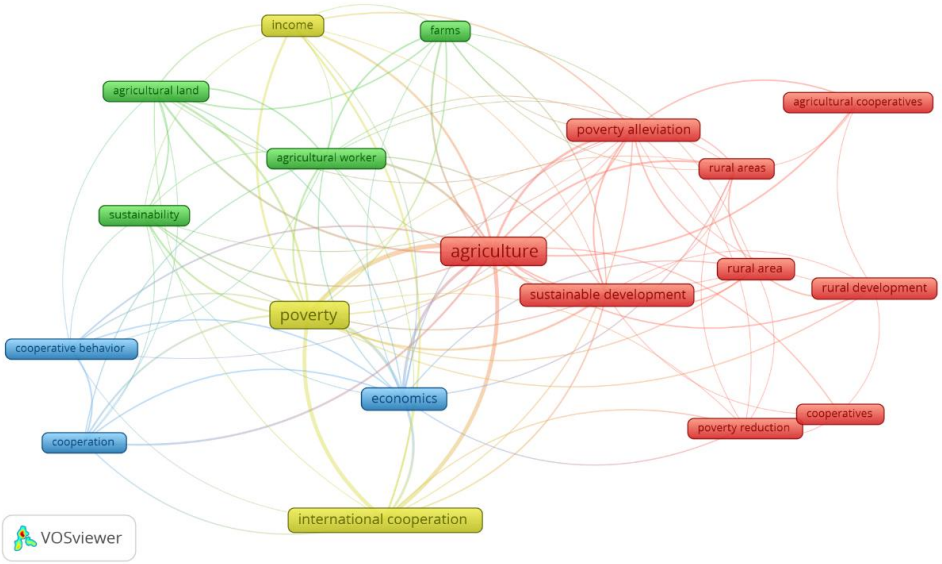
The implications of the role of cooperatives in poverty reduction are increasingly evident, especially through increasing more stable and sustainable farmer incomes. Cooperatives act as a link between farmers and modern agricultural technology, training, and access to capital that was previously difficult to obtain. By utilizing cooperative facilities, farmers can increase their agricultural output, which ultimately increases income and reduces dependence on loan sharks or third parties who are often burdensome. On the other hand, cooperatives also play a social role by building strong networks among farmers, allowing them to share knowledge and resources that are useful in facing common challenges.

Overview of agriculture cooperatives and poverty based on bibliometric analysis

This section provides an overview of agriculture cooperatives and their relationship to poverty through bibliometric analysis. It specifically utilizes co-occurrence analysis, which identifies the connections between words based on their simultaneous appearance in a particular text. This conceptual framework enables the author to create a map that illustrates the co-occurrence network drawn from the Scopus database.

Co occurrence analysis is a valuable tool for identifying research restriction. A co occurrence map, the size of a word node represents the number of phrases that commonly appear together. The closeness of nodes reflects the level of intellectual relatedness, words that are close together typically occur together, while words that are far apart tend to appear less frequently in conjunction. Lines connecting word nodes illustrate the relationships between phrases cited by different researchers. The color commonly cited phrases reflects the schools of thought that influence the structure of knowledge within a specific research field or discipline, such as agriculture cooperatives and poverty.

Figure 4. The co-occurrence relationship of agriculture, cooperatives, and poverty



The Figure 4 shows there are only four clusters that identified in the database for agriculture, cooperatives and poverty. The most commonly used keywords are agriculture (cluster 1), agricultural worker (cluster 2), cooperation (cluster 3), and poverty (cluster 4).

The occurrence value in cluster 1 shows that research on agriculture has been widely conducted. Cluster 1 is seen in the red node. Research on agriculture has a relationship with influencing factors. In articles from 2005 to 2024, using related words, agriculture such as, agricultural cooperatives, cooperatives, poverty alleviation, poverty reduction, rural area, rural development and sustainable development are often used, this cluster illustrates the focus on collaborative strategies such as agricultural development and technological innovation to support poverty reduction in rural areas, and integrate sustainable development as a priority. Agricultural cooperatives aim to increase family income through agricultural commercialization, by increasing agricultural production and supporting crop marketing, where survey results found that financial services were the cooperative services most valued by farming families.[43]

[43] Dhakal and Mueser, "Agricultural Cooperatives and the Failure to Achieve Commercialization of Agriculture in Nepal: A Case Study of the Chitwan District."

Table 3. Network Visualisation Data

Clusters	Items	Total Link	Occurrence
1	Agricultural cooperatives	4	5
	Agriculture	17	63
	Cooperatives	4	7
	Poverty alleviation	16	19
	Poverty reduction	7	6
	Rural area	10	9
	Rural areas	10	6
	Rural development	7	10
	Sustainable development	12	16
2	Agricultural land	11	7
	Agricultural worker	14	8
	Farms	10	5
3	Cooperation	8	7
	Cooperative behaviour	9	5
	Economics	14	18
4	Income	10	10
	International cooperation	11	30
	Poverty	16	54

In cluster 2 using related words agricultural land, agricultural workers, farms and sustainability, this cluster emphasizes the role of agricultural workers and land as the center of sustainable agricultural systems. This cluster illustrates the importance of the linkages between land governance, environmental sustainability, and labor efficiency to increase agricultural productivity. Sustainability in the agricultural sector is highly dependent on efficient land use, maintaining ecological balance, and the involvement of agricultural workers, the success of sustainable agricultural systems requires not only technology or financial interventions, but also integrated strategies, including the role of agricultural workers, efficient land governance, and concern for environmental sustainability. The knowledge generated through this participatory approach is essential to create innovative solutions that can increase productivity while ensuring sustainability in the agricultural sector.[44]

In cluster 3 using words such as cooperation, cooperation behavior, and economics, this cluster emphasizes the importance of international cooperation and collaborative behavior in promoting inclusive economic development. The emphasis of this cluster is on the formation of global alliances that support equitable social and economic growth, especially for developing

[44] N. Buehren, *Gender and Agriculture in Sub-Saharan Africa: Review of Constraints and Effective Interventions* (Gender Innovation Lab, World Bank, 2023).

countries. International cooperation and collaborative behavior are essential to support inclusive economic development, other forms of cooperation are based on the principles of collaboration, such as equal participation, transparency, trust, and accountability. This strategy is important for building global alliances that support economic and social growth, especially in developing countries, in addition, international cooperation allows cross-regional collaboration to address global challenges, such as climate change, land degradation, and food security.[45]

Meanwhile, in cluster 4 using the words income, international cooperation, and poverty, this cluster reflects the focus on poverty alleviation through increasing income and international collaboration and highlights the importance of rural development policies oriented towards poverty reduction and community empowerment through the development of the agricultural and agro-industrial sectors. Cooperative irrigation schemes can increase rice production and the net income of small farmers, which directly supports poverty reduction in rural areas. The benefits of rice farming create new employment opportunities, which contribute to community empowerment, and some feasible approaches to managing small-scale agricultural infrastructure can be adopted in rural development policies.[46] In addition, farmer cooperatives increase small farmers' access to finance, technology, and markets, which ultimately reduces multidimensional poverty, including material poverty, with a focus on strengthening the structure of the dynamics of the relationship between cooperatives and farmers, the integration of small farmers into modern agricultural systems is essential to increase income and welfare.[47]

CONCLUSION

Data analysis indicates that agricultural cooperatives significantly reduce poverty, especially in rural areas, through various mechanisms. Cooperatives help increase the income of small farmers by facilitating access to finance, technology, markets, and supporting their integration into modern agricultural systems. Case studies in several countries, such as Tanzania and China, confirm that the success of cooperatives also contributes to the creation of new job opportunities, community empowerment, and the reduction of multidimensional poverty, including material poverty, capabilities, and rights.

[45] W. Kabato et al., "Towards Climate-Smart Agriculture: Strategies for Sustainable Agricultural Production, Food Security, and Greenhouse Gas Reduction," *Agronomy* 15, no. 3 (2025): 565, https://doi.org/10.3390/agronomy15030565.

[46] C. H. Zhang and W. A. Benjamin, "The Contribution of Cooperative Irrigation Scheme to Poverty Reduction in Tanzania," *Journal of Integrative Agriculture* 20, no. 4 (2021): 953–63, https://doi.org/10.1016/S2095-3119(21)63634-1.

[47] Y. Shen et al., "How Do Cooperatives Alleviate Poverty of Farmers? Evidence from Rural China," *Land* 11, no. 10 (2022): 1836, https://doi.org/10.3390/land11101836.

However, the effectiveness of cooperatives depends on strong organizational capacity, efficient resource management, and relevant policy support. Challenges such as low human resource capacity and unequal distribution of benefits are still obstacles to achieving cooperative goals. Therefore, a comprehensive approach is necessary to strengthen relationship between cooperatives and their members, while optimizing risk-sharing mechanisms.

International cooperation and cross-regional collaboration are also important elements in supporting the sustainability of cooperatives. This strategy enables global alliances to address challenges such as climate change, land degradation, and the food security. With an emphasis on inclusive rural development, the development of the agricultural and agro-industrial sectors through cooperatives can be the key to eradicating poverty on a global scale. The combination of technological innovation, sustainable land management, and community-oriented rural development policies are important steps in achieving these goals.

The findings emphasize the key concepts of economic empowerment, financial independence, and resilience. Agricultural cooperatives have proven to be effective in strengthening farmers' bargaining power, improving access to resources, and increasing market competitiveness. The role of cooperatives in fostering economic resilience, especially in the face of climate change and fluctuating market prices, underscores their long-term potential in sustaining rural development. Additionally, cooperatives contribute to reducing poverty by improving farmer’s income stability and fostering strong social networks for knowledge exchange and resource sharing.

Furthermore, the co-occurrence analysis reveals four key clusters of research: agriculture, agricultural workers, cooperation, and poverty. These clusters illustrate the multifaceted relationship between cooperatives, agricultural practices, and poverty reduction. The studies highlight the importance of sustainable agricultural practices, international cooperation, and inclusive economic development in achieving long-term poverty alleviation. The role of cooperatives in integrating small farmers into modern agricultural systems, improving access to finance, technology, and markets, is crucial for increasing income and reducing multidimensional poverty.

Future research in the study of agricultural cooperatives and poverty alleviation should focus on exploring innovative models that integrate technology and sustainable practices to enhance the productivity and resilience of smallholder farmers. Additionally, examining the long-term impacts of cooperative membership on farmers' financial independence and social empowerment will provide valuable insights into the broader effects of cooperatives on rural development. Research could also investigate how cooperatives can adapt to climate change challenges, improve market access, and foster economic cooperation between different agricultural sectors. Furthermore, exploring the role of cooperatives in promoting gender equality and empowering

marginalized groups within rural communities could offer new perspectives on inclusive economic growth. Lastly, it is essential to evaluate the effectiveness of cooperative-led initiatives in reducing income inequality and improving overall well-being in disadvantaged regions.

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