

Convergence Points in the Literature Concerning the Topics of Food Security and Added Value

Vlad Constantin Turcea¹ and Marius Constantin²

¹⁾²⁾ *The Bucharest University of Economic Studies, Bucharest, Romania.*

E-mail: vladturcea@gmail.com; E-mail: marius.constantin@eam.ase.ro

Please cite this paper as:

Turcea, V.C. and Constantin, M., 2021. Convergence Points in the Literature Concerning the Topics of Food Security and Added Value. In: R. Pamfilie, V. Dinu, L. Tăchiciu, D. Pleșea, C. Vasiliu eds. 2021. *7th BASIQ International Conference on New Trends in Sustainable Business and Consumption*. Foggia, Italy, 3-5 June 2021. Bucharest: ASE, pp. 184-190
DOI: 10.24818/BASIQ/2021/07/024

Abstract

Increasing economic pressure is pushing the agri-food industry to choose yield instead of environmental care, whereas added value should be ideally created without radically deflating food output whilst using harmless practices. In this regard, several topics have been commenced in this paper, directly referring to the research results. The starting point of this study's design locates the key scientific subtopic that shapes the present academic interest and is followed by a convergence analysis based on the metadata processed after querying the Scopus database in a relevant manner. This facilitated to conclude this study with the interest analysis in form of a heat guide that is pointing towards current research trends. This specific paper aims at revealing emerging convergence points in research literature, quantitatively measuring peer-reviewed bibliometric metadata. The main research result refers to the surprising identified nexus point that confers a multidimensional approach to food security fulfillment, reflecting current sustainable trends, as well as the potential for increasing agricultural economic performance. Agriculture is known to become a more visible player in the climate change mitigation scene, especially through efficient resource allocation. However, the results of this paper indicate that key sustainability-driven elements, such as renewable energy, are already shaping the agri-food industry, as well as the research interests in this field. In the literature, the converging theme in the case of food security and added value is that of biomass, a possible equilibrium point that calls for a more economical-competitive orientation of the academic research work, without neglecting the sustainability factor. In this regard, research interests will continue to be influenced by the implementation of the SDGs roadmap and of the European Green Deal.

Keywords

food security; added value; value creation; food supply chain; biomass; sustainable development

DOI: 10.24818/BASIQ/2021/07/024

Introduction

As global food demand grows especially in developing regions, agricultural expansion is utterly necessary and to be doing so in a fashionable manner that no further negative impact over the environment is required. Enormous difficulties are currently undergoing in the agricultural sector (Foley, et al., 2011) and with the increasingly pressure to global food security fulfilling, the only viable solutions identified in multiple studies are targeting both consumption behaviours (FAO, 2020) and production expansion without further increasing the environmental harm (Dinu, et al., 2020; Voicu-Dorobanțu, et al., 2021).

The expansion of agriculture proved to negatively impact global carbon level, soil quality, natural habitats (Foley, et al., 2005; Ramankutty, et al., 2008; Andrei et al., 2020; Istudor, et al., 2019). Agricultural models, historically, are known to focus on production effectiveness (DeFries, et al., 2004), but in modern times, the ideal conditions in which agriculture is treated are more relying on

resource sustainability and environmental harmless practices (Pătărlăgeanu, Dinu and Constantin, 2020; Drăgoi, et al., 2018a). Additional challenges are also arising due to international food value chains' pressure (Ignat and Constantin, 2020a) and increasing urbanization (Gil, et al., 2019 Ignat and Constantin, 2020b).

Food system's globalization brings value along the chain, helping locals accessing broader markets and diversified investment capital (Godfray, et al., 2010). It was also noted that regional and national food production specialization is also increased, fact that is enhancing food appropriateness compatibility.

The global food demand is accelerating, croplands across the world are sitting with yields below their potential, and the general agricultural expansion forecasts on abiding environmental impact. Several indications have been already pointed, in order to address universal food security, such as natural diversity conservation, greenhouse gases contraction (Constantin, et al., 2021), proportional technological breakthrough transfer, enhancing soil fertility techniques usage, more adequate nutrient employment, and land clearing mitigation (Tilman, et al., 2011; Drăgoi et al., 2018), all of these aspects are more crucial today than ever before and can make a real change, especially in the SDG 2 roadmap to fulfilment.

The Sustainable Development Goals (SDGs) cover multiple layers of sustainability of both developing and developed countries recalling collective efforts to achieve prosperity, peace for the people and the planet through an equitable partnership (UN, 2015; Steffen, et al., 2015). The only goal that is integrating food security, hunger elimination and sustainable agriculture is SDG 2 "Zero Hunger".

It is more obvious, and especially in current times that food, livelihoods and natural resources management are compactly handled. Agriculture should be classified as a key sector in climate change mitigation and through sound indicator alacrity, SDGs could upscale into a management tool for countries in the resource allocation plans (FAO, 2016).

Considering the rising interest in the literature concerning, on the one hand, the topic of food security, and, on the other hand, the topic of added value in the agri-food industry, the objective of this research paper was to quantitatively review the literature and map convergence points based on the metadata of the existing papers concerning the research topics of interest.

Research methodology

Based on the research objective, the need for a quantitative method was implicit. Therefore, in this research paper, the bibliometric analysis was considered optimal for carrying out the quantitative study on the papers in which both the topics of food security and added value in the agri-food industry were treated.

Bibliometrics has become one of the standard tools for research trends analysis, involving multiple techniques that can be used to assess and monitor scientific resources (Pătărlăgeanu, Dinu and Constantin, 2019). This research was carried out with the help of the VOSviewer software tool, version 1.16.16, designed by Ness Jan van Eck and Ludo Waltman. This tool has been widely used in bibliometric studies with the aim of quantitatively reviewing specific areas of the literature. Since VOSviewer has a user-friendly interface, it was proven to be effective in this research regard and has made the quantitative analysis of the scientific publication' keywords more facile. VOSviewer enables the generation of maps and heatmaps that graphically represent the density and link power between keywords and word structures used in the title and abstract of the identified scientific publications on specific database queries. Paper metadata represents the foundation and instruments needed to construct and project bibliometric networks and maps.

Taking this into account, the bibliometric analysis carried out in this research paper was based on the Scopus database, which indexes content from more than 7,000 active publishers. Titles are rigorously vetted and selected by an independent review board. The information technology behind the Scopus database uses a rich underlying metadata architecture. Therefore, the Scopus database provides the 'raw materials' needed for the development of quantitative research analyzes in various fields, including the ones of food security and added value in the agri-food industry. Consequently, the Scopus database was queried in the following manner: (*TITLE-ABS-KEY ("food security") AND TITLE-ABS-*

KEY ("added value"). This query was performed in March 2021 and led to the identification of 73 publications indexed in the Scopus database. These publications contained the "food security" and "added value" word structures in the title, abstract or keywords. Connecting these structures in the same query represented the premises of identifying only the scientific publications specific to the topics of food security and added value in the agri-food industry.

Results and discussions

The intensification of the research scientific interest starting from 2016, as it can be noticed in Figure 1. This can be tied to the fact that the 2030 Agenda for Sustainable Development was published in 2015 and more scientific interest was paid to the implications of maximizing added value along the global agri-food chain, while still ensuring food security, meeting the SDGs and transitioning to the circular agriculture model (Pătărlăgeanu, et al., 2021). The peak of the scientific interest in this regard was reached in 2019, when 17 papers (representing 23.29% of the total) were published and indexed in the Scopus database.

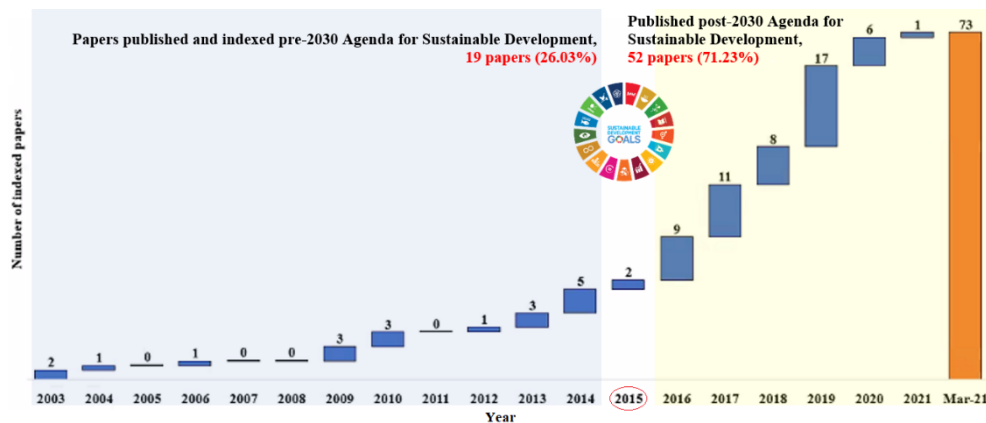


Figure no. 1. Waterfall chart of the evolution of the scientific interest concerning the topics of “food security” and “added value”, manifested under the shape of the scientific papers indexed in the Scopus database

Source: Authors' visual representation, based on Scopus metadata (2021)

According to the Scopus data graphically represented in Figure 2, most of the 73 identified papers were published under the subject area of *Agricultural and Biological Sciences, Environmental Science, Social Sciences*. One of the main components of any bibliometric study is the analysis of the correlations between the keywords associated to each of the publications indexed in the Scopus database. In the case of this research, the 73 indexed documents had 784 associated keywords. However, only 115 (14.66%) of them occurred in more than 2 papers. These 115 keywords were graphically represented in Figures 3 and 4. *Food security, food supply, agriculture, sustainable development* and *human* were the most frequently used keywords or keyword structures. Regarding food security and the added value in the agri-food industry, ‘biomass’ is the keyword that connects these topics in the literature, as it can be observed in Figure 3. But do these topics really converge towards the idea that biomass is an actual solution for ensuring higher levels of food security globally in a sustainable manner, while still maximizing the added value in the agri-food industry? Regarding Figures 3 and 4, one can notice that biomass is connecting various research areas, including those referring to economic profitability and food security: *biomass–added-value products–environmental monitoring, biomass–food security–land use planning*.

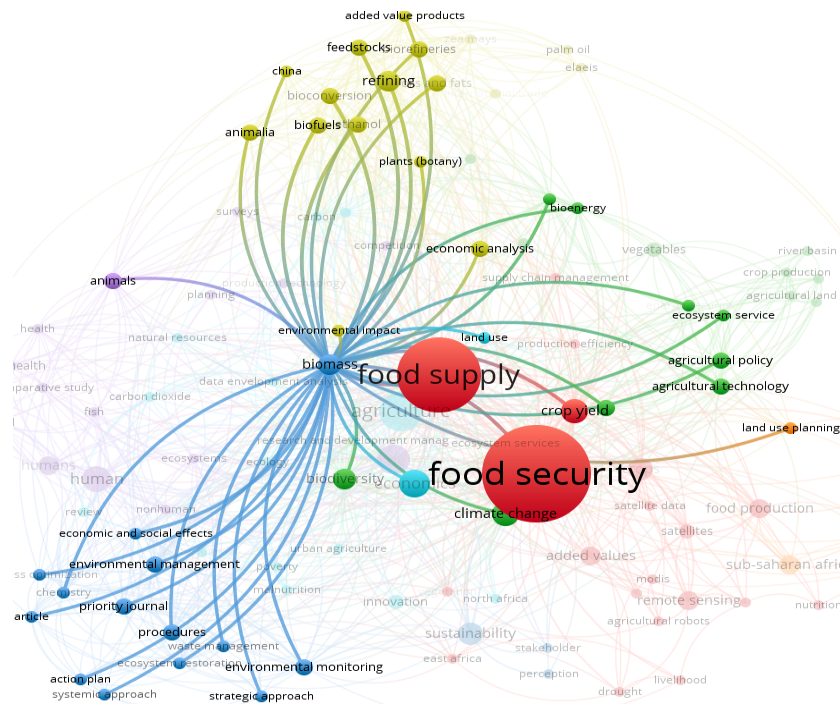


Figure no. 3. Biomass – the convergence point in the case of food security and adding value in the agri-food industry

Source: Authors' visual representation, based on Scopus metadata (2021)

Emergent research aspects in these field refer to the sustainability factor, agricultural robots, vegetation index, clean production technologies. Traditional keywords that are still relevant for the topics of food security and added value were mapped in Figure 4: *nutrition, land use planning, poverty, malnutrition*. Yet, through the ‘biowaste’ keyword, traditional and emergent aspects were approached in the new paradigm of the just transition. In this context, food security and maximizing the added value in the agri-food industry can no longer be considered without taking the need to protect the environment into account. Relevant scientific evidence such as the one of Mengistu, Gupta and Birner (2018) shows that biomass diversified use has a positive effect on developing countries’ farm households in food security fulfillment capacity through individual direct use, added value option being limited by market openness, information breaches and a lack of up-to-date technology on the one hand; and, on the other hand, Mohr et al., (2016), in a study that oversees 100+ countries, showed that biomass shouldn’t influence food security, at least if in the respective country, the food security topic is subjected to the rights-based principle furthermore, the non-food biomass can directly contribute in poverty elimination and achieving food security. Current international environmental focus points towards increasing biomass requirements as an intrinsic component of CO2 emissions from energy use, the need of renewable energy coming from organic material turning out to be higher than the need of food and feed, increasing demand for biomass to serve energetical purposes could also determine instabilities in the food supply chain (Nonhebel, 2010).

- Constantin, M., Radulescu, I., Andrei, J., Chivu, L., Erokhin, V. and Gao, T., 2021. A Perspective on Agricultural Labor Productivity and Greenhouse Gas Emissions in Context of the Common Agricultural Policy Exigencies. *Economics Of Agriculture*, 68(1), pp.53-67.
- DeFries, R.S., Foley, J.A. and Asner, G.P., 2004. Land-Use Choices: Balancing Human Needs and Ecosystem Function. *Frontiers in Ecology and the Environment*, 2(5), pp.249–257.
- Dinu, M., Pătărlăgeanu, S.R., Petrariu, R., Constantin, M. and Potcovaru, A.M., 2020. Empowering Sustainable Consumer Behavior in the EU by Consolidating the Roles of Waste Recycling and Energy Productivity. *Sustainability*, 12(23), Article number: 9794.
- Drăgoi, M.C., Andrei, J.V., Mיעilă, M., Panait, M., Dobrotă, C.E. and Lădaru, R.G., 2018a. Food Safety and Security in Romania – An Econometric Analysis in the Context of National Agricultural Paradigm Transformation. *Amfiteatru Economic*, 20(47), pp.134–150.
- Drăgoi, M.C., Popescu, M.F., Andrei, J.V. and Mיעilă, M., 2018b. Developments of the Circular Economy in Romania under the New Sustainability Paradigm. *Economic Computation & Economic Cybernetics Studies & Research*, 52(2), pp.125–138.
- FAO, 2016. *Key to achieving the 2030 Agenda for Sustainable Development*. [pdf] Available at: <<http://www.fao.org/3/i5499e/i5499e.pdf>> [Accessed 12 March 2021].
- FAO, 2020. *The State of Food Security and Nutrition in the World 2020*. FAO, IFAD, UNICEF, WFP and WHO. <https://doi.org/10.4060/ca9692en>.
- Foley, J., Defries, R., Asner, G., Barford, C., Bonan, G., Carpenter, S., Chapin III, F.S., Coe, M., Daily, G., Gibbs, H., Helkowski, J., Holloway, T., Howard, E., Kucharik, C., Monfreda, C., Patz, J., Prentice, I., Ramankutty, N. and Snyder, P., 2005. Global Consequences of Land Use. *Science (New York, N.Y.)*, 309, pp.570–574.
- Foley, J., Ramankutty, N., Brauman, K., Cassidy, E., Gerber, J., Johnston, M., Mueller, N., O’Connell, C., Ray, D., West, P., Balzer, C., Bennett, E., Carpenter, S., Hill, J., Monfreda, C., Polasky, S., Rockström, J., Sheehan, J., Siebert, S. and Zaks, D., 2011. Solutions for a Cultivated Planet. *Nature*, 478, pp.337–342.
- Gil, J.D.B., Reidsma, P., Giller, K., Todman, L., Whitmore, A. and van Ittersum, M., 2019. Sustainable development goal 2: Improved targets and indicators for agriculture and food security. *Ambio*, 48(7), pp.685–698.
- Godfray, H.C.J., Beddington, J.R., Crute, I.R., Haddad, L., Lawrence, D., Muir, J.F., Pretty, J., Robinson, S., Thomas, S.M. and Toulmin, C., 2010. Food Security: The Challenge of Feeding 9 Billion People. *Science*, 327(5967), pp.812–818.
- Ignat, R. and Constantin, M., 2020a. Multidimensional Facets of Entrepreneurial Resilience during the COVID-19 Crisis through the Lens of the Wealthiest Romanian Counties. *Sustainability*, 12(23), Article number: 10220.
- Ignat, R. and Constantin, M., 2020b. *Short-Term Effects of COVID-19 Pandemic on Agri-Food Value Chains in Romania. Innovative Models to Revive the Global Economy*, Sciendo.pp.578–588.
- Istudor, N., Ion, R.A., Petrescu, I.E. and Hrebenciuc, A., 2019. Agriculture and the Twofold Relationship between Food Security and Climate Change. Evidence from Romania. *Amfiteatrul Economic*, 21(51), pp.285–285.
- Mengistu, T.W., Gupta, S. and Birner, R., 2018. Analysis of maize biomass use in Ethiopia and its implications for food security and the bioeconomy. *Food Security*, 10(6), pp.1631–1648.
- Mohr, A., Beuchelt, T., Schneider, R. and Virchow, D., 2016. Food security criteria for voluntary biomass sustainability standards and certifications. *Biomass and Bioenergy*, 89, pp.133–145.
- Nonhebel, S., 2010. Biomass for Energy and the Impacts on Food Security. In: F. Barbir and S. Ulgiati, eds. *Energy Options Impact on Regional Security*, NATO Science for Peace and Security Series C: Environmental Security. Dordrecht: Springer Netherlands.pp.341–361.

- Pătărlăgeanu, S.R., Dinu, M. and Constantin, M., 2020. Bibliometric Analysis of the Field of Green Public Procurement. *Amfiteatru Economic*, 22(53), pp.71–81.
- Pătărlăgeanu, S.R., Constantin, M., Strat, G., Deaconu, M.E., 2021. *Best Practices of Circular Activities in the Agri-food Sector from the Netherlands and Romania*. Bucharest: ASE Publishing House.
- Ramankutty, N., Evan, A.T., Monfreda, C. and Foley, J.A., 2008. Farming the planet: 1. Geographic distribution of global agricultural lands in the year 2000: GLOBAL AGRICULTURAL LANDS IN 2000. *Global Biogeochemical Cycles*, 22(1), p.n/a-n/a. <https://doi.org/10.1029/2007GB002952>.
- Steffen, W., Richardson, K., Rockström, J., Cornell, S.E., Fetzer, I., Bennett, E.M., Biggs, R., Carpenter, S.R., de Vries, W., de Wit, C.A., Folke, C., Gerten, D., Heinke, J., Mace, G.M., Persson, L.M., Ramanathan, V., Reyers, B. and Sörlin, S., 2015. Sustainability. Planetary boundaries: guiding human development on a changing planet. *Science (New York, N.Y.)*, 347(6223), Article number: 1259855.
- Tilman, D., Balzer, C., Hill, J. and Befort, B.L., 2011. Global food demand and the sustainable intensification of agriculture. *Proceedings of the National Academy of Sciences*, 108(50), pp.20260–20264.
- UN, 2015. *Transforming our world: the 2030 Agenda for Sustainable Development*. United Nations Official Document. [online] Available at: <https://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E> [Accessed 17 Apr. 2021].
- Voicu-Dorobanțu, R., Volintiru, C., Popescu, M.F., Nerău, V. and Ștefan, G., 2021. Tackling Complexity of the Just Transition in the EU: Evidence from Romania. *Energies*, 14(5), Article number:1509.