Agriculture & Food Security

RESEARCH Open Access

A bibliometric analysis of the scientific production related to "zero hunger" as a sustainable development goal: trends of the pacific alliance towards 2030

Oscar Herrera-Calderon[1*], Ricardo Ángel Yuli-Posadas[1], Gilmar Peña-Rojas[2], Vidalina Andía-Ayme[3], Renán Dilton Hañari-Quispe[4] and Orlando Gregorio-Chaviano[5]

Abstract

Background: In 2015, The United Nations (UN) established 17 Sustainable Development Goals (SDGs) by 2030. In Latin America, the Pacific Alliance is integrated by Chile, Colombia, Peru, and Mexico, which the scientific activity is focused on the scientific production from research and academic institutions. In this study, the main goal was to analyze the scientific production (2015–2019) in the Pacific Alliance related to "zero hunger" as SDG. The bibliometric analysis of the scientific literature was carried out using the Scopus database with search terms related to zero hunger and validated by Elsevier. We analyzed the annual production of original articles, productive journals, leading institutions, funding agencies, authors, and the most influential original.

Results: Our results showed that the Pacific Alliance produced 2215 (81.0%) original articles, which is the fraction of non-excluded outputs with an annual growth rate of 12.62%, Mexico was the leading country, Nutrición Hospitalaria was the most active journal, and The Universidad Autónoma de Mexico was the leading institution and CONACYT as the leading funding institution.

Conclusion: As conclusion, the scientific production of the Pacific Alliance is showing positive substantial changes, which reflects the main research themes related to zero hunger, such as food security, sustainable agriculture, and malnutrition to achieve this SDG by 2030.

Keywords: VOSviewer, Bibliometric indicators, Science mapping analysis, Scientometric, Zero hunger, Sustainable development, Agriculture

Background

The Sustainable Development Goals (SDGs) were adopted by all United Nations (UN) Member States in November 2015 as a global agenda to end poverty, protect the planet, and ensure that all people enjoy peace and welfare by 2030 [1]. As of January 2016, SDGs replaced the Millennium Development Goals (MDGs), which nowadays are conformed by 17 SDGs and 169 targets, focusing on environmental, economic, and social sustainability [2]. However, SDGs are not only focused on developing countries, because the agenda towards 2030 covers all countries and sectors of the society [2].

SDG 2 called "zero hunger" has specific targets mainly environmental problems such as biodiversity, agricultural productivity, and sustainable production systems together with the serious consequences of climate

*Correspondence: oherreraca@unmsm.edu.pe
[1] Department of Pharmacology, Bromatology and Toxicology, Faculty of Pharmacy and Biochemistry, Universidad Nacional Mayor de San Marcos, Jr. Puno 1002, 15001 Lima, Peru
Full list of author information is available at the end of the article

change, the elimination of hunger and malnutrition, as well as the control of micronutrient deficiencies in different age groups and the socioeconomic factors involved that encompass farmers and commercial markets leading to a very in-depth investigation of them [4].

Zero hunger as SDG seems to be promised with ending all forms of undernourishment by 2030 and ensure that all people, especially children, have access to sufficient and nutritious food throughout next few years [3]. Several tasks have been involved by the UN to achieve this goal by 2030 such as promoting sustainable agricultural practices to obtain better crops, these activities must be practiced such as cover crops, crop rotation, permaculture, soil enrichment, natural pest predators, bio-intensive integrated pest management, polyculture farming, and others [4]. It is known that hunger and undernourishment remain as the main barrier for the development in many countries as a direct consequence of environmental degradation, drought, loss of biodiversity, and a growth of urban cities [5].

According to the UN, in the world, more than 90 million children under the age of 5 are dangerously underweight, being the malnutrition and food insecurity as the leading causes in all regions of Africa, as well as in South America [3, 6]. In 2018, famine affected 42.5 million people in Latin America and the Caribbean, according to the new joint UN report [9]. In fact, in South America lives the majority (68%) of undernourished people from Latin America and this observed increase in recent years is due to the economic slowdown experienced by Latin America countries. On the other hand, the Food and Agriculture Organization (FAO) revealed that undernourishment in 2018 had a prevalence of 6.1% in Central America and 5.5% in South America, respectively [10]. However, numerous efforts of each country try to stop the undernourishment and according to the Global Hunger Index (GHI) Chile is the country that has had a better index from 2000 to 2020 followed by Peru, Colombia, and Mexico, respectively [3].

On the other hand, the Pacific Alliance (PA) is a regional integration initiative, which was announced in Lima (Peru) on April 28, 2011, through the Lima Declaration made up of four member countries: Chile, Colombia, Mexico, and Peru, four countries in the incorporation process, four associated countries, and more than 40 observer countries on four continents [7]. PA presents four main axes as vision being: more integrated, more global, more connected, and more citizen. The last vision englobes to achieve the SDGs and ensure that the benefits of the PA reach all citizens, contributing to overcoming inequality and poverty, and have a sustainable agenda with joint projects for the adaptation and mitigation to the effects of climate change and energy clean, among others [7].

Bibliometrics as an instrumental discipline provides different types of indicators that allow us to know the trends and regularities of scientific activity. Its use is important to evaluate disciplines, institutions, journals, and other scientific aggregates, the results of which are useful both for decision-making and for the generation of new knowledge [8]. As antecedents to this investigation, bibliometric analysis of the second SDG has not been reported in the literature since 2015, which was the official launch year of the SDGs. In a recently published bibliometric report for the region of the Americas, European region, and the Western Pacific region, the SDG 13 (climate action) was the most researched field [9]. As regards international collaborations in the scientific literature based on 17 SDGs, the United Kingdom was linked especially with the United States and Brazil, Canada, India, Mexico, and Switzerland [10]. Therefore, analyses of this type seek to know the participation of countries in research on a topic, observe where the capacities are found, create, and strengthen alliances and carry out projects together.

On the other hand, governments need ideas, and alternative plans to decrease indicators related to famine and poverty, but unfortunately, a global review of the literature finds that most researchers have had wrong priorities [3]. Otherwise, researchers and academics are key players in this context and government authorities should take actions and decisions based on the results and recommendations of its researchers to achieve the SDGs in coming years [3]. According to Taşkın et al. [11], they indicated that the number of publications and citations will increase each year unless there is a change in research evaluation systems.

Therefore, we hypothesize that the scientific production of the original articles (2015–2019) related to "hunger zero" will reflect the investigations and trends in the Pacific Alliance to achieve the second SDG by 2030. Several research questions guided the review.

> RQ 1. What is the overall volume, growth rate of published documents across Pacific Alliance countries in "zero hunger" between 2015 and 2019 year?
> RQ 2. What journals, funding institutions, organizations or institutions, authors have had the greatest influence on "zero hunger" research?
> RQ 3. What is the most frequently studied topics in recent years in the "zero hunger" literature?
> RQ 4. What is the state-of-the-art underlying theory and "zero hunger" research?

Materials and methods

Search strategy and inclusion/exclusion criteria

This study was a cross-sectional descriptive analysis of scientific production from the Pacific Alliance related to "zero hunger" literature as SDG of the United Nations. Therefore, the Scopus database was used as a primary source of information. Scopus is widely used in bibliometric studies because it includes a wide range of indexed journals across all fields of scientific literature [12]. The current study was carried out on December 23rd, 2020, and all data analysis, including citation analysis, was carried out on the same day.

The search strategy for "zero hunger"- related literature was carried out based on search terms detailed in the pre-generated queries of Scopus Data Base, and it is stated as: (TITLE-ABS-KEY (({land tenure rights} OR (smallholder AND (farm OR forestry OR pastoral OR agriculture OR fishery OR {food producer} OR {food producers})) OR malnourish* OR malnutrition OR undernourish* OR {undernutrition} OR {agricultural production} OR {agricultural productivity} OR {agricultural practices} OR {agricultural management} OR {food production} OR {food productivity} OR {food security} OR {food insecurity} OR {land right} OR {land rights} OR {land reform} OR {land reforms} OR {resilient agricultural practices} OR (agriculture AND potassium) OR fertilizers OR {food nutrition improvement} OR {hidden hunger} OR {genetically modified food} OR (gmo AND food) OR {agroforestry practices} OR {agroforestry management} OR {agricultural innovation} OR ({food security} AND {genetic diversity}) OR ({food market} AND (restriction OR tariff OR access OR {north south divide} OR {development governance})) OR {food governance} OR {food supply chain} OR {food value chain} OR {food commodity market} AND NOT {disease})))) AND (AFFILCOUNTRY (peru OR colombia OR chile OR mexico)) AND (LIMIT-TO (PUBYEAR, 2019) OR LIMIT-TO (PUBYEAR, 2018) OR LIMIT-TO (PUBYEAR, 2017) OR LIMIT-TO (PUBYEAR, 2016) OR LIMIT-TO (PUBYEAR, 2015)). The meaning and the methodology for using these terms can be consulted and reviewed at https://data.mendeley.com/datasets/87txkw7khs/1 as well as in our Additional file 1. We took this model of search query, which is freely available on Mendeley (https://data.mendeley.com/datasets/87txkw7khs/1). These search terms were updated on November 26, 2020, as it is detailed in the Scopus database [13].

Accordingly, we conducted a literature search for the years 2015–2019. The documents were limited to original articles with at least one affiliation author of the Pacific Alliance countries such as: Mexico, Colombia, Chile, and Peru, without language restriction (Fig. 1). In this bibliometric analysis, only are included original articles, because it reflects the actual research in each country and has probably received some funding from national or international agencies [14], and additionally, the original articles are taken as primary information to make decisions regarding any problem local or global [15].

Bibliometric indicators

The information retrieved from the Scopus database included:

- Annual production of original articles of the Pacific Alliance countries related to "zero hunger",
- More productive journals,
- Leading institutions, countries, funding agencies, H index of authors, and the most influential original articles cited between 2015 and 2019,
- H index Scopus: a bibliometric indicator that measures the productivity and the impact of the published work of a scientist or academic. Also is defined as the number of papers with citation number higher or equal to h,
- Quartile: position of journals in a category based on SJR values,
- SJR (Scimago Journal Rank): indicator that measures the quality of Scopus journals. One journal transfers prestige to another for the fact of citing it, journals that receive citations from those better positioned, increase the SJR values.

Statistical treatment

Data in Scopus were exported to Excel software for tabulation or mapping and VOSviewer program for mapping purposes [16]. Mapping was made for the most frequently encountered terms in titles/abstracts of the retrieved documents, and the final number of terms was obtained by removing irrelevant terms [17] and for countries with a minimum contribution of 20 documents to visualize international research collaboration in SDG 2.

Results

Volume and annual growth of publications by documentary typology

The search query found 2734 documents of the Pacific Alliance countries between 2015 and 2019. Most citable documents were research articles ($n=2215$; 81.0%) followed by review articles ($n=204$; 7.5%) and book chapters ($n=132$; 4.8%). In the followings analysis, all results were based on the original articles.

The average percentage of the annual growth rate of original articles showed in Fig. 2 was 12.62%. The number of original articles showed an active increasing in 2016,