publications

MDPI

Article

Scientific Research in Ecuador: A Bibliometric Analysis

Gricelda Herrera-Franco [1,2,*], Néstor Montalván-Burbano [3,4], Carlos Mora-Frank [1,4] and Lady Bravo-Montero [4]

1 Facultad de Ciencias de la Ingeniería, Universidad Estatal Península de Santa Elena (UPSE), Avda. Principal La Libertad-Santa Elena, La Libertad 240204, Ecuador; cavmora@espol.edu.ec
2 Geo-Recursos y Aplicaciones GIGA, ESPOL Polytechnic University, Campus Gustavo Galindo km 30.5 Vía Perimetral, Guayaquil 09015863, Ecuador
3 Business and Economy Department, University of Almería, Ctra. Sacramento, S/N, La Cañada de San Urbano, 04120 Almería, Spain; nmb218@inlumine.ual.es
4 Centro de Investigación y Proyectos Aplicados a las Ciencias de la Tierra (CIPAT), ESPOL Polytechnic University, Campus Gustavo Galindo km 30.5 Vía Perimetral, Guayaquil 09015863, Ecuador; lkbravo@espol.edu.ec
* Correspondence: grisherrera@upse.edu.ec; Tel.: +593-992-613241

Abstract: Ecuador has shown a growth in its scientific production since 2011, representing 85% of the total historical production. These investigations are reflected in scientific publications, which address world interest topics and serve as a link for the university, business, and society. This work aims to analyze the scientific production generated by Ecuador in the period of 1920–2020 using bibliometric methods to evaluate its intellectual structure and performance. The methodology applied in this study includes: (i) terms definition and search criteria; (ii) database selection, initial search, and document compilation; (iii) data extraction and software selection; and finally, (iv) analysis of results. The results show that scientific production has been consolidated in 30,205 documents, developed in 27 subject areas, in 13 languages under the contribution of 84 countries. This intellectual structure is in harmony with the global context when presenting research topics related to "Biology and regional climate change", "Higher education and its various approaches", "Technology and Computer Science", "Medicine", "Energy, food and water", and "Development and applications on the Web". Topics framed in the Sustainable Development Goals (SDGs), sustainability, climate change, and others. This study contributes to the academic community, considering current re-search issues and global concerns, the collaboration between universities and countries that allow establishing future collaboration links.

Keywords: bibliometric analysis; intellectual structure; universities; country scientific output; Ecuador

check for updates

Citation: Herrera-Franco, G.; Montalván-Burbano, N.; Mora-Frank, C.; Bravo-Montero, L. Scientific Research in Ecuador: A Bibliometric Analysis. *Publications* **2021**, *9*, 55. https://doi.org/10.3390/publications9040055

Academic Editor: Craig Aaen-Stockdale

Received: 22 September 2021
Accepted: 29 November 2021
Published: 1 December 2021

1. Introduction

Ecuador is a natural laboratory that has aroused the interest of the academic world in recent years. This country has been among the 17 megadiverse countries in the world since 1998 [1–3], hosting various species, including birds (16%), amphibians and mammals (8%) and reptiles (5%) [4]. Additionally, this country has international recognition of eight world heritage sites [5–7], a world geopark declared by UNESCO and 11 national parks, where the Yasuní Park stands out for its biological wealth on a landscape and local scale [8,9].

Another of the attractions of Ecuador is its natural laboratories, the Galapagos Islands, and the Amazon region. The first is one of the most pristine places on the planet, [10], and received attention from the academy since the 18th century due to Charles Darwin's research [11–13] and subsequent contributions that allowed it to be declared as a natural heritage of humanity [14]. Galápagos is also considered one of the 137 irreplaceable protected areas globally [15], a hotspot of endemism [16] and a priority region for conservation [17]. The Ecuadorian Amazon is a relevant ecological zone due to the abundance of tropical forests found in this region and the most remarkable biological diversity globally [15,18]. The region is of economic importance for the country for its oil and wood extraction activities and oil palm plantations [19].

This growing interest in Ecuador's research has allowed three of its universities to be ranked among the top 1000 worldwide, and six are among the top 100 in South America according to the 2021 QS World University Rankings. These events contributed to Ecuador obtaining more than 29,000 publications in the last ten years. These are publications with strong international collaboration and that are indexed in prestigious academic journals within the Scopus database, resulting in a significant and beneficial contribution, both for the country and for the academic world.

These investigations have presented diverse approaches in their areas of knowledge. However, few studies have attempted to cover the intellectual structure of Ecuador's research. Castillo and Powell [20–22] present studies on scientific production in a short period of time, 2006–2015. Other researchers considered using the Web of Science (WoS) database [23]. Despite these efforts, a global analysis of the Ecuadorian investigation has not been carried out. Bibliometric analyses give a clear and precise answer on a global analysis of a country, journal or field of study [24–28]. These types of studies allow the exploration of the structure of the country's scientific research publications, their patterns of collaboration, and predominant areas of knowledge [29,30].

This work aims to analyze the scientific production generated by Ecuador in the period of 1920–2020 using bibliometric methods to evaluate its intellectual structure and performance.

This study has been structured in five sections. The first contains an introduction to research, activity, and its relationship with the university; Section 2 presents the methodology for the treatment and use of the data that are described in four phases (definition of search terms and criteria; selection of the database, initial search, and document compilation; data extraction and software selection; analysis of results). Section 3 presents the intellectual structure of scientific research and analysis of university publications based on their quantity and quality. Section 4 presents the discussion of the exposed analyzes, and finally, in Section 5, this research's main conclusions and limitations are presented.

2. Materials and Methods

Bibliometric analysis is considered an alternative to studying these research fields. This tool presents a systematic, rigorous and transparent process that broadly examines an academic field or a specific study area [31,32]. Specifically, this allows to quantitatively evaluate the production and performance of the structure, as mentioned earlier when examining documents, authors, institutions and journals [33,34]. This analysis is complemented with bibliometric maps, which allow us to examine the behaviour of the intellectual structure by observing the connections, the interrelation of the various disciplines, and research fields [35,36]. It can examine these bibliometric studies in various fields of knowledge such as business and management [37–39], environmental sciences [40,41] and earth sciences [42]. Other studies have focused on the institution's evaluation [43,44], scientific journals [45–47], the scientific production evolution by regions [48–51] or countries [24,25,52,53].

This study shows a systematic process made up of four phases that allow the analysis of the scientific production of Ecuador (see Figure 1): (i) terms definition and search criteria; (ii) database selection, initial search, and document compilation; (iii) data extraction and software selection, and finally, (iv) analysis of results.

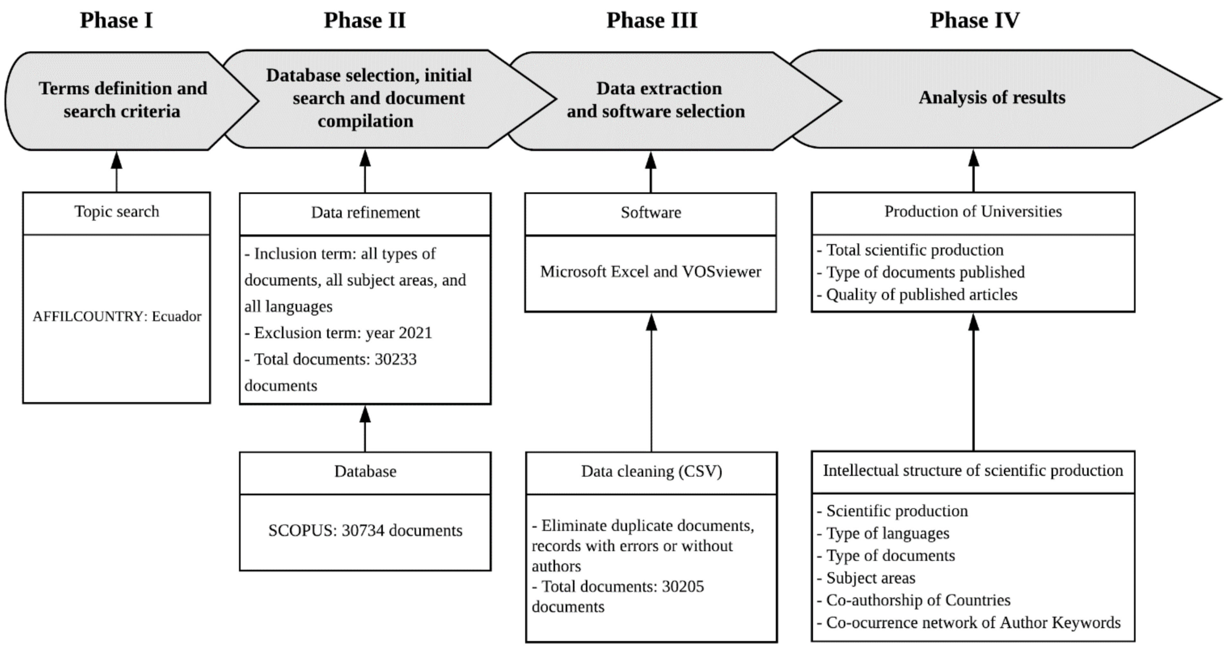

Figure 1. Investigation methodological scheme.

2.1. Terms Definition and Search Criteria

For this study, researchers focused on country affiliation [24,25], that is, publications that contain at least one affiliation from Ecuador. Therefore, it allows access to the scientific production in which they have participated, at least one researcher affiliated with universities, research centres, hospitals and other organisations belonging to the country.

2.2. Database Selection, Initial Search, and Document Compilation

The Scopus database was selected for three reasons: (1) its broad coverage in most fields of knowledge, access and visualization facilities allow adequate data analysis [54–56]; (2) its use in various bibliometric studies [57–59]; and (3) it is the source of information for the QS World University Rankings, the ranking most used by Latin American universities to determine their position in the region and the world [60,61].

The data collection was carried out in January 2021 using the descriptor 'Ecuador' in the country affiliation, allowing the search to be carried out: Topic Search (TS) = AFFILCOUNTRY (Ecuador). In total, 30,734 documents were obtained as an initial search. In the construction of the database, for bibliometric studies, it is necessary to fulfil several implicit and explicit selection criteria [42,62]. The first criterion considered was to use the following document types: article, conference paper, review, book chapter, letter, note, editorial, erratum, short survey, book, and data paper. Additionally, researchers considered all areas of knowledge, as well as all available languages of the publications. Thus, this allows the capture of the most information on published research. As a second criterion, it was considered to exclude the year 2021, as it is the current year, by applying these criteria, obtaining 30,233 documents.

2.3. Data Extraction and Software Selection

The results obtained from the search were downloaded in CSV format (comma-separated values), and they have bibliographic information, citation, abstract and Keywords, references, among others. In the analysis of the extracted data, two types of software were used:

(i) Microsoft Excel. Software that allows the pre-processing of data (data cleaning) to minimise errors by eliminating records with inconsistencies (incomplete, duplicate, with errors or without authors) [63,64]. A final basis for the analysis of 30,205 documents was obtained. Additionally, the software facilitates the analysis of scientific production based on documents, languages, subject areas, and journals [65,66].

(ii) VOSviewer. It is free software developed by the University of Leiden (Leiden, Netherlands), which allows the analysis of the intellectual structure of an academic field through the construction and visualization of two-dimensional networks [67,68]. The software is applied to study various subject areas [55,69–73], and a country or region scientific production [52,74,75].

2.4. Analysis of Results

In this study, a bibliometric analysis is presented in two sections. First, the intellectual structure analysis of scientific production and the scientific production analysis carried out by universities in the country.

The first one analyzes the scientific production that has been generated in the country, based on the number of published documents, their types and languages, the subject areas, international collaboration, and the co-occurrence of author keywords. These analyses are necessary when implementing a bibliometric study.

The second analysis emphasizes an essential agent in scientific production, which is the university. This section examines its production, published documents type and journal articles quality. Some of these analysis combinations are essential when generating a bibliometric study [76–78].

3. Analysis of Results

3.1. Intellectual Structure of Scientific Production

3.1.1. Scientific Production

In Ecuador, scientific research is reflected in 30,205 documents and 344,183 citations, distributed over 100 years of research (1920–2020). For analysis purposes, it was divided into two stages. The first covers the first investigations in a range of 70 years (1920–1990). The second comprises the most significant production of documents and citations that the country generated during the following 30 years (1991–2020):

First Development Stage (1920–1990)

This stage presents the beginnings of research and scientific collaboration through 372 documents (less than 1.3% of the total production) and obtaining 5311 citations. The first records correspond to studies related to medicine where the International Health Board plays a leading role. This foundation was created in 1916 as part of the Rockefeller foundations to promote public health and the dissemination of new knowledge in medicine [79]. In 1918, the organization arrived in Ecuador to cooperate with the country's public health, who nominated M. E. Connor as deputy director of health [80]. In 1920, as mentioned above, the researcher presented the first two publications in the country related to the control and measures to eradicate yellow fever [81]. Connor's research was relevant to solving the problems related to this disease [82]. At the end of the year (1920), a third publication belonging to E. Ray Royer, who was Chief Surgeon of the hospital of the mining camp of the South American Development Company, located in the city of Portovelo, is presented. This researcher studied intestinal parasites through biochemical tests in mine workers, allowing subsequent control and treatment [83].

The first study of an Ecuadorian university appeared in 1921, which corresponds to the authors F. Rojas and J. Tanca Marengo of the University of Guayaquil in the area of medicine [84]. In this same decade (1920s), studies related to other areas of knowledge such as agriculture [85], botany [86] and zoology are evidenced [87]. Since 1926, the investigations on the Ecuadorian coast were carried out by the Anglo Ecuadorian Oil Fields oil company through geologist George Sheppard [88,89].

In the 1930s, correspondence articles appear analyzing Sheppard's work and the operations of an oil company by geologist H. G. Busk [90,91]. In this same period, the development of research by Ecuadorian universities continues, presenting studies from the

National Polytechnic School through its researchers E. Grossmann and E. Hiedemann [92] and F. L. Hahn [93–96], in the areas of physics and chemistry, respectively. In 1937, the first investigation was carried out with the private company collaboration, Central Valdez (currently known as Ingenio Valdez) [97].

In the decade of the 40s, the research continues, with the publication of the 'Escuela Politécnica del Litoral (EPN)' in the chemistry area [98], the 'Universidad Central del Ecuador (UCE)' in the area of medicine [99] and the 'Universidad de Loja' in the area of chemistry [100]. Other studies related to entomology [101] and geography [102], by the International Ecuadorian Petroleum Company and the American College of Quito, respectively.

In the 50s, the private company with LIFE Laboratories (1952–1953) reappeared [103,104]. In addition, the Laboratories of Tropical Medicine (1952) [105], Ecuadorian Center for Entomological Research (1952) [106], 'Instituto Nacional de Nutrición del Ecuador' (1953) [107], the 'Hospital Eugenio Espejo' (1955) [108] and the 'Universidad Central del Ecuador' (1958–1959) [109,110].

Since the 60s, there has been a notable increase in scientific production with 34 documents (see Figure 2). The new contributors are the 'Fundación Charles Darwin' (1961) [111], the 'Instituto Leopoldo Izquieta Pérez' (1961–1962) [112,113], the 'Universidad de Cuenca' (1967) [114], the 'Hospital Luis Vernaza' and the 'Hospital de Seguridad Social' (1969) [115], and the 'Instituto Nacional de Pesca' (1969) [116].

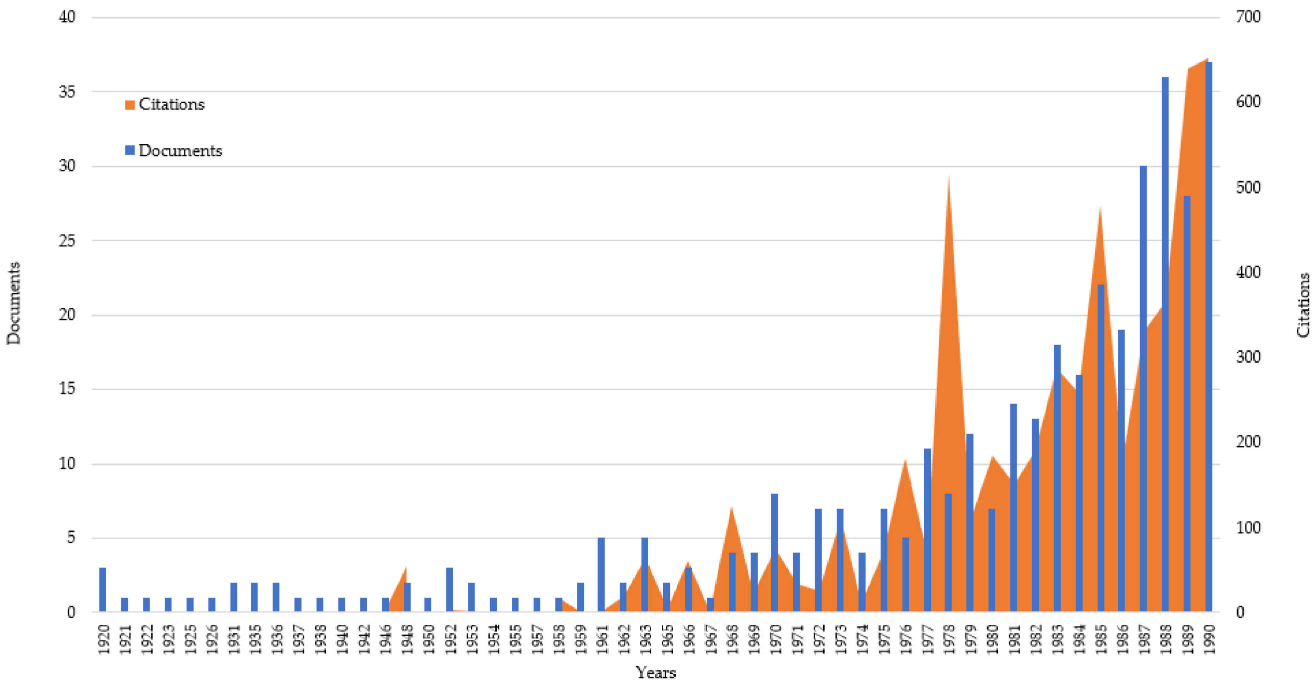

Figure 2. Scientific production of Ecuador (1920–1990).

In the 70s, scientific production continued to increase (72 documents) with the contribution of the 'Universidad de Cuenca', the 'Universidad Central del Ecuador', the 'Escuela Politécnica Nacional' and 'Fundación Charles Darwin'. The 'Escuela Superior Politécnica del Litoral' [117], the 'Pontificia Universidad Católica del Ecuador' [118], the 'Instituto Nacional de Investigaciones Agropecuarias' [119], and the 'Hospital Vos Andes' [120].

In the 80s, there were essential changes in the Higher Education system. In 1982, the 'Consejo Nacional de Universidades y Escuelas Politécnicas' (CONUEP) was created. This body provided the first public budget for research in the universities [121]. It allowed 233 documents to be published in this period.

It is necessary to consider that at this stage (1920–1990), the Ecuadorian university was focused on teaching existing knowledge rather than its creation; due to a poor legal framework and late government budget allocation for research and development [23,122]. The scientific production of this stage can be observed in greater detail in Figure 2.

Second Development Stage (1991–2020)

This period marks an exponential growth in Ecuador's scientific production, registering 29,833 documents, equivalent to more than 98% of total production (see Figure 3).

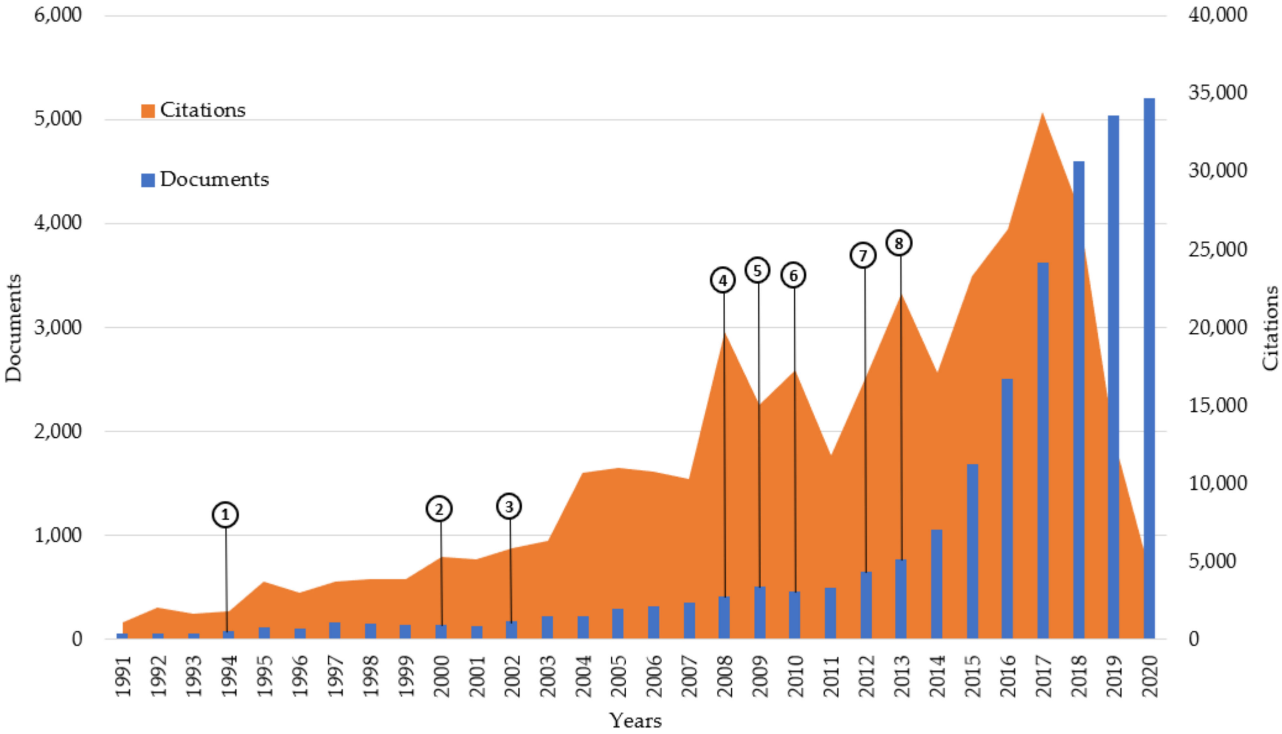

Figure 3. Scientific production of Ecuador (1991–2020). Milestones: 1. SENACYT and FUNDACYT creation; 2. LOES and CONESUP creation; 3. CONEA creation; 4. New Constitution; 5. Mandate 14 and its results; 6. New LOES, CEAACES and SENESCYT creation; 7. Evaluation of category "E" universities and 'Reglamento de Escalafón Docente'; 8. Evaluation of venues and extensions, universities, and the 'proyecto Prometeo'.

In the 1990s, educational reforms of the country's legal framework continued. In 1994, the 'Consejo Nacional de Ciencia y Tecnología' (CONACYT) was abolished and later, the 'Secretaría Nacional de Ciencia y Tecnología' (SENACYT) and the 'Fundación Nacional de Ciencia y Tecnología' (FUNDACYT) were created [123]. In 2000, the 'Ley Orgánica de Educación Superior' (LOES) was created to guarantee the right to quality higher education. This body plan regulates and coordinates the higher education system [124]. In 2000, LOES replaced CONUEP with the 'Consejo Nacional de Educación Superior' (CONESUP) to provide financial resources in research projects and works.

In the 2000s, the course was charted for changes in the higher education system. In 2002, the "Consejo Nacional de Evaluación y Acreditación de la Educación Superior del Ecuador" (CONEA) was created to evaluate and ensure the quality of universities. This legal body considers scientific research in its evaluation processes for university accreditation. In 2008, the "Asamblea Constituyente" established a new constitution where the "Sistema Nacional de Ciencia, Tecnología, Innovación y Saberes" is created (art. 385 and 388) [125] and establishes the constituent mandate # 14. This mandate assesses the performance of 71 universities, which ended with the closure of fourteen universities due to poor quality [126]. In 2010, a new "Ley Orgánica de Educación Superior" (LOES) was created. This law abolishes CONESUP, CONEA and SENACYT, replacing them with the "Consejo de Evaluación, Acreditación y Aseguramiento de la Calidad de la Educación Superior" (CEAACES) and the "Secretaría Nacional de Educación, Ciencia, Tecnología e Innovación" (SENESCYT) [121]. The first, CEAACES, is in charge of executing the constitutional and legal provisions to guarantee the quality of university education.

The second, SENESCYT, promotes the training of human talent and the development of research.

In the 2010s, a considerable increase in scientific research begins (84.96%). During this period, the new control bodies carry out a series of evaluations and issuance of regulations that regulate the support of higher education [127]. Those who carried out a series of evaluations: universities in category "E" (2012), headquarters and extensions (2013), and universities (2013). About the regulations, the "Reglamento del Escalafón Docente" (2012) and the "Reglamento de Régimen Académico" (2013) that require publications from teachers of academic institutions came into force [128,129].

Additionally, the organizations carried out projects to strengthen scientific research, such as the "Proyecto Prometeo", which was carried out between 2013 and 2017. Eight hundred forty-eight foreign researchers participated in this project, in which there was a production of more than 400 documents (indexed in the Scopus database) [21].

Finally, in this boom in scientific production, other additional elements were incorporated, such as the appearance of new universities (33), the use of international rankings to measure the university's academic reputation in the national and international context, and ease of access databases.

Based on the statistical data of the scientific production of Ecuador, more detailed analyzes are generated: type of documents, languages, subject area, contribution of countries and analysis of author keywords, which are exhibited below.

3.1.2. Language Types

In the various areas of knowledge, the English language is predominant due to its relevance in the scientific community as the common link of international collaboration [130,131]. Scientific publications in Ecuador present a similar pattern, representing 80.7% in the English language. The second language that has been published the most is Spanish (16.5%). Other languages presented for studies are Portuguese, French, German, Italian, Russian, Chinese, Czech, Georgian, Korean, Polish, and Catalan.

This prominence of languages needs to be examined as a function of time. Figure 4 shows the first stage of development (1920–1990) and the second stage (1991–2020), the latter divided into decades. The English language shows its majority presence in all periods (over 76%), with a peak of publications in the 2000s. The Spanish language lost prominence in this same decade, resuming with force (the 2010s) due to an unusual increase in Spanish-speaking journals (e.g., Risti Revista Iberica de Sistemas e Tecnologias de Informacao; Espacios; Investigación Clínica Venezuela; Archivos Venezolanos de Farmacología y Terapéutica; Revista Ecuatoriana de Neurología; Revista Bionatura, among others).

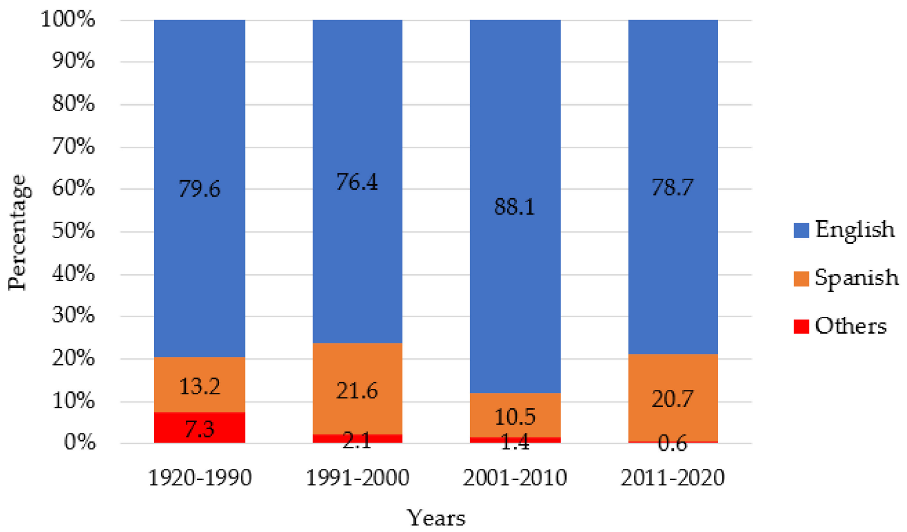

Figure 4. Language types used in Ecuadorian scientific production.

3.1.3. Documents Type

Scientific production has been reflected in 11 document types (see Figure 5). Journal articles are the majority (68.8%) because these are documents considered certified knowledge when examined by peer review and significant for the scientific community [42,132]. The conference articles are also representative (22.01%). However, the country entered this type of publication in 1989 [133], and its significant growth began in 2013.

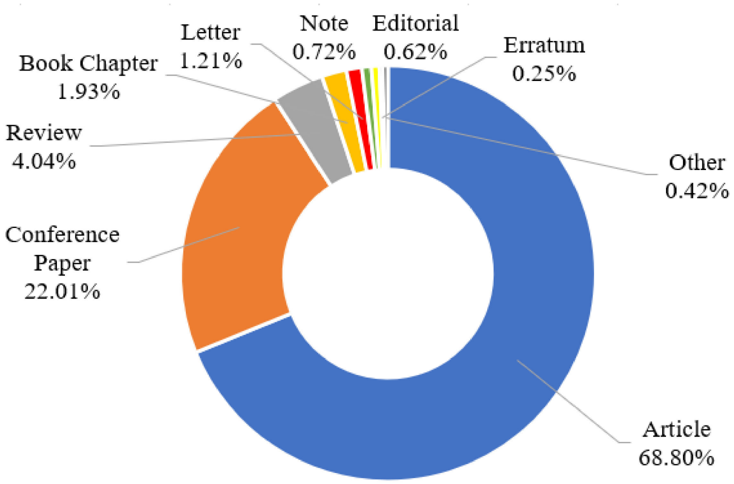

Figure 5. Document types.

3.1.4. Subject Areas

Ecuador has made contributions in 27 subject areas (see Figure 6). The areas with the highest contribution are 'Computer Science' (12.7%), followed by 'Agricultural and Biological Sciences (11.3%) and 'Medicine' (11.2%). Other minor ones comprise 14.2%: Chemistry; Materials Science; Pharmacology, Toxicology and Pharmaceutics; Arts and Humanities; Neuroscience; Chemical Engineering; Multidisciplinary; Economics, Econometrics and Finance; Veterinary; Psychology; Nursing; Health Professions, and Dentistry.

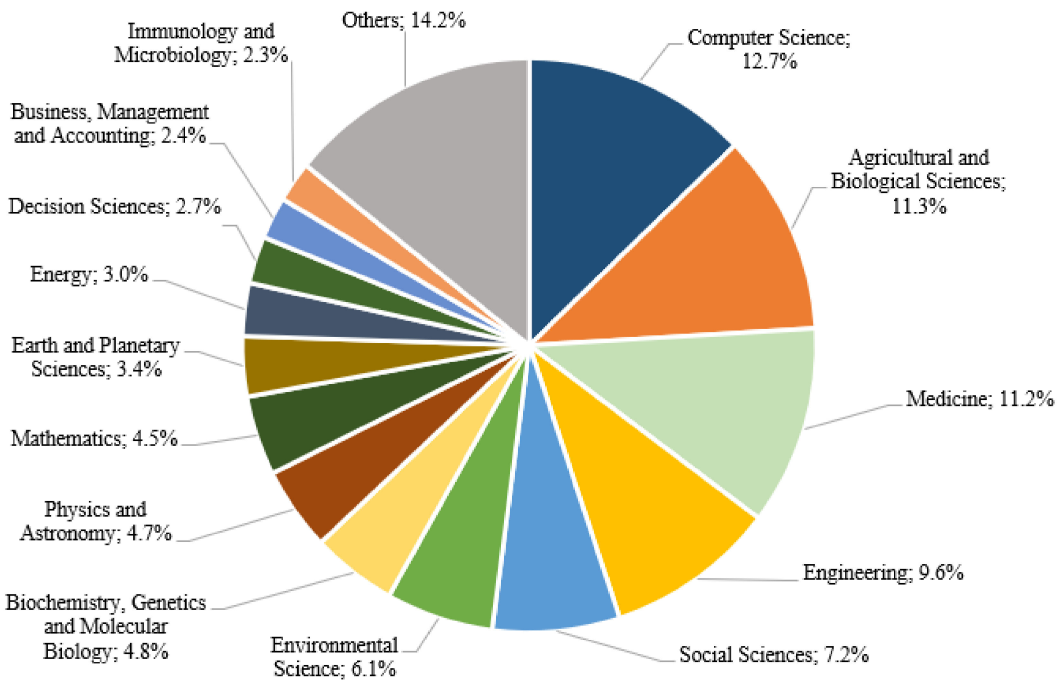

Figure 6. Main subject areas.

Figure 7 shows the ten main subject areas of Ecuador's research analysis. This analysis allows us to know their current vital areas and how they have evolved.

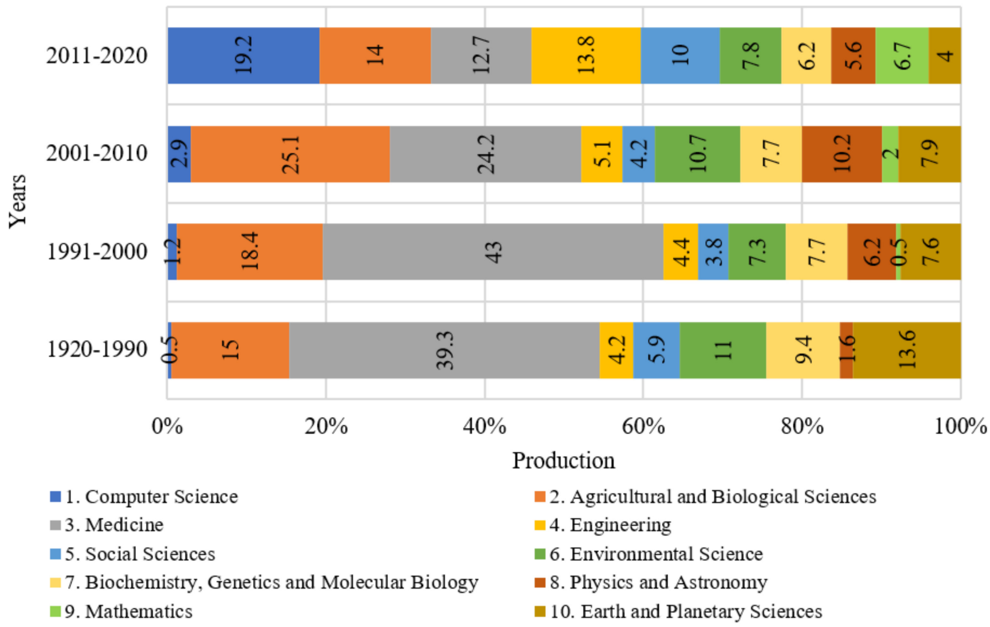

Figure 7. Top 10 of main subject areas.

Table 1 shows the five main authors in the top ten thematic areas of scientific research in Ecuador. The thematic areas in which Ecuadorian authors predominate are Agricultural and Biological Sciences, Environmental Sciences, Mathematics, and Earth and Planetary Sciences. Table S3 (in Supplementary Materials) contains information on these areas in the last ten years.

Table 1. Top 5 of authors in main subject areas.

No.	Subject Areas	Authors	Actual Affiliation	Country	Documents	H-Index
1	Computer Science	Andaluz, V.H.	Universidad de las Fuerzas Armadas (ESPE)	Ecuador	118	14
		Guarda, T.	Universidad Estatal Península de Santa Elena (UPSE)	Ecuador	95	4
		Aguilar, J.	Universidad Regional Autónoma de los Andes (UNIANDES)	Venezuela	84	21
		Luján-Mora, S.	Universitat d'Alacant	Spain	82	19
		Robles-Bykbaev, V.	Universidad Politécnica Salesiana (UPS)	Ecuador	76	7
2	Agricultural and Biological Sciences	Greeney, H.F.	Yanayacu Biological Station	Ecuador	133	13
		Guayasamin, J.M.	Universidad San Francisco de Quito (USFQ)	Ecuador	80	25
		Torres-Carvajal, O.	Pontificia Universidad Católica del Ecuador (PUCE)	Ecuador	63	20
		Valencia, R.	Pontificia Universidad Católica del Ecuador (PUCE)	Ecuador	63	39
		Dangles, O.	Université de Montpellier	France	61	35

Table 1. *Cont.*

No.	Subject Areas	Authors	Actual Affiliation	Country	Documents	H-Index
3	Medicine	Del Brutto, O.H.	Universidad Espíritu Santo (UEES)	Ecuador	315	49
		Chedraui, P.	Universidad Católica de Santiago de Guayaquil (UCSG)	Ecuador	178	37
		Cooper, P.J.	Universidad Internacional del Ecuador (UIDE)	Ecuador	124	47
		Mera, R.M.	Gilead Sciences Incorporated	United States	114	36
		Pérez-López, F.R.	Universidad de Zaragoza	Spain	105	35
4	Engineering	Parashar, N.	Purdue University Northwest	United States	74	122
		Wood, D.	Northeastern University	United States	74	126
		Aarrestad, T.K.	European Organization for Nuclear Research	Switzerland	73	67
		Abbaneo, D.	European Organization for Nuclear Research	Switzerland	73	117
		Abbiendi, G.	Alma Mater Studiorum Università di Bologna	Italy	73	120
5	Social Sciences	Luján-Mora, S.	Universitat d'Alacant	Spain	56	19
		Piedra, N.	Universidad Técnica Particular de Loja (UTPL)	Ecuador	39	12
		Chicaiza, J.	Universidad Técnica Particular de Loja (UTPL)	Ecuador	27	11
		Ochoa, X.	NYU Steinhardt	United States	25	15
		Robles-Bykbaev, V.	Universidad Politécnica Salesiana (UPS)	Ecuador	23	7
6	Environmental Science	Dangles, O.	Université de Montpellier	France	34	35
		Valencia, R.	Pontificia Universidad Católica del Ecuador (PUCE)	Ecuador	31	39
		Célleri, R.	Universidad de Cuenca (UCUENCA)	Ecuador	28	22
		Gómez-Salgado, J.	Universidad Espíritu Santo (UEES)	Ecuador	28	12
		Crespo, P.	Universidad de Cuenca (UCUENCA)	Ecuador	26	19
7	Biochemistry, Genetics and Molecular Biology	Chedraui, P.	Universidad Católica de Santiago de Guayaquil (UCSG)	Ecuador	88	37
		Paz-y-Miño, C.	Universidad Tecnológica Equinoccial (UTE)	Ecuador	63	19
		Pérez-López, F.R.	Universidad de Zaragoza	Spain	50	35
		Guevara-Aguirre, J.	LifeLabs	Canada	44	32
		López-Cortés, A.	Universidad Tecnológica Equinoccial (UTE)	Ecuador	39	13

Table 1. *Cont.*

No.	Subject Areas	Authors	Actual Affiliation	Country	Documents	H-Index
8	Physics and Astronomy	Beri, S.B.	Panjab University	India	952	123
		Lincoln, D.	Fermi National Accelerator Laboratory	United States	951	117
		Ruchti, R.	University of Notre Dame	United States	951	124
		Varelas, N.	University of Illinois at Chicago	United States	951	125
		Wayne, M.	University of Notre Dame	United States	951	124
9	Mathematics	Andaluz, V.H.	Universidad de las Fuerzas Armadas (ESPE)	Ecuador	81	14
		Camacho, O.	Escuela Politécnica Nacional (EPN)	Ecuador	53	15
		Peluffo-Ordóñez, D.H.	Universidad Yachay Tech (YACHAYTECH)	Ecuador	41	11
		Aguilar, W.G.	Universidad de las Fuerzas Armadas (ESPE)	Ecuador	35	16
		Robles-Bykbaev, V.	Universidad Politécnica Salesiana (UPS)	Ecuador	33	7
10	Earth and Planetary Sciences	Toulkeridis, T.	Universidad de las Fuerzas Armadas (ESPE)	Ecuador	54	21
		Mothes, P.	Escuela Politécnica Nacional (EPN)	Ecuador	46	27
		Ruiz, M.	Escuela Politécnica Nacional (EPN)	Ecuador	41	21
		Samaniego, P.	Université Clermont Auvergne	France	37	22
		Yepes, H.	Escuela Politécnica Nacional (EPN)	Ecuador	35	25

Although the areas of Computer Science, Agricultural and Biological Sciences, and Medicine are the largest areas of research in the country, they have evolved differently over time.

- *Computer Science* showed little contribution in 1920–1990 and regularly grew until 2001–2010 (2.9%). However, between 2011 and 2020, it grew exponentially, reaching 19.2% of the publications of the decade and placing this subject area as the most important in the country's scientific production. The development of this area is mainly due to the research disclosed in international conferences (over 70%) and the strong participation of the 'Universidad de las Fuerzas Armadas', 'Escuela Politécnica Nacional (EPN)', 'Escuela Superior Politécnica del Litoral (ESPOL)', 'Universidad Politécnica Salesiana' and 'Universidad Técnica Particular de Loja (UTPL)', who together represent approximately 47% of the publications. The research that presents the most citations in this area (562 citations) corresponds to a conference article by Rafael Fierro (ex EPN and is currently affiliated with The University of New Mexico). This document deals with a control structure implemented in nonholonomic mobile robots [134].
- *Agricultural and Biological Sciences*, an area that showed sustained growth until 2001-2010 and presented a decrease in the following decade (14%). However, the type of document that supports this area of research journals articles (greater than 88%), presented mainly by the 'Pontificia Universidad Católica del Ecuador (PUCE)', 'Universidad San Francisco de Quito (USFQ)', 'Escuela Superior Politécnica del Litoral (ESPOL)', 'Universidad Técnica Particular de Loja (UTPL)', and 'Escuela Politécnica Nacional (EPN)'. These universities represent 35.7% of the total. In this area, the most cited study corresponds to the work "GST and its relatives do not measure differentiation" with 1770 citations [135].

- *Medicine* is the third most important area in the country's publications. However, its global contribution has decreased in recent decades, standing in the 2011–2020 period at 12.7%. The universities that have contributed the most in this area are 'Universidad Central del Ecuador (UCE)', 'Universidad Espíritu Santo (UESS)', 'Universidad San Francisco de Quito (USFQ)', 'Pontificia Universidad Católica del Ecuador (PUCE)' and 'Universidad Católica de Santiago de Guayaquil (UCSG)', representing 34.4% of the total. The study that has received the most citations in this area corresponds to researcher Marcos Serrano's current affiliation to PUCE (4480 citations). In this study, the researcher is the co-author of an international classification on disorders related to headaches [136].
- *Engineering* is a subject area that has shown a considerable increase in the last decade (13.8%). Research in this area has been presented mainly in conference articles (58%) and journal articles (37%). The main contributors are 'Escuela Politécnica Nacional (EPN)', 'Escuela Superior Politécnica del Litoral (ESPOL)', 'Universidad de las Fuerzas Armadas (ESPE)', 'Universidad Politécnica Salesiana' and 'Universidad San Francisco de Quito (USFQ)'. One of the most cited documents corresponds to Claudio A. Cañizares (ex EPN and currently belongs to the University of Waterloo) [137].
- *Social Science*, whose studies have mainly appeared journal articles (70%) with a strong contribution from the 'Escuela Superior Politécnica del Litoral (ESPOL)', 'Universidad Técnica Particular de Loja (UTPL)', FLACSO Ecuador, 'Universidad de Cuenca' and 'Escuela Politécnica Nacional (EPN)'. The outstanding work corresponds to "Elevation-dependent warming in mountain regions of the world" (967 citations) [138] by E. Cáceres who is co-author of the work with affiliation to the 'Institute Nacional de Meteorología e Hidrología (INAMHI) '.
- *Other subject areas* in the 2011–2020 decade present a contribution of less than 10% of the total scientific production (see Figure 7). These areas correspond to Environmental Science; Biochemistry, Genetics and Molecular Biology; Physics and Astronomy; Mathematics; and Earth and Planetary Sciences.

3.1.5. Co-Authorship by Countries Analysis

The analysis of co-authorship by countries allows the determination of the pattern of collaboration between researchers according to the country that represents it [68,139]. A bibliometric map is constructed using the VOSviewer software to carry out this analysis, considering the countries with at least 20 documents. Figure 8 shows the scientific contributions made by Ecuador in 84 countries. Most of the collaboration is related to Spain, the United States, Brazil, Colombia, and the United Kingdom. Other countries that collaborate with Ecuador are shown in the earlier mentioned figure.

Spain (purple colour) is Ecuador's main scientific collaborator with 5660 documents, emphasising Computer Science, Engineering, Physics and Astronomy, Medicine, Agricultural and Biological Sciences, Social Sciences and Environmental Science. This production focuses on universities (i.e., 'Universidad Autónoma de Madrid', 'Universidad de Oviedo' and 'Universidad de Cantabria'), institutes (i.e., 'Instituto de Física de Cantabria') and research centers (i.e., 'Center for Energy, Environmental and Technological Research').

The United States (yellow colour) with 5504 documents, has the majority of collaboration in Agricultural and Biological Sciences; Medicine; Physics and Astronomy; Environmental Science; Biochemistry, Genetics and Molecular Biology; Engineering; and Social Sciences. In contribution to the University of Kansas, Brown University, Northeastern University, Northwestern University, University of Nebraska–Lincoln, University of California-Riverside, and the University of Illinois at Chicago.

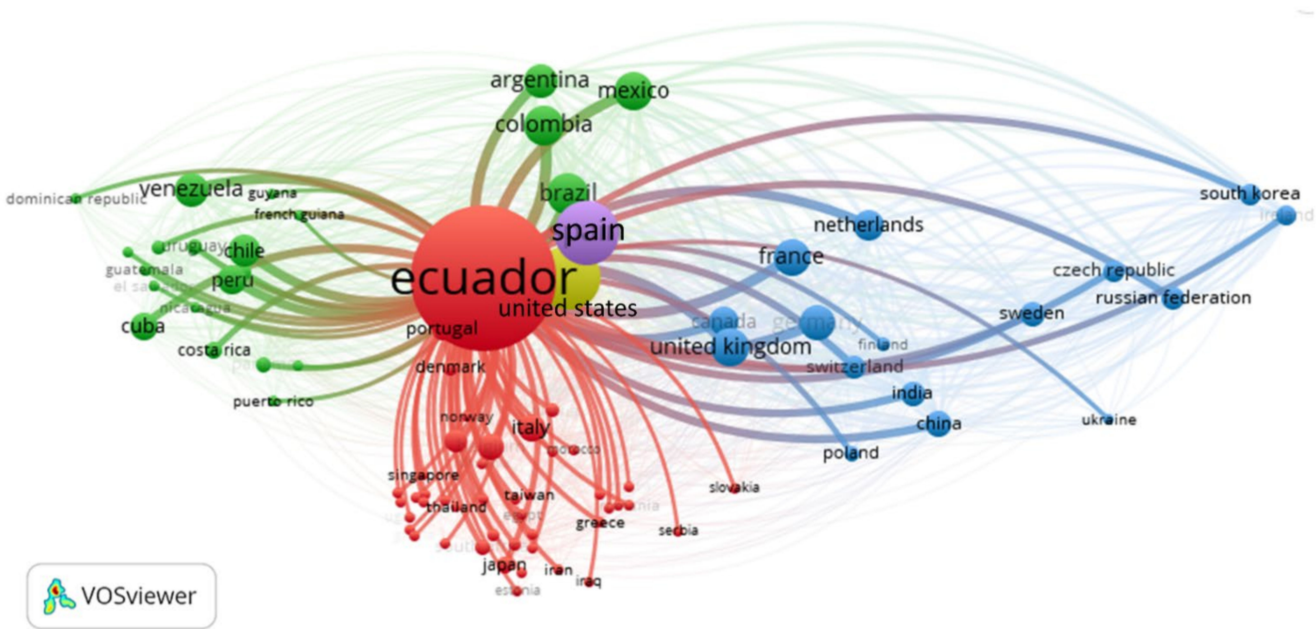

Figure 8. Countries co-authorship Network.

Brazil presents 2166 documents in co-authorship with Ecuador in the areas of Physics and Astronomy; Medicine; Agricultural and Biological Sciences; Environmental Science; Engineering; Biochemistry, Genetics and Molecular Biology; and Computer Science. In collaboration with 'Universidade do Estado do Rio de Janeiro', 'Universidade Estadual Paulista Júlio de Mesquita Filho', 'Universidade Federal do ABC', 'Universidade Estadual de Campinas', and 'Centro Brasileiro de Pesquisas Físicas'.

Colombia, with 2012 documents, presents most of the research in Physics and Astronomy; Medicine; Agricultural and Biological Sciences; Computer Science; Engineering; Biochemistry, Genetics and Molecular Biology; and Environmental Science. These research works are mostly in collaboration with the 'Universidad de Los Andes', 'Universidad Nacional de Colombia', 'Universidad de Antioquia', 'Pontificia Universidad Javeriana', and 'Universidad del Valle'.

The United Kingdom presents greater collaboration in the subject areas of Physics and Astronomy; Medicine; Agricultural and Biological Sciences; Environmental Science; Engineering; Biochemistry, Genetics and Molecular Biology; and Earth and Planetary Sciences. The main participants in these investigations are Imperial College London, University College London, University of Oxford, the University of Cambridge, and the University of Bristol.

Figure 8 shows five clusters and nodes representing each of the 84 countries that collaborate scientifically with Ecuador. The central and the biggest node is the red one, where 'Ecuador' is the main keyword. The yellow (United States) and purple (Spain) clusters are closely related to this largest node. Followed by the green and blue cluster described below.

The green cluster is the closest group to the central cluster, that is, shows the contributions with most Latin American countries, distinguishing those that present a high relationship, such as Brazil (2166), Colombia (2012), Mexico (1855), Argentina (1425), and Venezuela (1386). The nodes that make up the red cluster show less collaboration from other European, Asian, and African countries, which can be observed in the size of their nodes and links.

The blue and red clusters show a significant international contribution between some European and Asian countries. However, the blue cluster stands out for its substantial contribution to the cluster network. This is verified with the width of the connection lines (link strength) of the countries with Ecuador. That is, the wider the line, the greater the relationship between the nodes. In the blue cluster, the most significant contribution is reflected with the United Kingdom with 1938 documents, followed by France (1715), Germany (1631), Netherlands (1154), China (849), India (716), Sweden (666), and Russia (596). While, in the cluster network, the contribution of countries such as Italy (953), Australia (581), Belgium (825), Japan (294), and South Africa (217) stands out.

3.1.6. Intellectual Structure of Scientific Production

When examining the intellectual structure, the author keywords co-occurrence analysis is required. This analysis consists of constructing a network of terms (author keywords) that appear more frequently in the field of study [73,140]. The network is a visual map that determines the cognitive structure, the thematic groups (clusters) and topics (author keywords), which are related [67,141]. The VOSviewer software generates this visual representation.

In the network generation, 59,847 author keywords were established, and the words that have a co-occurrence of at least ten times were chosen, obtaining a selection of 1213 words. The software selects the most vital relationships (link strength), choosing the first 1000. The main keywords for each cluster are shown in Table 2.

Table 2. Author keywords clusters.

Cluster	Cluster Name	Colour	Main Author Keywords
1	Biology and regional climate change	Red	Andes, taxonomy, south america, galapagos, conservation, climate change, biodiversity, new species, amazon
2	Higher education and its various approaches	Green	Latin america, higher education, education, social network, sustainability, university, innovation, ict, management, communication
3	Technology and Computer Science	Blue	Internet of Things (IoT), machine learning, model, data mining, optimization, virtual reality, monotoring, artificial intelligence, smart grid, fuzzy logic
4	Medicine	Yellow	epidemiology, risk factor, children, obesity, covid-19, pregnancy, diagnosis, population-based study, prevalence, menopause
5	Energy, food and water	Purple	essential oil, biomass, nutrition, growth, agriculture, water quality, antioxidant activity, nanoparticles, antioxidant, pesticides
6	Development and applications on the Web	Light blue	learning, cloud computing, accessibility, mobile application, usability, evaluation, e-learning, learning analytics, security, semantic web
7	Multidisciplinary	Orange	gis, incidence, aedes aegypti, banana, consumption, dengue, guayaquil, spatial analysis, income, weight
8	Physics and its applications	Brown	hadron-hadron scattering, cms, physics, beyond standard model, higgs physics, supersymmetry
9	Parasitic diseases	Violet	neurocysticercosis, cysticercosis, chagas disease, epilepsy, taenia solium, trypanosoma cruzi
10	Tourism and Gastronomy	Pink	tourism, motivation, segmentation, satisfaction, ecotourism, gastronomy
11	Native Forest	Light green	cloud forest, egg, behavior, nest, nestling, natural history
12	Allergic and Tropical Diseases	Bluish lead	asthma, tropics, atopy, geohelminths, rural, allergy

Based on the number of co-occurrences, the clusters were analyzed in order of importance:

- Cluster 1 "Biology and regional climate change" (red colour), presents 184 keywords (18,4% of the total). This cluster focuses on various topics related to biodiversity in the national territory (especially in the Andes, Galapagos, and Amazonia) and the resulting impact of climate change. Some researchers have considered these effects on biodiversity [142,143], on the biological quality of water in rivers and lakes [144–146], soil moisture deficit [147], land use and land cover [148–150]. As well as the retreat of the glaciers, the decline of snow and ice in the Andes [151–153]. Other authors have studied its forests and their diversity [154], freshwater ecosystems [155], as well as the discovery of new species [156–163]. Due to the importance of the Galapagos Islands, water security and water quality have been studied [164–166], the impact on fishery resources [167,168], damage caused by plastic waste [169], the effects on the soils of complex agrosystems [170] and air quality [171].

- Cluster 2 "Higher education and its various approaches" (green colour). It is the second-largest group with 179 keywords that corresponds to 17.9% of the total. The cluster relates the various investigations of the country with Latin America on issues related to higher education [172–176]. Acosta-Vargas et al. [177] presented the process of building a dataset to evaluate the accessibility of 368 university websites in Latin America. A study proposed a teacher training model linked to responsible consumption in Ecuadorian primary education [178]. On the other hand, the focus of research on sustainability has gained relevance in recent years [179–181].
- Cluster 3, "Technology and Computer Science" (blue colour), contains 169 keywords (16.9%). This cluster features technological and developmental research in computer science. Technological innovation in this cluster stands out as it is related to cloud computing, information systems and digital technologies, topics that were decisive for the development or production of the Internet of Things (IoT), over the last two decades [182,183]. However, data processing needed analytical power, leading to the generation of studies related to Big Data, becoming an increasingly challenging area [184]. On the other hand, this innovation has allowed computational sciences to strengthen control and access activities in various fields, such as environmental control. [185], electricity consumption [186], telemedicine [187], hydraulic systems, autonomous underwater vehicle [188] and agricultural production [189,190].
- Cluster 4, "Medicine" (yellow colour). The cluster presents a set of 153 keywords (15.3% of total). Epidemiology-related studies stand out, highlighting risk factors, obesity, and current issues such as covid-19. In Latin America, there are mainly epidemiological problems [191–194]. Physical inactivity in Ecuador is the highest reported worldwide and ranks fifth as a risk factor for mortality [195,196], obesity [197,198] and COVID-19 [199–201].
- Cluster 5, "Energy, food and water" (purple colour). This fifth group represents a connection of 128 nodes (12.8%). The main topics in this cluster are essential oil [202,203], agriculture [204–206], and water quality [144,207]. In essential oils, these substances are in great demand worldwide as they can be used without modification due to their different chemical and biological properties, including as natural sources of chemical compounds [208,209]. Concerning water quality, a study calculated two biotic indices to evaluate water quality with an ecological approach in the Guayas river basin, Ecuador [210]. Finally, oil palm cultivation is important in Ecuador's agricultural sector because it generates sources of employment in some of the most vulnerable areas and contributes 4.35% of the agricultural gross domestic product [211].
- Cluster 6, "Development and applications on the Web" (light blue colour). It is made up of 118 nodes that represent 11.8% of words on the map. In Latin America and the world, the Web has evolved significantly during the last decade, becoming a main source of information, knowledge and research [212]. In Ecuador, the development of web applications has been developed for the benefit of society, such as websites of state entities (Geo-MOOC, WCAG 2.0) [213], website accessibility [214], educational websites [215,216] and models for quality evaluation in higher education [217,218].
- Cluster 7, "Multidisciplinary" (orange colour). The cluster contains several disciplines supporting other clusters. The cluster contains various disciplines existing in Ecuador that support other clusters (red, green, blue, and purple), with a total of 18 topics. The main studies are focused on simulation systems [219], analysis of Handytec Company [220], Collective Spatial analysis [221], dengue detection system [222], spatial distribution system [223], social-ecological analysis of dengue [224], disease control surveys [225] and livestock activities [226–228].
- Cluster 8, "Physics and its applications" (brown colour). It is made up of 13 nodes that comprise 1.3% of the total terms of the structure. It is located at the extreme

right of Figure 9. This cluster does not connect with the rest of the clusters because its area of knowledge is particular and does not require input from the other areas. Publications in this cluster are related to physics and the study of hadrons, Compact Muon Solenoid (CMS) y Higgs Boson. For the former, with studies related to its types: baryons [229,230], mesons [231,232], as well as its use Hadronic final states [233], Bose-Einstein correlations of charged hadrons [234] Finally, Quark and antiquark [235,236]. Studies have been carried out in the experiments related to CMS to analyse the Higgs Boson, concerning its production [237,238], measurement of mass, decay, neutrality [239,240] and dark matter particles [241,242].

- Cluster 9, "Parasitic diseases" (violet colour). This cluster contains 13 nodes. The publications related to Neurocysticercosis and Chagas disease, caused by the parasites Taenia Solium and Trypanosoma cruzi, respectively. Studies for the former have established criteria for its diagnosis [243–245]; it has been determined that it produces antibodies if it is extraparenchymal [246], treatments [247,248] and other studies of a general nature [249,250]. Regarding Chagas disease, its life cycle [251,252], alterations it generates in the human body [253], treatments [254] and controls [255] have been considered.
- Cluster 10, "Tourism and Gastronomy" (pink colour). The studies in this cluster are related to the development of tourism in diverse themes such as Coastal marine destinations [256], 3S (sea sun and sand) [257], Mining sites [258], Geoparks [259], protected areas [260], Heritage tourism [261], Eco-tourism [262,263], Community tourism [264,265] and Religious tourism [266]. Gastronomy is considered part of Ecuadorian cultural identity [267,268], considering the contributions on Food Tourism [269,270], indigenous food cultures [271], and gastronomic routes [272].
- Cluster 11, "Native Forest" (light green colour) and includes 9 nodes. In this cluster, topics such as cloud forest [273–275] and natural history mainly stand out [276,277]. In Ecuador, when about 13% of mining concessions were opened with protected forest areas, the threat of extinction of part of the country's biodiversity became evident [278]. In terms of natural history, the investigation of Human Papillomavirus (HPV) infections has not been thoroughly studied. Previous studies have focused on the age group with the highest prevalence and incidence of VPH [279].
- Cluster 12, "Allergic and Tropical Diseases" (bluish lead colour), has a total of 7 nodes. This cluster presents studies related to helminth parasites, whose relative factor is allergic diseases in humans, mainly in tropical climates. In Ecuador, these infections affect rural areas in tropical environments [280] and disadvantaged urban populations [281]. However, studies have been carried out on protection against helminths, which is an advantage in combating these allergic diseases [282,283].

Figure 9 shows the bibliometric map of keyword co-occurrence that corresponds to the intellectual structure of scientific production, composed of 12 clusters, 1000 nodes (author keywords) and 12,812 relationships between nodes.

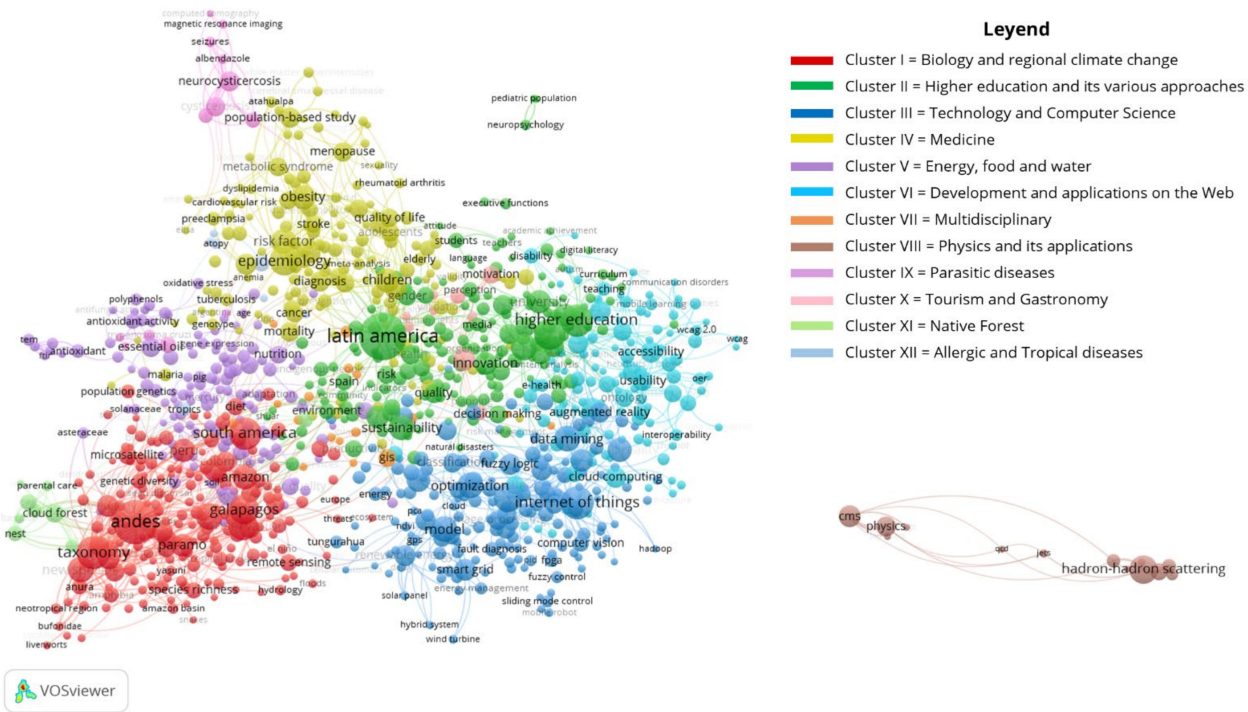

Figure 9. Map of co-occurrence author keywords of the Ecuador universities scientific publications.

3.2. Scientific Production of Universities

3.2.1. Total Production

In Ecuador, 59 universities are accredited, where 44 universities present scientific publications indexed in Scopus (see Figure 10). The total production by Higher Education institutions until 2020 is 28,796 documents, representing 95.3% of the country's publications.

(a) *Production greater than 2000 scientific publications*. In Figure 10, it can be seen that three universities exceed this threshold: the 'Universidad San Francisco de Quito (USFQ)' (9.58% of total production), the 'Escuela Politécnica Nacional (EPN)' (8.89%), and the 'Escuela Superior Politécnica del Litoral Ecuador (ESPOL)' (7.49%). The combination of these institutions represents 25.96% of scientific publications. The 'Universidad de San Francisco de Quito (USFQ) 'shows a strong presence in the subject areas of social sciences, agricultural and biological sciences, mathematics, environmental science, and energy. University that according to the QS World University Rankings of 2021 occupies the first place in the country, the position 65 in Latin America and worldwide it is between the positions 751–800. EPN shows a greater contribution in the areas of computer science, engineering, physics and astronomy, mathematics and earth and planetary sciences. This institution according to the QS World University Rankings of 2021, is located in second place nationally, in position 106 in Latin America and in the range of 1001 to 1200 worldwide. ESPOL presents an important scientific production in areas such as computer science, engineering, social sciences, agricultural and biological sciences, and mathematics. According to the QS World University Rankings of 2021, it ranks fourth nationally, 74th in Latin America and worldwide between 1001–1200.

(b) *Production between 1501 and 2000 scientific publications*. Three universities represent 19.09% of this production. The 'University of the Armed Forces of Ecuador (ESPE)', 'Pontificia Universidad Católica del Ecuador (PUCE)', and 'Universidad Técnica Particular de Loja (UTPL)' are part of this group. These universities are in the QS World University Rankings of 2021, the PUCE (3rd place national, 109th Latin America and 1001–1200 worldwide), and the ESPE (6th place national, 191–200 Latin America and 1201+ worldwide).

(c) *Production between 1001 and 1500 scientific publications*. Group made up of three universities: 'Universidad de Cuenca (UCUENCA)', 'Universidad Politécnica Salesiana (UPS)', and 'Universidad Central del Ecuador (UCE)'. These universities comprise 13.29% of the production. The UCE is the only university in this group located in the QS World University Rankings of 2021 (5th place national, 161–170 Latin America and 1001–1200 worldwide).

(d) *Production between 501 and 1000 scientific publications*. The group makes up a total of eight universities (20.37%): 'Universidad de Guayaquil (UG)', 'Universidad de las Américas (UDLA)', 'Universidad Espíritu Santo (UEES)', 'Universidad Yachay Tech (YACHAYTECH)', 'Universidad Técnica de Ambato (UTA)', 'Universidad Católica de Santiago de Guayaquil (UCGS)', 'Universidad Tecnológica Equinoccial (UTE)', and 'Escuela Superior Politécnica de Chimborazo (ESPOCH)'.

(e) *Production of less than 500 scientific publications.* In this group are most universities in Ecuador (27), representing 21.28% of total scientific research (see Figure 10). In this group is the 'Universidad Técnica del Norte (UTN)', 'Universidad Técnica de Manabí (UTM)', 'Universidad Tecnológica Indoamérica (UTI)', 'Universidad Nacional de Chimborazo (UNACH)', 'Universidad del Azuay (UDA)', 'Facultad Latinoamericana de Ciencias Sociales (FLACSO)', 'Universidad Técnica Estatal de Quevedo (UTEQ)', 'Universidad Estatal Amazónica (UEA)', 'Universidad Técnica de Machala (UTMACH)', 'Universidad Estatal Península de Santa Elena (UPSE)', 'Universidad Nacional de Loja (UNL)', 'Universidad Católica de Cuenca (UCACUE)', 'Universidad Laica Eloy Alfaro de Manabí (ULEAM)', 'Universidad Internacional del Ecuador (UIDE)', 'Universidad Regional Amazónica Ikiam (IKIAM)', 'Universidad Regional Autónoma de los Andes (UNIANDES)', 'Universidad Estatal de Milagro (UNEMI)', 'Universidad Técnica de Cotopaxi (UTC)', 'Universidad Internacional SEK Ecuador (UISEK)', 'Universidad Andina Simón Bolívar (UASB)', 'Universidad Estatal de Bolívar (UEB)', 'Universidad Nacional de Educación (UNAE)', 'Universidad Tecnológica Ecotec (ECOTEC)', 'Universidad Técnica de Babahoyo (UTB)', 'Universidad Tecnológica Israel (UISRAEL)', 'Universidad Metropolitana del Ecuador (UMET)', and 'Universidad del Pacifico (UPACÍFICO)'.

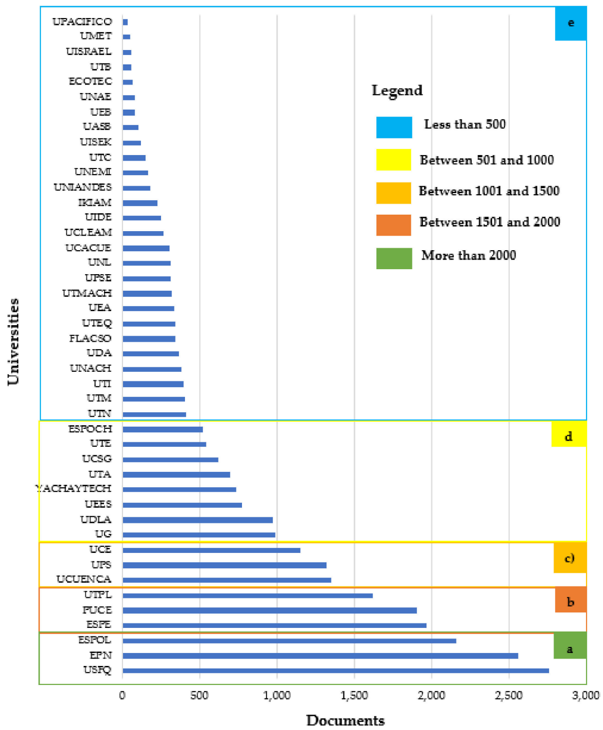

Figure 10. Universities total production.

3.2.2. Documents Published Type

The 44 universities have published scientific publications mainly in journal articles (67%) and conference articles (25.4%). Other documents (7.55%) include 'book', 'book chapter', 'review', 'letter', 'note', 'editorial', 'erratum', 'data paper', and 'short survey'.

Next, researchers proceed to indicate the universities in the country that have used this type of document:

(a) *Journal articles*. The scientific production has been reflected in 5390 journals (a figure that includes those sources that do not currently register continuity in the Scopus database). Of this group of journals, 13 exceed 100 publications; 331 contain between 96 and 10 documents; 2297 between 9 and 2 documents; and 2749 journals show a single publication. Table S1 shows the top 25 journals most used by Ecuador, in which 3,886 documents have been published (14.1% of the total). Among the journals most used by the universities of Ecuador are 'Revista Ibérica de Sistemas e Tecnología de Información (RISTI) ' (513 documents); 'Espacios' (511). These first two sources have a percentile lower than 25 (which corresponds to Q_4), and Espacios' journal discontinued Scopus in 2020. Locations three to five correspond to Q_1 journals.

(b) *Conference articles.* Ecuador, through its universities, has participated in 1367 conferences around the world with 6677 conference articles. The predilection of these conferences can be observed in Table S2, where the first four conferences correspond to the fields of Information Systems and Technology. The conference with the most significant participation is "Advances in Intelligent Systems and Computing, "a Book Series that compiles the research presented at conferences, symposia, and congresses. The second conference is the "Iberian Conference on Information Systems and Technologies", an annual technical-scientific event, where knowledge, perspectives and innovations in the area are presented and discussed. The third and fourth correspond to "Communications in Computer and Information" Science and "Lecture Notes in Computer Science", a Book Series of the proceedings of computer science conferences. These conferences have in common the SJR indicator (see Table S2), a prestige indicator that classifies information sources according to their average prestige per document. Consider the quotes as the prestige of the source [284]. Of the conferences shown in Table S2, 66.7% do not indicate the conference's performance or prestige. Instead, they are registered only in Scopus.

3.2.3. Quality of Articles Published by University

One issue that has caused debate in the academic world is the relationship between the number of scientific publications and their perceived quality, which allows us to understand how these publications can influence the field of study [285,286]. These investigations allow the generation of new knowledge valuable for the academy and the socio-economic growth of a region or country [287,288].

The production of scientific knowledge occurs globally. However, its development differs between developed and developing countries [289]. In developed countries, it is considered that there should be a balance between the quantity and quality of scientific publications [290]. Along the same lines, Haslam [291] considers that researchers must publish frequently and with a certain quality to generate scientific impact. Other authors consider that the higher the production, the higher the quality, which is about the world's largest universities [292]. In developing countries, especially South American countries, scientific productivity is considered a long and hard road to travel, but it is essential to consolidate the system, and that quality ends up exceeding quantity [289,293].

In Figure 11, the production of journal articles by the university is presented, divided according to their equivalent quartile using the CiteScore metrics 2019. In the construction of the figures, journals whose coverage has been discontinued in Scopus or are recently created. Therefore, they do not present a valuation in the CiteScore indicator for the year 2019 (data obtained in January 2021), which allowed to obtain a total of 20,244 articles.

In Figure 11, higher education institutions with production more significant than 300 documents can be seen, representing 81.96% of scientific production.

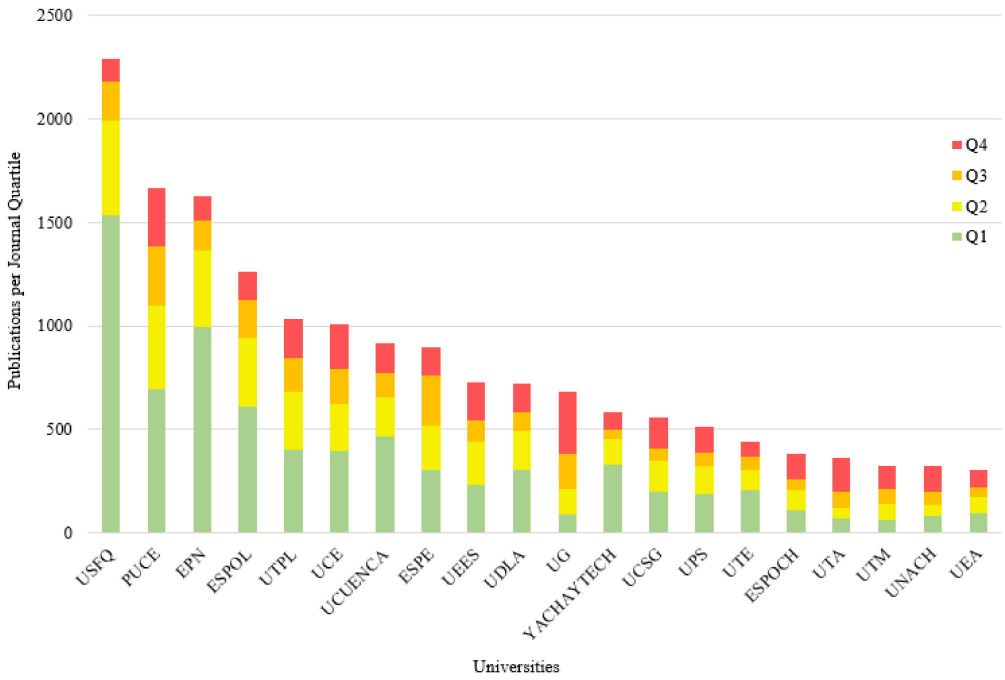

Figure 11. Publications by Journal Quartile (up 300 publications).

Ecuador's universities in the period 1920–2020 present a scientific production categorized according to quartiles (Q_1 to Q_4), which are shown in Figure 11.

1. *Q_1 (quartile 1).* They are those publications that are between the 99th–75th percentiles of the CiteScore, representing 41.47% of the production. In this quartile, five universities contribute 51.2%: 'Universidad San Francisco de Quito (USFQ)', 'Escuela Politécnica Nacional (EPN)', 'Pontificia Universidad Católica del Ecuador (PUCE)', 'Escuela Superior Politécnica del Litoral (ESPOL)', and 'Universidad de Cuenca (UCUENCA)', in their order. Most universities (26) have less than 100 documents, which represents 13.1% of the total quartile.
2. *Q_2 (quartile 2).* Corresponds to the 74th-50th percentile of the CiteScore. This quartile comprises 22.5% of scientific production, where five universities represent 40.4% of the publications in this quartile. In this cluster, most of the universities mentioned in Q1 appear in different order: 'Universidad San Francisco de Quito (USFQ)', 'Pontificia Universidad Católica del Ecuador (PUCE)', 'Escuela Politécnica Nacional (EPN)', and 'Escuela Superior Politécnica del Litoral (ESPOL)'. Entering the 'Universidad Técnica Particular de Loja (UTPL)' instead of the 'Universidad de Cuenca (UCUENCA)'. It is observed that 30 universities present less than 100 documents (25.2%) in this quartile.
3. *Q_3 (quartile 3).* They are those that are in the 49th–25th percentile of the CiteScore and that represent 15.04% of scientific production. In this quartile, the main contributors are in order: 'Pontificia Universidad Católica del Ecuador (PUCE)', 'Universidad de las Fuerzas Armadas (ESPE)', 'Universidad San Francisco de Quito (USFQ)', 'Escuela Superior Politécnica del Litoral (ESPOL)', and 'Universidad de Guayaquil (UG)', contributing 35.2% of the publications in this quartile.
4. *Q_4 (quartile 4).* Represents the lowest percentile of the CiteScore (24th-0). It ranks third in production by quartiles (20.95%), placing 21 universities with more than 100 articles. This group includes the 'Universidad de Guayaquil (UG)', 'Pontificia Universidad Católica del Ecuador (PUCE)', 'Universidad Central del Ecuador (UCE)', 'Universidad Técnica Particular de Loja (UTPL)', 'Universidad Espíritu Santo (UEES)', 'Universidad Técnica de Ambato (UTA)', 'Universidad Católica de Santiago de Guayaquil (UCSG)',

'Universidad de Cuenca (UCUENCA)', 'Universidad Católica de Cuenca (UCACUE)', and 'Universidad of the Americas (UDLA)'. When examining the scientific production of each university, we can observe the proportion of publications in Q4, led by the 'Universidad Regional Autónoma de los Andes (UNIANDES)' with 82.76%, the 'Universidad Tecnológica Ecotec (ECOTEC)' (82.26%), the 'Universidad Católica de Cuenca (UCACUE)' (65.74%), the 'Universidad Tecnológica Israel (UISRAEL)' (62.5%), the 'Universidad Técnica de Cotopaxi (UTC)' (62.18%), the 'Universidad Técnica de Babahoyo (UTB)' (60%), and 'Universidad Metropolitana del Ecuador (UMET)' (50%). These universities also share the group of less than 300 publications and most of them share the latest locations.

4. Discussion

In emerging countries, such as Ecuador, a long and complex process of scientific production is ongoing, wherein quantity is more important than quality. This research evaluation in Ecuadorian universities is annual; therefore, it presents limitations of resources and time to publish. Consequently, these institutions and researchers opt for journals with short publication times, mainly in the Q2–Q4 quartiles, representing 58.5% of the total production. In contrast, a minority group of universities (six) are in close competition to improve their research indexes to climb international rankings (see Figure 11). Ecuadorian universities have managed to position themselves in the world rankings due to existing changes in the legal framework (laws and regulations), government evaluations, and international rankings. According to the QS World University Ranking, three universities are in the top 1000, and in the South American ranking, six are in the top 100.

Since 2015, Ecuador has shown the highest growth in scientific production compared to the rest of Latin American countries [294]. These publications resulted from close collaboration with foreign researchers and universities that allowed them to participate in international research projects, doctorate training for Ecuadorian teachers, recruitment of foreign researchers through the Prometheus Project [23,295,296], and priority attention to areas of national interest and plans for ancestral knowledge management [294]. International collaboration has focused on Spain, the United States, and some South American countries (see Figure 8). Spain, a country with profound cultural, social and economic ties since colonial times [297], has made it the primary destination for masters and doctorate courses [298]. The United States has been considered by Ecuadorian researchers for the experience and quality of the research of their North American colleagues, as well as access to funds [20]. It is a destination for the undergraduate, doctoral and postdoctoral levels of scholarship [298]. These countries show their importance when collaborating with Ecuador in the areas of Computer Science, Engineering, Social Science and Medicine mainly.

In the South American context, its relations with Brazil, Colombia and Mexico are due to their proximity and geopolitical relations in their cooperation and collaboration agreements, especially with Colombia as they are bordering neighbours and share part of the Amazon region [20]. This international collaboration is given in general terms by the megadiversity of the regions of Ecuador, the presence of natural laboratories (Galapagos Islands and the Ecuadorian Amazon), the appearance of new endemic species [16], their international recognition as World Heritage Sites and Global Geoparks [7], as well as for its cultural, gastronomic and tourist diversity. These characteristics have led Ecuador to awaken the interest of the world scientific community in recent years.

Latindex is a regional online information database for scientific journals from Latin America, Spain, and Portugal. The system has disadvantages due to the low visibility and quality of the articles, and the journals do not have an impact or prestige indicator [299,300]. Therefore, journals cannot be classified in the respective subject areas. In addition, they do not have a centralised repository approach, so it is not possible to have a unified view of their publications, limiting the possibility of carrying out bibliometric studies or integrating all the information [301].

In the coming years, the country should observe and imitate what is happening in the academic world, such as publishing English-language articles and seek an appropriate balance between production and quality [23,130].

5. Conclusions

This study examines 100 years of scientific production in Ecuador (1920–2020), indexed in a central academic database such as Scopus. The intellectual structure of 30,205 documents, written in 13 languages in collaboration with 84 countries, was analysed using bibliometric methods.

The analysis of scientific production shows a sustained growth over time that has allowed to approach it in two stages: (i) 1920–1990 and (ii) 1991–2020. In the first stage, 372 documents were registered (1.3% of the total), with the first research by foreign authors (M. E. Connor and R. Royer) and Ecuadorian authors (F. Rojas and J. Tanca Marengo). The areas of Medicine, Agricultural and Biological Sciences, Earth and Planetary Sciences were consolidated at this stage, thanks to private enterprise, public bodies, hospitals, foundations, and universities. In the 70–80s, there was a 4.5-fold increase in publications compared to the previous years due to changes in the legal system and the creation of other universities. In the second stage, there was a sustained increase until 2008, when an exponential growth in scientific publications began. In particular, new changes in the Higher Education System related to national legislation, universities' evaluation, and new guidelines for their teaching staff. This stage accounts for 98.77% of the publications.

The country's scientific research has an essential component of international collaboration, with Spain, the United States and most South American' countries standing out. Production has been mainly in the form of journal articles (68.8%) and conference papers (22.01%), with a preference for English (80.7%). This scientific production has allowed research development in 27 subject areas, mainly Computer Science, Agricultural and Biological Sciences and Medicine (35.2%).

In the co-occurrence analysis of author keywords, the intellectual structure of the country's scientific research is revealed in 12 research lines (clusters) and 1000 topics (nodes) that make them up. These lines broadly incorporate the 27 subject areas mentioned above.

The role of universities is predominant in the country's research, where 44 universities are contributing 95.3% of the publications. However, balancing the publications quantity and quality is an unfinished task. The 63.97% are between quartiles 1-2, mostly carried out by six universities. In addition, there is low participation in the scientific production of 24 universities that contribute less than 300 documents each and have a preference to publish in quartile 4.

This study contributes to the academic world because: (i) Ecuador is considered a natural laboratory for researchers, as it is a megadiverse and irreplaceable country; (ii) scientific research has increased exponentially since 2011 due to changes in public policy and collaboration with 84 countries; (iii) international links with foreign universities and the establishment of collaborative networks; iv) the research addressing Ecuador has been developed in 12 research themes in 27 subject areas; (v) the subject areas have the participation of foreign authors recognised in the main lines of research that have been developed in the country.

Finally, this work is limited to the Scopus database due to the limitations of other databases. Nevertheless, we hope this study will encourage future research on the country's quantity and quality of academic publications.

Supplementary Materials: The following tables are available online at https://www.mdpi.com/article/10.3390/publications9040055/s1. Table S1: Most representative journal articles of the universities scientific production. Table S2: Most representative conference articles of the universities scientific production. Table S3: Top 5 of author in main subject areas (2011–2020).

Author Contributions: Conceptualization, G.H.-F. and N.M.-B.; methodology, G.H.-F., N.M.-B. and C.M.-F.; software, C.M.-F.; validation, G.H.-F.; formal analysis, G.H.-F., N.M.-B., C.M-F. and L.B.-M.;

investigation, N.M.-B. and C.M.-F.; data curation, N.M.-B. and C.M.-F.; writing—original draft preparation, G.H.-F., N.M.-B., C.M.-F. and L.B.-M.; writing—review and editing, G.H.-F., N.M.-B., C.M.-F. and L.B.-M.; supervision, G.H.-F. All authors have read and agreed to the published version of the manuscript.

Funding: This research does not receive funding by external factors.

Data Availability Statement: Not applicable.

Acknowledgments: The preparation of this study counted with the collaboration of various scientific research projects, as the "Peninsula Santa Elena Geopark Project" of the UPSE University project (Universidad Estatal Península de Santa Elena) with code no. 91870000.0000.381017; and the project "Factores Geoambientales de los Pozos Petroleros y su Incidencia en el Desarrollo Territorial en los Cantones Salinas y La Libertad de la Provincia de Santa Elena", code no: 91870000.0000.385428. Also, to projects of the ESPOL Polytechnic University such as "Registry of geological and mining heritage and its impact on the defense and preservation of geodiversity in Ecuador" with code CIPAT-01-2018, and "Ruta del Oro Geopark" with code CIPAT-02-2018. The authors appreciate the feedback received by the reviewers and editor in the review process of this article.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Brehm, G.; Fiedler, K.; Häuser, C.L.; Dalitz, H. *Methodological Challenges of a Megadiverse Ecosystem*; Springer: New York, NY, USA, 2008; pp. 41–47.
2. Convention on Biological Diversity Ecuador—Main Details. Available online: https://www.cbd.int/countries/profile/?country=ec (accessed on 13 November 2021).
3. UNEP-WCMC Megadiverse Countries. Available online: https://www.biodiversitya-z.org/content/megadiverse-countries (accessed on 13 November 2021).
4. Mestanza-Ramón, C.; Henkanaththegedara, S.M.; Vásconez Duchicela, P.; Vargas Tierras, Y.; Sánchez Capa, M.; Constante Mejía, D.; Jimenez Gutierrez, M.; Charco Guamán, M.; Mestanza Ramón, P. In-Situ and Ex-Situ Biodiversity Conservation in Ecuador: A Review of Policies, Actions and Challenges. *Diversity* **2020**, *12*, 315. [CrossRef]
5. Sandoval-Guerrero, L.K. Patrimonio Cultural y Turismo en el Ecuador. *Tsafiqui Rev. Científica Ciencias Soc.* **2017**. [CrossRef]
6. Carrión-Mero, P.; Morante-Carballo, F. The Context of Ecuador's World Heritage, for Sustainable Development Strategies. *Int. J. Des. Nat. Ecodynamics* **2020**, *15*, 39–46. [CrossRef]
7. UNESCO World Heritage List. Available online: http://whc.unesco.org/en/list/&&order=country (accessed on 13 November 2021).
8. Bass, M.S.; Finer, M.; Jenkins, C.N.; Kreft, H.; Cisneros-Heredia, D.F.; McCracken, S.F.; Pitman, N.C.A.; English, P.H.; Swing, K.; Villa, G.; et al. Global Conservation Significance of Ecuador's Yasuní National Park. *PLoS ONE* **2010**, *5*, e8767. [CrossRef]
9. Martin, P.L. Global Governance from the Amazon: Leaving Oil Underground in Yasuní National Park, Ecuador. *Glob. Environ. Polit.* **2011**, *11*, 22–42. [CrossRef]
10. Salinas-de-León, P.; Martí-Puig, P.; Buglass, S.; Arnés-Urgellés, C.; Rastoin-Laplane, E.; Creemers, M.; Cairns, S.; Fisher, C.; O'Hara, T.; Ott, B.; et al. Characterization of deep-sea benthic invertebrate megafauna of the Galapagos Islands. *Sci. Rep.* **2020**, *10*, 13894. [CrossRef] [PubMed]
11. Hennessy, E. The politics of a natural laboratory: Claiming territory and governing life in the Galápagos Islands. *Soc. Stud. Sci.* **2018**, *48*, 483–506. [CrossRef] [PubMed]
12. Lake, D.; Isabela, V.D. Darwin's Name in Galápagos. In *Galápagos: An Encyclopedia of Geography, History, and Culture*; Moore, R., Ed.; ABC-CLIO: Galápagos, Ecuador, 2021; pp. 173–176.
13. Hesketh, I. Narratives of Charles Darwin Down Under. *Stud. Hist. Philos. Sci. Part A* **2021**, *88*, 303–311. [CrossRef] [PubMed]
14. Olson, D.M.; Dinerstein, E. The Global 200: Priority Ecoregions for Global Conservation. *Ann. Missouri Bot. Gard.* **2002**, *89*, 199. [CrossRef]
15. Le Saout, S.; Hoffmann, M.; Shi, Y.; Hughes, A.; Bernard, C.; Brooks, T.M.; Bertzky, B.; Butchart, S.H.M.; Stuart, S.N.; Badman, T.; et al. Protected Areas and Effective Biodiversity Conservation. *Science* **2013**, *342*, 803–805. [CrossRef]
16. Orihuela-Torres, A.; Tinoco, B.; Ordóñez-Delgado, L.; Espinosa, C.I. Knowledge Gaps or Change of Distribution Ranges? Explaining New Records of Birds in the Ecuadorian Tumbesian Region of Endemism. *Diversity* **2020**, *12*, 66. [CrossRef]
17. Tanner, M.K.; Moity, N.; Costa, M.T.; Marin Jarrin, J.R.; Aburto-Oropeza, O.; Salinas-de-León, P. Mangroves in the Galapagos: Ecosystem services and their valuation. *Ecol. Econ.* **2019**, *160*, 12–24. [CrossRef]
18. Myers, N.; Mittermeier, R.A.; Mittermeier, C.G.; da Fonseca, G.A.B.; Kent, J. Biodiversity hotspots for conservation priorities. *Nature* **2000**, *403*, 853–858. [CrossRef]
19. Viteri-Salazar, O.; Toledo, L. The expansion of the agricultural frontier in the northern Amazon region of Ecuador, 2000–2011: Process, causes, and impact. *Land Use Policy* **2020**, *99*, 104986. [CrossRef]
20. Castillo, J.A.; Powell, M.A. Análisis de la producción científica del Ecuador e impacto de la colaboración internacional en el periodo 2006-2015. *Rev. Española Doc. Científica* **2019**, *42*, 225. [CrossRef]

21. Castillo, J.A.; Powell, M.A. Research Impact and International Collaboration: A Study of Ecuadorian Science. *J. Hispanic High. Educ.* **2020**, *19*, 232–249. [CrossRef]
22. Castillo, J.A.; Powell, M.A. Research Productivity and International Collaboration: A Study of Ecuadorian Science. *J. Hispanic High. Educ.* **2020**, *19*, 369–387. [CrossRef]
23. Calahorrano, L.; Monge-Nájera, J.; Wang, M.-H.; Ho, Y.-S. Ecuador publications in the Science Citation Index Expanded: Institutions, subjects, citation and collaboration patterns. *Rev. Biol. Trop.* **2020**, *68*, 159. [CrossRef]
24. Galbán-Rodríguez, E.; Torres-Ponjuán, D.; Martí-Lahera, Y.; Arencibia-Jorge, R. Measuring the Cuban scientific output in scholarly journals through a comprehensive coverage approach. *Scientometrics* **2019**, *121*, 1019–1043. [CrossRef]
25. Liu, W.; Tang, L.; Gu, M.; Hu, G. Feature report on China: A bibliometric analysis of China-related articles. *Scientometrics* **2015**, *102*, 503–517. [CrossRef]
26. Kumar, S.; Spais, G.S.; Kumar, D.; Sureka, R. A Bibliometric History of the Journal of Promotion Management (1992–2019). *J. Promot. Manag.* **2020**, *26*, 97–120. [CrossRef]
27. Donthu, N.; Kumar, S.; Pattnaik, D. Forty-five years of Journal of Business Research: A bibliometric analysis. *J. Bus. Res.* **2020**, *109*, 1–14. [CrossRef]
28. Einecker, R.; Kirby, A. Climate Change: A Bibliometric Study of Adaptation, Mitigation and Resilience. *Sustainability* **2020**, *12*, 6935. [CrossRef]
29. Donthu, N.; Kumar, S.; Mukherjee, D.; Pandey, N.; Lim, W.M. How to conduct a bibliometric analysis: An overview and guidelines. *J. Bus. Res.* **2021**, *133*, 285–296. [CrossRef]
30. Farrukh, M.; Shahzad, I.A.; Meng, F.; Wu, Y.; Raza, A. Three decades of research in the technology analysis & strategic management: A bibliometrics analysis. *Technol. Anal. Strateg. Manag.* **2021**, *33*, 989–1005. [CrossRef]
31. Fahimnia, B.; Sarkis, J.; Davarzani, H. Green supply chain management: A review and bibliometric analysis. *Int. J. Prod. Econ.* **2015**, *162*, 101–114. [CrossRef]
32. Briones-Bitar, J.; Carrión-Mero, P.; Montalván-Burbano, N.; Morante-Carballo, F. Rockfall Research: A Bibliometric Analysis and Future Trends. *Geosciences* **2020**, *10*, 403. [CrossRef]
33. Montalván-Burbano, N.; Pérez-Valls, M.; Plaza-Úbeda, J.; Foroudi, P. Analysis of scientific production on organizational innovation. *Cogent Bus. Manag.* **2020**, *7*, 1745043. [CrossRef]
34. Dzikowski, P. A bibliometric analysis of born global firms. *J. Bus. Res.* **2018**, *85*, 281–294. [CrossRef]
35. Cobo, M.J.; Chiclana, F.; Collop, A.; de Ona, J.; Herrera-Viedma, E. A Bibliometric Analysis of the Intelligent Transportation Systems Research Based on Science Mapping. *IEEE Trans. Intell. Transp. Syst.* **2014**, *15*, 901–908. [CrossRef]
36. Herrera-Franco, G.; Montalván-Burbano, N.; Carrión-Mero, P.; Apolo-Masache, B.; Jaya-Montalvo, M. Research Trends in Geotourism: A Bibliometric Analysis Using the Scopus Database. *Geosciences* **2020**, *10*, 379. [CrossRef]
37. Payán-Sánchez, B.; Belmonte-Ureña, L.J.; Plaza-Úbeda, J.A.; Vazquez-Brust, D.; Yakovleva, N.; Pérez-Valls, M. Open Innovation for Sustainability or Not: Literature Reviews of Global Research Trends. *Sustainability* **2021**, *13*, 1136. [CrossRef]
38. Maldonado-Erazo, C.P.; Álvarez-García, J.; del Río-Rama, M.; Correa-Quezada, R. Corporate Social Responsibility and Performance in SMEs: Scientific Coverage. *Sustainability* **2020**, *12*, 2332. [CrossRef]
39. Nobanee, H.; Al Hamadi, F.Y.; Abdulaziz, F.A.; Abukarsh, L.S.; Alqahtani, A.F.; AlSubaey, S.K.; Alqahtani, S.M.; Almansoori, H.A. A Bibliometric Analysis of Sustainability and Risk Management. *Sustainability* **2021**, *13*, 3277. [CrossRef]
40. De Sousa, F.D.B. The role of plastic concerning the sustainable development goals: The literature point of view. *Clean. Responsible Consum.* **2021**, *3*, 100020. [CrossRef]
41. Herrera-Franco, G.; Montalván-Burbano, N.; Carrión-Mero, P.; Bravo-Montero, L. Worldwide Research on Socio-Hydrology: A Bibliometric Analysis. *Water* **2021**, *13*, 1283. [CrossRef]
42. Herrera-Franco, G.; Montalván-Burbano, N.; Carrión-Mero, P.; Jaya-Montalvo, M.; Gurumendi-Noriega, M. Worldwide Research on Geoparks through Bibliometric Analysis. *Sustainability* **2021**, *13*, 1175. [CrossRef]
43. Eito-Brun, R.; Ledesma Rodríguez, M. 50 years of space research in Europe: A bibliometric profile of the European Space Agency (ESA). *Scientometrics* **2016**, *109*, 551–576. [CrossRef]
44. Taşkin, Z.; Doğan, G.; Akça, S.; Şencan, I.; Akbulut, M. Does scopus put its own journal selection criteria into practice. In Proceedings of the ISSI, Istanbul, Turkey, 29 June–3 July 2015; pp. 1198–1199.
45. Merigó, J.M.; Pedrycz, W.; Weber, R.; de la Sotta, C. Fifty years of Information Sciences: A bibliometric overview. *Inf. Sci.* **2018**, *432*, 245–268. [CrossRef]
46. Laengle, S.; Merigó, J.M.; Miranda, J.; Słowiński, R.; Bomze, I.; Borgonovo, E.; Dyson, R.G.; Oliveira, J.F.; Teunter, R. Forty years of the European Journal of Operational Research: A bibliometric overview. *Eur. J. Oper. Res.* **2017**, *262*, 803–816. [CrossRef]
47. Farrukh, M.; Meng, F.; Raza, A.; Tahir, M.S. Twenty-seven years of Sustainable Development Journal: A bibliometric analysis. *Sustain. Dev.* **2020**, *28*, 1725–1737. [CrossRef]
48. Bonilla, C.A.; Merigó, J.M.; Torres-Abad, C. Economics in Latin America: A bibliometric analysis. *Scientometrics* **2015**, *105*, 1239–1252. [CrossRef]
49. Jokić, M.; Mervar, A.; Mateljan, S. The development of political science in Central and Eastern Europe: Bibliometric perspective, 1996–2013. *Eur. Polit. Sci.* **2019**, *18*, 491–509. [CrossRef]
50. Glänzel, W. Science in Scandinavia: A Bibliometric Approach. *Scientometrics* **2000**, *48*, 121–150. [CrossRef]

51. Confraria, H.; Godinho, M.M. The impact of African science: A bibliometric analysis. *Scientometrics* **2015**, *102*, 1241–1268. [CrossRef]
52. Lancho-Barrantes, B.S.; Cantú-Ortiz, F.J. Science in Mexico: A bibliometric analysis. *Scientometrics* **2019**, *118*, 499–517. [CrossRef]
53. Anuradha, K.T.; Urs, S.R. Bibliometric indicators of Indian research collaboration patterns: A correspondence analysis. *Scientometrics* **2007**, *71*, 179–189. [CrossRef]
54. Baas, J.; Schotten, M.; Plume, A.; Côté, G.; Karimi, R. Scopus as a curated, high-quality bibliometric data source for academic research in quantitative science studies. *Quant. Sci. Stud.* **2020**, *1*, 377–386. [CrossRef]
55. Del Río-Rama, M.; Maldonado-Erazo, C.; Álvarez-García, J.; Durán-Sánchez, A. Cultural and Natural Resources in Tourism Island: Bibliometric Mapping. *Sustainability* **2020**, *12*, 724. [CrossRef]
56. Visser, M.; van Eck, N.J.; Waltman, L. Large-scale comparison of bibliographic data sources: Scopus, Web of Science, Dimensions, Crossref, and Microsoft Academic. *Quant. Sci. Stud.* **2021**, *2*, 20–41. [CrossRef]
57. Zhu, J.; Liu, W. A tale of two databases: The use of Web of Science and Scopus in academic papers. *Scientometrics* **2020**, *123*, 321–335. [CrossRef]
58. Pico-Saltos, R.; Carrión-Mero, P.; Montalván-Burbano, N.; Garzás, J.; Redchuk, A. Research Trends in Career Success: A Bibliometric Review. *Sustainability* **2021**, *13*, 4625. [CrossRef]
59. Abad-Segura, E.; de la Fuente, A.B.; González-Zamar, M.-D.; Belmonte-Ureña, L.J. Effects of Circular Economy Policies on the Environment and Sustainable Growth: Worldwide Research. *Sustainability* **2020**, *12*, 5792. [CrossRef]
60. Moed, H.F. A critical comparative analysis of five world university rankings. *Scientometrics* **2017**, *110*, 967–990. [CrossRef]
61. Torres-Samuel, M.; Vásquez, C.L.; Viloria, A.; Varela, N.; Hernández-Fernandez, L.; Portillo-Medina, R. Analysis of Patterns in the University World Rankings Webometrics, Shanghai, QS and SIR-SCimago: Case Latin America. In *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*; Springer: New York, NY, USA, 2018; Volume 10943, pp. 188–199. ISBN 9783319938028.
62. Kovačević, J.; Hallinger, P. Finding Europe's niche: Science mapping the knowledge base on educational leadership and management in Europe, 1960–2018. *Sch. Eff. Sch. Improv.* **2020**, *31*, 405–425. [CrossRef]
63. Najmi, A.; Rashidi, T.H.; Abbasi, A.; Travis Waller, S. Reviewing the transport domain: An evolutionary bibliometrics and network analysis. *Scientometrics* **2017**, *110*, 843–865. [CrossRef]
64. Carrión-Mero, P.; Montalván-Burbano, N.; Paz-Salas, N.; Morante-Carballo, F. Volcanic Geomorphology: A Review of Worldwide Research. *Geosciences* **2020**, *10*, 347. [CrossRef]
65. Milán-García, J.; Uribe-Toril, J.; Ruiz-Real, J.; de Pablo Valenciano, J. Sustainable Local Development: An Overview of the State of Knowledge. *Resources* **2019**, *8*, 31. [CrossRef]
66. Montalván-Burbano, N.; Velastegui-Montoya, A.; Gurumendi-Noriega, M.; Morante-Carballo, F.; Adami, M. Worldwide Research on Land Use and Land Cover in the Amazon Region. *Sustainability* **2021**, *13*, 6039. [CrossRef]
67. Van Eck, N.J.; Waltman, L. Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics* **2010**, *84*, 523–538. [CrossRef]
68. Van Eck, N.J.; Waltman, L. Visualizing Bibliometric Networks. In *Measuring Scholarly Impact*; Springer International Publishing: Cham, Switzerland, 2014; pp. 285–320.
69. Chernysh, Y.; Roubík, H. International Collaboration in the Field of Environmental Protection: Trend Analysis and COVID-19 Implications. *Sustainability* **2020**, *12*, 10384. [CrossRef]
70. De Sousa, F.D.B. Management of plastic waste: A bibliometric mapping and analysis. *Waste Manag. Res.* **2021**, *39*, 664–678. [CrossRef] [PubMed]
71. Kabil, M.; Priatmoko, S.; Magda, R.; Dávid, L.D. Blue Economy and Coastal Tourism: A Comprehensive Visualization Bibliometric Analysis. *Sustainability* **2021**, *13*, 3650. [CrossRef]
72. León-Castro, M.; Rodríguez-Insuasti, H.; Montalván-Burbano, N.; Victor, J.A. Bibliometrics and Science Mapping of Digital Marketing. In *Marketing and Smart Technologies. Smart Innovation, Systems and Technologies*; Rocha, Á., Reis, J.L., Peter, M.K., Cayolla, R., Loureiro, S., Bogdanović, Z., Eds.; Springer: Singapore, 2021; pp. 95–107. ISBN 978-981-33-4183-8.
73. Carrión-Mero, P.; Montalván-Burbano, N.; Morante-Carballo, F.; Quesada-Román, A.; Apolo-Masache, B. Worldwide Research Trends in Landslide Science. *Int. J. Environ. Res. Public Health* **2021**, *18*, 9445. [CrossRef] [PubMed]
74. Zyoud, S.H. The Arab region's contribution to global COVID-19 research: Bibliometric and visualization analysis. *Global. Health* **2021**, *17*, 31. [CrossRef] [PubMed]
75. Maula, A.W.; Fuad, A.; Utarini, A. Ten-years trend of dengue research in Indonesia and South-east Asian countries: A bibliometric analysis. *Glob. Health Action* **2018**, *11*, 1504398. [CrossRef]
76. Abad-Segura, E.; Cortés-García, F.J.; Belmonte-Ureña, L.J. The Sustainable Approach to Corporate Social Responsibility: A Global Analysis and Future Trends. *Sustainability* **2019**, *11*, 5382. [CrossRef]
77. Cobo, M.J.; López-Herrera, A.G.; Herrera-Viedma, E.; Herrera, F. An approach for detecting, quantifying, and visualizing the evolution of a research field: A practical application to the Fuzzy Sets Theory field. *J. Informetr.* **2011**, *5*, 146–166. [CrossRef]
78. Carrión-Mero, P.; Montalván-Burbano, N.; Herrera-Narváez, G.; Morante-Carballo, F. Geodiversity and Mining Towards the Development of Geotourism: A Global Perspective. *Int. J. Des. Nat. Ecodynamics* **2021**, *16*, 191–201. [CrossRef]
79. The Rockefeller Archive Center International Health Division. Available online: https://rockfound.rockarch.org/international-health-division (accessed on 15 July 2021).

80. Coello, C. The Present Sanitary Conditions at Guayaquil with Special Reference to Yellow Fever. *Am. J. Public Health* **1921**, *12*, 188–192. [CrossRef]
81. Connor, M.E. Yellow Fever Control in Ecuador. *J. Am. Med. Assoc.* **1920**, *74*, 650–651. [CrossRef]
82. The Rockefeller Foundation. *The Rockefeller Foundation Annual Report*; The Rockefeller Foundation: New York, NY, USA, 1923.
83. Ray Royer, E. Hookworm and Other Intestinal Parasites in Ecuador. *J. Am. Med. Assoc.* **1920**, *75*, 1702–1705. [CrossRef]
84. Rojas, F.; Merengo, J.T. Uncinarial Nephritis. *Arch. Intern. Med.* **1921**, *28*, 550. [CrossRef]
85. Popenoe, W.; Pachano, A. The Capsulín Cherry. *J. Hered.* **1922**, *13*, 51–62. [CrossRef]
86. Hitchcock, A.S. Sodiro Herbarium. *Science* **1923**, *58*, 465. [CrossRef] [PubMed]
87. Spillmann, F. Beiträge Zur Kenntnis Des Fluges Der Fledermäuse Und Der Ontogenetischen Entwicklung Ihrer Flugapparate. *Acta Zool.* **1925**, *6*, 217–222. [CrossRef]
88. Sheppard, G. Relation of volcanic dikes and oil-bearing formations of southern Ecuador, South America. *Econ. Geol.* **1926**, *21*, 70–80. [CrossRef]
89. Sheppard, G. Plankton Changes on the Coast of Ecuador. *Nature* **1931**, *127*, 629–630. [CrossRef]
90. Busk, H.G. The Clay Pebble Bed of Ancon, Ecuador. *Geol. Mag.* **1931**, *68*, 240. [CrossRef]
91. Busk, H.G. The Oil-Field Belt of South-West Iran and Iraq. *Geol. Mag.* **1940**, *77*, 413–414. [CrossRef]
92. Grossmann, E.; Hiedemann, E. Darstellung der Fresnelschen Beugungserscheinungen mit Wasseroberflächenwellen und Ultraschallwellen. In *Zeitschrift für Physik A Hadrons and Nuclei*; Springer: New York, NY, USA, 1935; Volume 95, pp. 383–390. [CrossRef]
93. Hahn, F.L. An Unknown Property of the Calomel Half-Cell and the Estimation of Bromide-Chloride Mixtures. *J. Am. Chem. Soc.* **1935**, *57*, 2537. [CrossRef]
94. Hahn, F.L. Ein neues Prinzip der Absorption von Gasen und Dämpfen.—Bestimmung kleinster Mengen flüchtiger Bromide. *Mikrochemie* **1936**, *20*, 239–243. [CrossRef]
95. Hahn, F.L. Qualitative Reaktion auf Bromate. *Mikrochemie* **1936**, *20*, 236–238. [CrossRef]
96. Hahn, F.L. Einfache Wägebüretten und ihr zweckmäßiger Gebrauch.—Umkehrtitrationen. *Mikrochim. Acta* **1938**, *3*, 7–12. [CrossRef]
97. Valdez, R.; Camps-Campins, F. Determination of the Ash Content of Sugar Products: A Standardized Sulfated Ash Method. *Ind. Eng. Chem. Anal. Ed.* **1937**, *9*, 35–37. [CrossRef]
98. Hahn, F. Fluorescein as Indicator in Bromometric Titrations. *Ind. Eng. Chem. Anal. Ed.* **1942**, *14*, 571. [CrossRef]
99. Lipschutz, A.; Mostny, G.; Robin, L.; Santiana, A. Blood Groups in Tribes of Tierra del Fuego and their Bearing on Ethnic and Genetic Relationships. *Nature* **1946**, *157*, 696–697. [CrossRef] [PubMed]
100. Ruess, G.; Vogt, F. Höchstlamellarer Kohlenstoff aus Graphitoxyhydroxyd.—Über den Ort der aktiven Eigenschaften am Kohlenstoffkristall. *Mon. Chem.* **1948**, *78*, 222–242. (In German) [CrossRef]
101. Earle, K.V. Injuries produced by tropical "water-beetles. " *Trans. R. Soc. Trop. Med. Hyg.* **1948**, *42*, 101–104. [CrossRef]
102. Hearn, L.T. A Geographic Study of the Village of Cotocollao, Ecuador. *J. Geog.* **1950**, *49*, 225–231. [CrossRef]
103. Naranjo, P. Histamine Shock and Vitamins. *Exp. Biol. Med.* **1952**, *81*, 111–113. [CrossRef] [PubMed]
104. Naranjo, P.; de Naranjo, E.B. Inactivation of the antihistaminic drugs in the liver and in the gastrointestinal tract. *J. Allergy* **1953**, *24*, 442–445. [CrossRef]
105. Boyd, J.S.K. Bacteriophage-typing and Epidemiological Problems. *Br. Med. J.* **1952**, *2*, 679–685. [CrossRef] [PubMed]
106. Levi-Castillo, R. Wyeomia (Wyeomyia) Aphobema Var. Aequatorialis Var. N., A New Sabethine Mosquito From Ecuador (Diptera: Culicidae). *Proc. R. Entomol. Soc. London. Ser. B Taxon.* **1952**, *21*, 131–133. [CrossRef]
107. Munsell, H.E.; Castillo, R.; Zurita, C.; Portilla, J.M. Production, Uses, and Composition of Foods of Plant Origin from Ecuador. *J. Food Sci.* **1953**, *18*, 319–342. [CrossRef]
108. Estupiñán, A. Drug Samples. *J. Am. Med. Assoc.* **1955**, *159*, 214. [CrossRef]
109. Naranjo, P. Etiological agents of respiratory allergy in tropical countries of Central and South America. *J. Allergy* **1958**, *29*, 362–374. [CrossRef]
110. Naranjo, P.; De Naranjo, E.B. Molecular Weight and Plasma Substituting Effectiveness of 3 Plasma Expanders. *Exp. Biol. Med.* **1959**, *101*, 12–16. [CrossRef] [PubMed]
111. Dorst, J. The Fate of Wildlife in the Galapagos Islands. *Oryx* **1961**, *6*, 53–59. [CrossRef]
112. Rodríguez, J.D. Revisión Crítica de Investigaciones y Literatura Micológicas Durante Los Años 1950–1960 en Ecuador. *Mycopathol. Mycol. Appl.* **1962**, *17*, 185–202. [CrossRef]
113. Rodriguez, J.D.M. Piedra En Ecuador. *Mycopathol. Mycol. Appl.* **1961**, *14*, 31–38. [CrossRef]
114. JoséSerrano, V. Dens in dente. *Oral Surg. Oral Med. Oral Pathol.* **1967**, *23*, 189–192. [CrossRef]
115. Ortega, J.; Flor, E. Incomplete Naso-Ocular Cleft. *Plast. Reconstr. Surg.* **1969**, *43*, 630–632. [CrossRef] [PubMed]
116. Teixeiera, C.; Tundisi, J.; Ycaza, J.S. Plankton Studies in a Mangrove Environment. VI. Primary Production, Zooplankton Standing-Stock and some Environmental Factors. *Int. Rev. Gesamten Hydrobiol. Hydrogr.* **1969**, *54*, 289–301. [CrossRef]
117. Haering, G.W. Boundary-layer separation—Effect of low-speed wall jets. *J. Aircr.* **1972**, *9*, 751–752. [CrossRef]
118. MacBryde, B. Set-backs to conservation in Ecuador. *Biol. Conserv.* **1972**, *4*, 387–388. [CrossRef]
119. Munoz, F.J.; Plaisted, R.L.; Thurston, H.D. Resistance to potato virus Y inSolanum tuberosum spp.andigena. *Am. Potato J.* **1975**, *52*, 107–115. [CrossRef]

120. Carrillo, R.; Streeten, B.W. Malignant Teratoid Medulloepithelioma in an Adult. *Arch. Ophthalmol.* **1979**, *97*, 695–699. [CrossRef]
121. Asamblea Nacional de Ecuador. *Ley de Universidades y Escuelas Politécnicas del Ecuador*; Asamblea Nacional del Ecuador: Quito, Ecuador, 1982; p. 12.
122. Ayala Mora, E. La investigación científica en las universidades ecuatorianas. *Rev. Univ. Cuenca* **2015**, *57*, 61–72.
123. Salazar Jaramillo, R. Ciencia y tecnología en el Ecuador: Una breve introducción de su institucionalización. *Cienc. Tecnol. Ecuador* **2013**, 1–8. (In Spanish)
124. Asamblea Nacional del Ecuador. *Ley Organica de Educación Superior, 2000*; Asamblea Nacional del Ecuador: Quito, Ecuador, 2000; p. 29.
125. Asamblea Nacional del Ecuador. *Constitución de la República del Ecuador*; Asamblea Nacional del Ecuador: Quito, Ecuador, 2008; p. 219.
126. CONEA. *Mandato Constituyente No. 14: Evaluación de Desempeño Institucional de las Universidades y Escuelas Politécnicas del Ecuador*; CONEA: Quito, Ecuador, 2009.
127. Johnson, M.A. Contemporary Higher Education Reform in Ecuador: Implications for Faculty Recruitment, Hiring, and Retention. *Arch. Analíticos Políticas Educ.* **2017**, *25*, n68. [CrossRef]
128. Villavicencio Vivar, A. *Ecuador: El Modelo de Evaluación del Mandato 14*; Consejo de Evaluación, Acreditación y Aseguramiento de la Calidad de la Educación Superior (CEAACES): Quito, Ecuador, 2013.
129. Consejo de Educación Superior (CES). *Reglamento de Carrera y Escalofón del Profesor e Investigador del Sistema de Educación Superior*; Consejo de Educación Superior (CES): Quito, Ecuador, 2012; p. 46.
130. Martín-Martín, A.; Orduna-Malea, E.; Thelwall, M.; Delgado López-Cózar, E. Google Scholar, Web of Science, and Scopus: A systematic comparison of citations in 252 subject categories. *J. Informetr.* **2018**, *12*, 1160–1177. [CrossRef]
131. Vera-Baceta, M.-A.; Thelwall, M.; Kousha, K. Web of Science and Scopus language coverage. *Scientometrics* **2019**, *121*, 1803–1813. [CrossRef]
132. Vallaster, C.; Kraus, S.; Merigó Lindahl, J.M.; Nielsen, A. Ethics and entrepreneurship: A bibliometric study and literature review. *J. Bus. Res.* **2019**, *99*, 226–237. [CrossRef]
133. Arias, E.; Wang, F.N.; Zeng, H.Q.; El-Tonsy, H.; Hafez, E.S.E. Molecular andrology and unexplained infertility. *Mol. Androl.* **1989**, *1*, n3.
134. Fierro, R.; Lewis, F.L. Control of a nonholonomic mobile robot using neural networks. *IEEE Trans. Neural Netw.* **1998**, *9*, 589–600. [CrossRef] [PubMed]
135. Jost, L. GST and its relatives do not measure differentiation. *Mol. Ecol.* **2008**, *17*, 4015–4026. [CrossRef]
136. Olesen, J.; Bes, A.; Kunkel, R.; Lance, J.W.; Nappi, G.; Pfaffenrath, V.; Rose, F.C.; Schoenberg, B.S.; Soyka, D.; Tfelt-Hansen, P.; et al. The International Classification of Headache Disorders, 3rd edition (beta version). *Cephalalgia* **2013**, *33*, 629–808. [CrossRef]
137. Canizares, C.A.; Alvarado, F.L. Point of collapse and continuation methods for large AC/DC systems. *IEEE Trans. Power Syst.* **1993**, *8*, 1–8. [CrossRef]
138. Pepin, N.; Bradley, R.S.; Diaz, H.F.; Baraer, M.; Caceres, E.B.; Forsythe, N.; Fowler, H.; Greenwood, G.; Hashmi, M.Z.; Liu, X.D.; et al. Elevation-dependent warming in mountain regions of the world. *Nat. Clim. Chang.* **2015**, *5*, 424–430. [CrossRef]
139. Morante-Carballo, F.; Montalván-Burbano, N.; Carrión-Mero, P.; Espinoza-Santos, N. Cation Exchange of Natural Zeolites: Worldwide Research. *Sustainability* **2021**, *13*, 7751. [CrossRef]
140. Türkeli, S.; Kemp, R.; Huang, B.; Bleischwitz, R.; McDowall, W. Circular economy scientific knowledge in the European Union and China: A bibliometric, network and survey analysis (2006–2016). *J. Clean. Prod.* **2018**, *197*, 1244–1261. [CrossRef]
141. Morante-Carballo, F.; Montalván-Burbano, N.; Carrión-Mero, P.; Jácome-Francis, K. Worldwide Research Analysis on Natural Zeolites as Environmental Remediation Materials. *Sustainability* **2021**, *13*, 6378. [CrossRef]
142. Cuesta, F.; Tovar, C.; Llambí, L.D.; Gosling, W.D.; Halloy, S.; Carilla, J.; Muriel, P.; Meneses, R.I.; Beck, S.; Ulloa Ulloa, C.; et al. Thermal niche traits of high alpine plant species and communities across the tropical Andes and their vulnerability to global warming. *J. Biogeogr.* **2020**, *47*, 408–420. [CrossRef]
143. Zuquim, G.; Costa, F.R.C.; Tuomisto, H.; Moulatlet, G.M.; Figueiredo, F.O.G. The importance of soils in predicting the future of plant habitat suitability in a tropical forest. *Plant Soil* **2020**, *450*, 151–170. [CrossRef]
144. Jerves-Cobo, R.; Forio, M.A.E.; Lock, K.; Van Butsel, J.; Pauta, G.; Cisneros, F.; Nopens, I.; Goethals, P.L.M. Biological water quality in tropical rivers during dry and rainy seasons: A model-based analysis. *Ecol. Indic.* **2020**, *108*, 105769. [CrossRef]
145. Schneider, T.; Musa Bandowe, B.A.; Bigalke, M.; Mestrot, A.; Hampel, H.; Mosquera, P.V.; Fränkl, L.; Wienhues, G.; Vogel, H.; Tylmann, W.; et al. 250-year records of mercury and trace element deposition in two lakes from Cajas National Park, SW Ecuadorian Andes. *Environ. Sci. Pollut. Res.* **2021**, *28*, 16227–16243. [CrossRef]
146. Mejía-Veintimilla, D.; Ochoa-Cueva, P.; Samaniego-Rojas, N.; Félix, R.; Arteaga, J.; Crespo, P.; Oñate-Valdivieso, F.; Fries, A. River Discharge Simulation in the High Andes of Southern Ecuador Using High-Resolution Radar Observations and Meteorological Station Data. *Remote Sens.* **2019**, *11*, 2804. [CrossRef]
147. Fries, A.; Silva, K.; Pucha-Cofrep, F.; Oñate-Valdivieso, F.; Ochoa-Cueva, P. Water Balance and Soil Moisture Deficit of Different Vegetation Units under Semiarid Conditions in the Andes of Southern Ecuador. *Climate* **2020**, *8*, 30. [CrossRef]
148. Borja, M.O.; Camargo, R.; Moreno, N.; Turpo, E.; Villacis, S. A Long-Term Land Cover And Land Use Mapping Methodology For The Andean Amazon. In Proceedings of the IEEE Latin American GRSS & ISPRS Remote Sensing Conference (LAGIRS), Santiago de, Chile, Chile, 22–26 March 2020; pp. 386–391.

149. Benítez, F.; Mena, C.; Zurita-Arthos, L. Urban Land Cover Change in Ecologically Fragile Environments: The Case of the Galapagos Islands. *Land* **2018**, *7*, 21. [CrossRef]
150. Marian, F.; Ramírez Castillo, P.; Iñiguez Armijos, C.; Günter, S.; Maraun, M.; Scheu, S. Conversion of Andean montane forests into plantations: Effects on soil characteristics, microorganisms, and microarthropods. *Biotropica* **2020**, *52*, 1142–1154. [CrossRef]
151. Vuille, M.; Carey, M.; Huggel, C.; Buytaert, W.; Rabatel, A.; Jacobsen, D.; Soruco, A.; Villacis, M.; Yarleque, C.; Elison Timm, O.; et al. Rapid decline of snow and ice in the tropical Andes—Impacts, uncertainties and challenges ahead. *Earth Sci. Rev.* **2018**, *176*, 195–213. [CrossRef]
152. Zimmer, A.; Meneses, R.I.; Rabatel, A.; Soruco, A.; Dangles, O.; Anthelme, F. Time lag between glacial retreat and upward migration alters tropical alpine communities. *Perspect. Plant Ecol. Evol. Syst.* **2018**, *30*, 89–102. [CrossRef]
153. Buytaert, W.; Moulds, S.; Acosta, L.; De Bièvre, B.; Olmos, C.; Villacis, M.; Tovar, C.; Verbist, K.M.J. Glacial melt content of water use in the tropical Andes. *Environ. Res. Lett.* **2017**, *12*, 114014. [CrossRef]
154. Quizhpe, W.; Benítez, Á.; Cuenca, K.; Uvidia, H.; Huamantupa, I.; Muñoz, J.; Cabrera, O. Forest Diversity and Structure in the Amazonian Mountain Ranges of Southeastern Ecuador. *Diversity* **2019**, *11*, 196. [CrossRef]
155. Steinitz-Kannan, M.; López, C.; Jacobsen, D.; Guerra, M.D.L. History of limnology in Ecuador: A foundation for a growing field in the country. *Hydrobiologia* **2020**, *847*, 4191–4206. [CrossRef]
156. Parra, V.; Nunes, P.M.S.; Torres-Carvajal, O. Systematics of Pholidobolus lizards (Squamata, Gymnophthalmidae) from southern Ecuador, with descriptions of four new species. *Zookeys* **2020**, *954*, 109–156. [CrossRef]
157. De Córdova, J.F.; Nivelo-Villavicencio, C.; Reyes-Puig, C.; Pardiñas, U.F.J.; Brito, J. A new species of crab-eating rat of the genus Ichthyomys, from Ecuador (Rodentia, Cricetidae, Sigmodontinae). *Mammalia* **2020**, *84*, 377–391. [CrossRef]
158. Tobes, I.; Falconí-López, A.; Valdiviezo-Rivera, J.; Provenzano-Rizzi, F. A new species of Microglanis (Siluriformes: Pseudopimelodidae) from the Pacific slope of Ecuador. *Neotrop. Ichthyol.* **2020**, *18*, 23. [CrossRef]
159. Torres-Carvajal, O.; Sanchez-Nivicela, J.C.; Posse, V.; Celi, E.; Koch, C. A new species of cat-eyed snake (Serpentes: Dipsadinae: Leptodeirini) from the Andes of southern Ecuador. *Zootaxa* **2020**, *4895*, 357–380. [CrossRef] [PubMed]
160. Brito, J.; Koch, C.; Percequillo, A.R.; Tinoco, N.; Weksler, M.; Pinto, C.M.; Pardiñas, U.F.J. A new genus of oryzomyine rodents (Cricetidae, Sigmodontinae) with three new species from montane cloud forests, western Andean cordillera of Colombia and Ecuador. *PeerJ* **2020**, *8*, e10247. [CrossRef] [PubMed]
161. Ponert, J.; Andrade, M.P.; Chumova, Z.; Trávnícek, P. A new species of Andinia (Pleurothallidinae, Orchidaceae) with unusual bearded flowers from Ecuador. *Phytotaxa* **2020**, *439*, 77–84. [CrossRef]
162. Vigle, G.O.; Coloma, L.A.; Santos, J.C.; Hernandez-Nieto, S.; Ortega-Andrade, H.M.; Paluh, D.J.; Read, M. A new species of Leucostethus (Anura: Dendrobatidae) from the Cordillera Mache-Chindul in northwestern Ecuador, with comments on similar Colostethus and Hyloxalus. *Zootaxa* **2020**, *4896*, 342–372. [CrossRef]
163. Torres-Carvajal, O.; Venegas, P.J.; Sales Nunes, P.M. Description and Phylogeny of a New Species of Andean Lizard (Gymnophthalmidae: Cercosaurinae) from the Huancabamba Depression. *South Am. J. Herpetol.* **2020**, *18*, 13. [CrossRef]
164. Van Echelpoel, W.; Forio, M.A.E.; Van Der Heyden, C.; Bermúdez, R.; Ho, L.; Moncayo, A.M.R.; Narea, R.N.P.; Granda, L.E.D.; Sanchez, D.; Goethals, P.L.M. Spatial Characteristics and Temporal Evolution of Chemical and Biological Freshwater Status as Baseline Assessment on the Tropical Island San Cristóbal (Galapagos, Ecuador). *Water* **2019**, *11*, 880. [CrossRef]
165. Mateus, C.; Guerrero, C.A.; Quezada, G.; Lara, D.; Ochoa-Herrera, V. An Integrated Approach for Evaluating Water Quality between 2007–2015 in Santa Cruz Island in the Galapagos Archipelago. *Water* **2019**, *11*, 937. [CrossRef]
166. Nicholas, K.; Bentley, M.; Terán, E.; Thompson, A. Water Security in the Galápagos: Socioecological Determinants and Health Implications. *Ecohealth* **2020**, *17*, 111–124. [CrossRef] [PubMed]
167. Murillo-Posada, J.C.; Salas, S.; Velázquez-Abunader, I. Factors affecting relative abundance of low-mobility fishing resources: Spiny lobster in the Galapagos Marine Reserve. *PeerJ* **2019**, *7*, e7278. [CrossRef]
168. Bucaram, S.J.; Hearn, A.; Trujillo, A.M.; Rentería, W.; Bustamante, R.H.; Morán, G.; Reck, G.; García, J.L. Assessing fishing effects inside and outside an MPA: The impact of the Galapagos Marine Reserve on the Industrial pelagic tuna fisheries during the first decade of operation. *Mar. Policy* **2018**, *87*, 212–225. [CrossRef]
169. Zambrano-Monserrate, M.A.; Ruano, M.A. Estimating the damage cost of plastic waste in Galapagos Islands: A contingent valuation approach. *Mar. Policy* **2020**, *117*, 103933. [CrossRef]
170. Laso, F.J.; Benítez, F.L.; Rivas-Torres, G.; Sampedro, C.; Arce-Nazario, J. Land Cover Classification of Complex Agroecosystems in the Non-Protected Highlands of the Galapagos Islands. *Remote Sens.* **2019**, *12*, 65. [CrossRef]
171. Cazorla, M.; Herrera, E. Air quality in the Galapagos Islands: A baseline view from remote sensing and in situ measurements. *Meteorol. Appl.* **2020**, *27*, 1878. [CrossRef]
172. Gilar-Corbi, R.; Pozo-Rico, T.; Castejón, J.-L.; Sánchez, T.; Sandoval-Palis, I.; Vidal, J. Academic Achievement and Failure in University Studies: Motivational and Emotional Factors. *Sustainability* **2020**, *12*, 9798. [CrossRef]
173. Hilliger, I.; De Laet, T.; Henríquez, V.; Guerra, J.; Ortiz-Rojas, M.; Zuñiga, M.Á.; Baier, J.; Pérez-Sanagustín, M. For Learners, with Learners: Identifying Indicators for an Academic Advising Dashboard for Students. In *Addressing Global Challenges and Quality Education, 15th European Conference on Technology Enhanced Learning*; Springer: Heidelberg, Germany, 2020; pp. 117–130.
174. Pluck, G.; Bravo Mancero, P.; Ortíz Encalada, P.A.; Urquizo Alcívar, A.M.; Maldonado Gavilanez, C.E.; Chacon, P. Differential associations of neurobehavioral traits and cognitive ability to academic achievement in higher education. *Trends Neurosci. Educ.* **2020**, *18*, 100124. [CrossRef] [PubMed]

175. Contreras, F.; Juarez, F.; Cuero Acosta, Y.A.; Dornberger, U.; Soria-Barreto, K.; Corrales-Estrada, M.; Ramos-Garza, C.; Steizel, S.; Portalanza, A.; Jauregui, K.; et al. Critical factors for innovative work behaviour in Latin American firms: Test of an exploratory model. *Cogent Bus. Manag.* **2020**, *7*, 1812926. [CrossRef]
176. Serrano Giné, D.; Galárraga Sánchez, R. El páramo andino: Características territoriales y estado ambiental. Aportes interdisciplinarios para su conocimiento. *Estud. Geográficos* **2015**, *76*, 369–393. [CrossRef]
177. Acosta-Vargas, P.; González, M.; Luján-Mora, S. Dataset for evaluating the accessibility of the websites of selected Latin American universities. *Data Br.* **2020**, *28*, 105013. [CrossRef] [PubMed]
178. Juan, B.; Yasmín, C.; Milton, B. Media Competences and Academic Performance of Education Sciences' Teachers of UCE. In *Technology, Sustainability and Educational Innovation (TSIE)*; Springer: New York, NY, USA, 2020; pp. 343–351.
179. Fortini, R.; Braga, M.J.; De Freitas, C.O.; Vinueza Delgado, K.A. Prácticas agrícolas conservacionistas en Brasil: ¿cuáles son los factores asociados a su adopción? *Stud. Appl. Econ.* **2020**, *38*, 2949. [CrossRef]
180. Caliman, J.-P.; Berthaud, A.; Dubos, B.; Tailliez, B. Agronomy, sustainability and good agricultural practices. *Oléagineux Corps Lipides* **2005**, *12*, 134–140. [CrossRef]
181. Rahman, A.; Lin, J.; Jaramillo, F.E.; Bazylinski, D.A.; Jeffryes, C.; Dahoumane, S.A. In Vivo Biosynthesis of Inorganic Nanomaterials Using Eukaryotes—A Review. *Molecules* **2020**, *25*, 3246. [CrossRef] [PubMed]
182. Yacchirema, D.C.C.; Sarabia-Jacome, D.; Palau, C.E.E.; Esteve, M. A Smart System for Sleep Monitoring by Integrating IoT With Big Data Analytics. *IEEE Access* **2018**, *6*, 35988–36001. [CrossRef]
183. Montesdeoca-Mendez, P.A.; Gallegos-Segovia, P.L.; Leon-Paredes, G.A.; Vintimilla-Tapia, P.E.; Bravo-Torres, J.F.; Larios-Rosillo, V.M. Implementation of fog computing for data pre-processing in an IoT and cloud computing scenario. In Proceedings of the 2019 IEEE Colombian Conference on Communications and Computing (COLCOM), Barranquilla, Colombia, 5–7 June 2019; pp. 1–6.
184. Constante Nicolalde, F.; Silva, F.; Herrera, B.; Pereira, A. Big Data Analytics in IOT: Challenges, Open Research Issues and Tools. In *Trends and Advances in Information Systems and Technologies*; Springer: New York, NY, USA, 2018; pp. 775–788.
185. Carrera-Villacrés, D.; Carrera Villacrés, J.L.; Braun, T.; Zhao, Z.; Gómez, J.; Quinteros-Carabalí, J. Fog Harvesting and IoT based Environment Monitoring System at the Ilalo volcano in Ecuador. *Int. J. Adv. Sci. Eng. Inf. Technol.* **2020**, *10*, 407. [CrossRef]
186. Alulema, D.; Zapata, M.; Zapata, M.A. An IoT-Based Remote Monitoring System for Electrical Power Consumption via Web-Application. In Proceedings of the 2018 International Conference on Information Systems and Computer Science (INCISCOS), Quito, Ecuador, 13–15 November 2018; pp. 193–197.
187. Enciso-Quispe, L.; Sarmiento, S.; Zelaya-Policarpo, E. Personalized medical alert system based on Internet of Things with DHIS2. In Proceedings of the 2018 13th Iberian Conference on Information Systems and Technologies (CISTI), Cáceres, Spain, 13–16 June 2018; pp. 1–6.
188. Barrios-Bello, K.; Gonzalez-Benitez, R.; Otero-Escobar, A.; Garizurieta, J.; Catalina, P.; Boris, B.; Juan, G.; Andrea, G.-C.; Roger, C.; Monica, H. Prototype of Seismic Alarm Based on Internet of Things. In Proceedings of the 2019 IEEE 39th Central America and Panama Convention (CONCAPAN XXXIX), Guatemala City, Guatemala, 20–22 November 2019; pp. 1–6.
189. Granda-Cantuna, J.; Molina-Colcha, C.; Hidalgo-Lupera, S.-E.; Valarezo-Varela, C.-D. Design and Implementation of a Wireless Sensor Network for Precision Agriculture Operating in API Mode. In Proceedings of the 2018 International Conference on eDemocracy & eGovernment (ICEDEG), Ambato, Ecuador, 4–6 April 2018; pp. 144–149.
190. Guillermo, J.C.; García-Cedeño, A.; Rivas-Lalaleo, D.; Huerta, M.; Clotet, R. IoT Architecture Based on Wireless Sensor Network Applied to Agricultural Monitoring: A Case of Study of Cacao Crops in Ecuador. In Proceedings of the 2nd International Conference of ICT for Adapting Agriculture to Climate Change 2019, Cali, Colombia, 21–23 November 2018; pp. 42–57.
191. Fors, M.; González, P.; Viada, C.; Falcón, K.; Palacios, S. Actinic keratoses in subjects from la Mitad del Mundo, Ecuador. *BMC Dermatol.* **2020**, *20*, 11. [CrossRef] [PubMed]
192. Dekkers, L.M.S.; Groot, N.A.; Díaz Mosquera, E.N.; Andrade Zúñiga, I.P.; Delfos, M.F. Prevalence of Autism Spectrum Disorders in Ecuador: A Pilot Study in Quito. *J. Autism Dev. Disord.* **2015**, *45*, 4165–4173. [CrossRef]
193. López Gavilanez, E.; Guerrero Franco, K.; Solórzano Zambrano, N.; Navarro Chávez, M.; López Estrella, C.; Vaca Burbano, L.; Marriott Díaz, E. Epidemiología de la acromegalia en Ecuador. *Endocrinol. Nutr.* **2016**, *63*, 333–338. [CrossRef] [PubMed]
194. González-Andrade, F.; López-Pulles, R.; Gascón, S.; García Campayo, J. Epidemiological issues regarding suicides in Ecuador: An 8-year report. *J. Public Health* **2011**, *19*, 161–169. [CrossRef]
195. Ferrari, G.L.; Kovalskys, I.; Fisberg, M.; Gómez, G.; Rigotti, A.; Sanabria, L.Y.C.; García, M.C.Y.; Torres, R.G.P.; Herrera-Cuenca, M.; Zimberg, I.Z.; et al. Socio-demographic patterning of objectively measured physical activity and sedentary behaviours in eight Latin American countries: Findings from the ELANS study. *Eur. J. Sport Sci.* **2020**, *20*, 670–681. [CrossRef] [PubMed]
196. García-Bustos, S.; Ronquillo, Y.; Zambrano, G. Regresión multinomial en el análisis de factores asociados en el consumo de alcohol en estudiantes adolescentes. In Proceedings of the Proceedings of the 18th LACCEI International Multi-Conference for Engineering, Education, and Technology, Bogota, DC, USA, 27–31 July 2020.
197. Blümel, J.E.; Carrillo-Larco, R.M.; Vallejo, M.S.; Chedraui, P. Multimorbidity in a cohort of middle-aged women: Risk factors and disease clustering. *Maturitas* **2020**, *137*, 45–49. [CrossRef]
198. Padilla-Sánchez, S.D.; Navarrete, D.; Caicedo, A.; Teran, E. Circulating cell-free mitochondrial DNA levels correlate with body mass index and age. *Biochim. Biophys. Acta Mol. Basis Dis.* **2020**, *1866*, 165963. [CrossRef]

199. Zavala-Alcívar, A.; Verdecho, M.-J.; Alfaro-Saiz, J.-J. Resilient Strategies and Sustainability in Agri-Food Supply Chains in the Face of High-Risk Events. In *Boosting Collaborative Networks 4.0*; Springer: New York, NY, USA, 2020; pp. 560–570.
200. López-Feldman, A.; Chávez, C.; Vélez, M.A.; Bejarano, H.; Chimeli, A.B.; Féres, J.; Robalino, J.; Salcedo, R.; Viteri, C. Environmental Impacts and Policy Responses to Covid-19: A View from Latin America. *Environ. Resour. Econ.* **2020**, 1–6. [CrossRef]
201. Chérrez-Ojeda, I.; Vanegas, E.; Felix, M. The unusual experience of managing a severe COVID-19 case at home: What can we do and where do we go? *BMC Infect. Dis.* **2020**, *20*, 862. [CrossRef] [PubMed]
202. Armijos, C.; Matailo, A.; Bec, N.; Salinas, M.; Aguilar, G.; Solano, N.; Calva, J.; Ludeña, C.; Larroque, C.; Vidari, G. Chemical composition and selective BuChE inhibitory activity of the essential oils from aromatic plants used to prepare the traditional Ecuadorian beverage horchata lojana. *J. Ethnopharmacol.* **2020**, *263*, 113162. [CrossRef] [PubMed]
203. Noriega, P.; Ballesteros, J.; De la Cruz, A.; Veloz, T. Chemical Composition and Preliminary Antimicrobial Activity of the Hydroxylated Sesquiterpenes in the Essential Oil from Piper barbatum Kunth Leaves. *Plants* **2020**, *9*, 211. [CrossRef] [PubMed]
204. Zuluaga Jimenez, J.C.; Cobo, V. Acción colectiva y representación gremial: El caso de la Sociedad de Agricultores y Ganaderos del Valle del Cauca, Colombia, 1940-2002. *América Lat.Hist. Económica* **2020**, *28*, e1063. [CrossRef]
205. Balzan, M.V.; Sadula, R.; Scalvenzi, L. Assessing Ecosystem Services Supplied by Agroecosystems in Mediterranean Europe: A Literature Review. *Land* **2020**, *9*, 245. [CrossRef]
206. Ciaccia, M.; Mejía, C.; Vásquez, C.; San Antonio, T. Ergonomic Evaluation of Agriculture-Related Activities Performed by Ecuadorian Indigenous Women. In *Advances in Physical, Social & Occupational Ergonomics*; Springer: Berlin/Heidelberg, Germany, 2020; pp. 348–353.
207. Fernandez, M.A.; Daigneault, A.J. A double win: New pathways to reduce greenhouse gas emissions and improve water quality in New Zealand. *Environ. Res. Lett.* **2020**, *15*, 074004. [CrossRef]
208. Valarezo, E.; Ojeda-Riascos, S.; Cartuche, L.; Andrade-González, N.; González-Sánchez, I.; Meneses, M.A. Extraction and Study of the Essential Oil of Copal (*Dacryodes peruviana*), an Amazonian Fruit with the Highest Yield Worldwide. *Plants* **2020**, *9*, 1658. [CrossRef]
209. Licon, C.C.; Moro, A.; Librán, C.M.; Molina, A.M.; Zalacain, A.; Berruga, M.I.; Carmona, M. Volatile Transference and Antimicrobial Activity of Cheeses Made with Ewes' Milk Fortified with Essential Oils. *Foods* **2020**, *9*, 35. [CrossRef]
210. Damanik-Ambarita, M.N.; Lock, K.; Boets, P.; Everaert, G.; Nguyen, T.H.T.; Forio, M.A.E.; Musonge, P.L.S.; Suhareva, N.; Bennetsen, E.; Landuyt, D.; et al. Ecological water quality analysis of the Guayas river basin (Ecuador) based on macroinvertebrates indices. *Limnologica* **2016**, *57*, 27–59. [CrossRef]
211. Viera-Torres, M.; Sinde-González, I.; Gil-Docampo, M.; Bravo-Yandún, V.; Toulkeridis, T. Generating the Baseline in the Early Detection of Bud Rot and Red Ring Disease in Oil Palms by Geospatial Technologies. *Remote Sens.* **2020**, *12*, 3229. [CrossRef]
212. Acosta-Vargas, P.; Acosta, T.; Lujan-Mora, S. Challenges to Assess Accessibility in Higher Education Websites: A Comparative Study of Latin America Universities. *IEEE Access* **2018**, *6*, 36500–36508. [CrossRef]
213. Calle-Jimenez, T.; Sanchez-Gordon, S.; Lujan-Mora, S. Web accessibility evaluation of massive open online courses on Geographical Information Systems. In Proceedings of the 2014 IEEE Global Engineering Education Conference (EDUCON), Istanbul, Turkey, 3–5 April 2014; pp. 680–686.
214. Sanchez-Gordon, S.; Lujan-Mora, S.; Sanchez-Gordon, M. E-Government Accessibility in Ecuador: A Preliminary Evaluation. In Proceedings of the 2020 Seventh International Conference on eDemocracy & eGovernment (ICEDEG), Buenos Aires, Argentina, 22–24 April 2020; pp. 50–57.
215. Campoverde-Molina, M.; Lujan-Mora, S.; Garcia, L.V. Empirical Studies on Web Accessibility of Educational Websites: A Systematic Literature Review. *IEEE Access* **2020**, *8*, 91676–91700. [CrossRef]
216. Navarrete, R.; Lujan-Mora, S. OER-based learning and people with disabilities. In Proceedings of the 2015 International Conference on Interactive Collaborative and Blended Learning (ICBL), Mexico City, Mexico, 9–11 December 2015; pp. 25–34.
217. Mejía-Madrid, G.; Molina-Carmona, R. Model for quality evaluation and improvement of higher distance education based on information technology. In Proceedings of the Proceedings of the Fourth International Conference on Technological Ecosystems for Enhancing Multiculturality, Salamanca, Spain, 2–4 November 2016; pp. 1171–1177.
218. Meza-Bolaños, D.V.; Compañ-Rosique, P.; Satorre-Cuerda, R. Designing a model to estimate the impact and cost effectiveness of online learning platforms. In Proceedings of the Proceedings of the Fourth International Conference on Technological Ecosystems for Enhancing Multiculturality, Salamanca, Spain, 2–4 November 2016; pp. 1109–1114.
219. Palme, M.; Inostroza, L.; Villacreses, G.; Lobato-Cordero, A.; Carrasco, C. From urban climate to energy consumption. Enhancing building performance simulation by including the urban heat island effect. *Energy Build.* **2017**, *145*, 107–120. [CrossRef]
220. Calle-Jimenez, T.; Orellana-Alvear, B.; Prado-Imbacuan, R. GIS and User Experience in Decision Support for Retail Type Organizations. In Proceedings of the 2019 International Conference on Information Systems and Software Technologies (ICI2ST), Quito, Ecuador, 13–15 November 2019; pp. 156–161.
221. Castillo-Rosas, J.; Diez-Rodríguez, J.; Jiménez-Vélez, A.; Núñez-Andrés, M.; Monguet-Fierro, J. Collection and Integration of Local Knowledge and Experience through a Collective Spatial Analysis. *ISPRS Int. J. Geo-Information* **2017**, *6*, 33. [CrossRef]
222. Platt, K.B.; Mangiafico, J.A.; Rocha, O.J.; Zaldivar, M.E.; Mora, J.; Trueba, G.; Rowley, W.A. Detection of Dengue Virus Neutralizing Antibodies in Bats from Costa Rica and Ecuador. *J. Med. Entomol.* **2000**, *37*, 965–967. [CrossRef]
223. Jácome, G.; Vilela, P.; Yoo, C. Social-ecological modelling of the spatial distribution of dengue fever and its temporal dynamics in Guayaquil, Ecuador for climate change adaption. *Ecol. Inform.* **2019**, *49*, 1–12. [CrossRef]

224. Stewart Ibarra, A.M.; Luzadis, V.A.; Borbor Cordova, M.J.; Silva, M.; Ordoñez, T.; Beltrán Ayala, E.; Ryan, S.J. A social-ecological analysis of community perceptions of dengue fever and Aedes aegypti in Machala, Ecuador. *BMC Public Health* **2014**, *14*, 1135. [CrossRef] [PubMed]
225. Heydari, N.; Larsen, D.; Neira, M.; Beltrán Ayala, E.; Fernandez, P.; Adrian, J.; Rochford, R.; Stewart-Ibarra, A. Household Dengue Prevention Interventions, Expenditures, and Barriers to Aedes aegypti Control in Machala, Ecuador. *Int. J. Environ. Res. Public Health* **2017**, *14*, 196. [CrossRef]
226. Andrade-Yucailla, V.; Toalombo, P.; Andrade-Yucailla, S.; Lima-Orozco, R. Evaluation of productive parameters of broilers Cobb 500 and Ross 308 in the Amazon region of Ecuador. *Rev. Electron. Vet.* **2017**, *18*, 1–7.
227. Yépez Macías, P.F.; Plúa Panta, K.A.; Rizzo Zamora, L.G.; Herrera Alvarado, C.E.; Luna Murillo, R.A.; Tinajero Jiménez, C.F.; Chacón Marcheco, E.; Ramos Quesada, Y.; Ramírez de la Ribera, J.L. Employment of Saccharomyces cervisiae in diets for poultry of feeding. *Rev. Electron. Vet.* **2016**, *17*, 041604.
228. Sánchez, J.; Caicedo, W.; Aragón, E.; Andino, M.; Bosques, F.; Viamonte, M.I.; Ramírez de la Ribera, J.L. Inclusion of the Colocasia esculenta (Chinese potato) in the feeding of pigs in it feeds. *Rev. Electron. Vet.* **2018**, *19*, 041815.
229. Sirunyan, A.M.; Tumasyan, A.; Adam, W.; Ambrogi, F.; Bergauer, T.; Brandstetter, J.; Dragicevic, M.; Erö, J.; Escalante Del Valle, A.; Flechl, M.; et al. Production of Λc+ baryons in proton-proton and lead-lead collisions at sNN = 5.02 TeV. *Phys. Lett. B* **2020**, *803*, 135328. [CrossRef]
230. Abazov, V.M.; Abbott, B.; Acharya, B.S.; Adams, M.; Adams, T.; Agnew, J.P.; Alexeev, G.D.; Alkhazov, G.; Alton, A.; Askew, A.; et al. Measurement of the forward-backward asymmetries in the production of Ξ and Ω baryons in p p collisions. *Phys. Rev. D* **2016**, *93*, 112001. [CrossRef]
231. Sirunyan, A.M.; Tumasyan, A.; Adam, W.; Ambrogi, F.; Asilar, E.; Bergauer, T.; Brandstetter, J.; Brondolin, E.; Dragicevic, M.; Erö, J.; et al. Nuclear modification factor of D0 mesons in PbPb collisions at $\sqrt{}$sNN = 5.02 TeV. *Phys. Lett. B* **2018**, *782*, 474–496. [CrossRef]
232. Abazov, V.M.; Abbott, B.; Acharya, B.S.; Adams, M.; Adams, T.; Agnew, J.P.; Alexeev, G.D.; Alkhazov, G.; Alton, A.; Askew, A.; et al. Evidence for Simultaneous Production of J = ψ and Υ Mesons. *Phys. Rev. Lett.* **2016**, *116*, 082002. [CrossRef] [PubMed]
233. Sirunyan, A.M.; Tumasyan, A.; Adam, W.; Ambrogi, F.; Bergauer, T.; Brandstetter, J.; Dragicevic, M.; Erö, J.; Escalante Del Valle, A.; Flechl, M.; et al. Search for electroweak production of a vector-like T quark using fully hadronic final states. *J. High Energy Phys.* **2020**, *2020*, 36. [CrossRef]
234. Sirunyan, A.M.; Tumasyan, A.; Adam, W.; Ambrogi, F.; Asilar, E.; Bergauer, T.; Brandstetter, J.; Dragicevic, M.; Erö, J.; Escalante Del Valle, A.; et al. Bose-Einstein correlations of charged hadrons in proton-proton collisions at $\sqrt{s}$ = 13 TeV. *J. High Energy Phys.* **2020**, *2020*, 14. [CrossRef]
235. Sirunyan, A.M.; Tumasyan, A.; Adam, W.; Ambrogi, F.; Asilar, E.; Bergauer, T.; Brandstetter, J.; Dragicevic, M.; Erö, J.; Escalante Del Valle, A.; et al. Measurement of the single top quark and antiquark production cross sections in the t channel and their ratio in proton-proton collisions at $\sqrt{s}$ = 13 TeV. *Phys. Lett. B* **2020**, *800*, 135042. [CrossRef]
236. Sirunyan, A.M.; Tumasyan, A.; Adam, W.; Ambrogi, F.; Asilar, E.; Bergauer, T.; Brandstetter, J.; Brondolin, E.; Dragicevic, M.; Erö, J.; et al. Evidence for the Higgs boson decay to a bottom quark–antiquark pair. *Phys. Lett. B* **2018**, *780*, 501–532. [CrossRef]
237. Sirunyan, A.M.; Tumasyan, A.; Adam, W.; Ambrogi, F.; Asilar, E.; Bergauer, T.; Brandstetter, J.; Dragicevic, M.; Erö, J.; Escalante Del Valle, A.; et al. Observation of nuclear modifications in W$\pm$ boson production in pPb collisions at $\sqrt{}$sNN = 8.16 TeV. *Phys. Lett. B* **2020**, *800*, 135048. [CrossRef]
238. Khachatryan, V.; Sirunyan, A.M.; Tumasyan, A.; Adam, W.; Asilar, E.; Bergauer, T.; Brandstetter, J.; Brondolin, E.; Dragicevic, M.; Erö, J.; et al. Search for single production of a heavy vector-like T quark decaying to a Higgs boson and a top quark with a lepton and jets in the final state. *Phys. Lett. B* **2017**, *771*, 80–105. [CrossRef]
239. Sirunyan, A.M.; Tumasyan, A.; Adam, W.; Ambrogi, F.; Bergauer, T.; Dragicevic, M.; Erö, J.; Escalante Del Valle, A.; Flechl, M.; Frühwirth, R.; et al. A measurement of the Higgs boson mass in the diphoton decay channel. *Phys. Lett. B* **2020**, *805*, 135425. [CrossRef]
240. Sirunyan, A.M.; Tumasyan, A.; Adam, W.; Ambrogi, F.; Asilar, E.; Bergauer, T.; Brandstetter, J.; Dragicevic, M.; Erö, J.; Escalante Del Valle, A.; et al. Search for a W′ boson decaying to a τ lepton and a neutrino in proton-proton collisions at $\sqrt{s}$ = 13 TeV. *Phys. Lett. B* **2019**, *792*, 107–131. [CrossRef]
241. Sirunyan, A.M.; Tumasyan, A.; Adam, W.; Ambrogi, F.; Bergauer, T.; Brandstetter, J.; Dragicevic, M.; Erö, J.; Escalante Del Valle, A.; Flechl, M.; et al. Search for dark matter particles produced in association with a Higgs boson in proton-proton collisions at $\sqrt{s}$ = 13 TeV. *J. High Energy Phys.* **2020**, *2020*, 25. [CrossRef]
242. Khachatryan, V.; Sirunyan, A.M.; Tumasyan, A.; Adam, W.; Asilar, E.; Bergauer, T.; Brandstetter, J.; Brondolin, E.; Dragicevic, M.; Erö, J.; et al. Search for Dark Matter and Supersymmetry with a Compressed Mass Spectrum in the Vector Boson Fusion Topology in Proton-Proton Collisions at sqrt(s) = 8 TeV. *Phys. Rev. Lett.* **2017**, *118*, 021802. [CrossRef]
243. Del Brutto, O.H. Twenty-five years of evolution of standard diagnostic criteria for neurocysticercosis. How have they impacted diagnosis and patient outcomes? *Expert Rev. Neurother.* **2020**, *20*, 147–155. [CrossRef] [PubMed]
244. Parkhouse, R.M.E.; Carpio, A.; Campoverde, A.; Sastre, P.; Rojas, G.; Harrison, L.J.S.; Cortez, M.M. A modified lateral flow assay, using serum, for the rapid identification of human and bovine cysticercosis in the absence of false positives. *Trans. R. Soc. Trop. Med. Hyg.* **2019**, *113*, 101–104. [CrossRef] [PubMed]

245. Garcia, H.H.; Castillo, Y.; Gonzales, I.; Bustos, J.A.; Saavedra, H.; Jacob, L.; Del Brutto, O.H.; Wilkins, P.P.; Gonzalez, A.E.; Gilman, R.H. Low sensitivity and frequent cross-reactions in commercially available antibody detection ELISA assays for Taenia solium cysticercosis. *Trop. Med. Int. Heal.* **2018**, *23*, 101–105. [CrossRef]
246. Parkhouse, R.M.E.; Sciutto, E.; Hernández, M.; Cortez, M.M.; Carpio, A.; Fleury, A. Extraparenchymal human neurocysticercosis induces autoantibodies against brain tubulin and MOG35–55 in cerebral spinal fluid. *J. Neuroimmunol.* **2020**, *349*, 577389. [CrossRef] [PubMed]
247. Montgomery, M.A.; Ramos, M.; Kelvin, E.A.; Carpio, A.; Jaramillo, A.; Hauser, W.A.; Zhang, H. A longitudinal analysis of albendazole treatment effect on neurocysticercosis cyst evolution using multistate models. *Trans. R. Soc. Trop. Med. Hyg.* **2019**, *113*, 781–788. [CrossRef] [PubMed]
248. Rodríguez-Hidalgo, R.; Carpio, A.; Van den Enden, E.; Benítez-Ortiz, W. Monitoring treatment of Taenia solium- neurocysticercosis by detection of circulating antigens: A case report. *BMC Neurol.* **2019**, *19*, 52. [CrossRef]
249. Carpio, A.; Fleury, A.; Romo, M.L.; Abraham, R. Neurocysticercosis: The good, the bad, and the missing. *Expert Rev. Neurother.* **2018**, *18*, 289–301. [CrossRef] [PubMed]
250. Hamamoto Filho, P.T.; Singh, G.; Winkler, A.S.; Carpio, A.; Fleury, A. Could Differences in Infection Pressure Be Involved in Cysticercosis Heterogeneity? *Trends Parasitol.* **2020**, *36*, 826–834. [CrossRef]
251. Padilla, N.A.; Moncayo, A.L.; Keil, C.B.; Grijalva, M.J.; Villacís, A.G. Life Cycle, Feeding, and Defecation Patterns of Triatoma carrioni (Hemiptera: Reduviidae), Under Laboratory Conditions. *J. Med. Entomol.* **2019**, *56*, 617–624. [CrossRef] [PubMed]
252. Ocaña-Mayorga, S.; Lobos, S.E.; Crespo-Pérez, V.; Villacís, A.G.; Pinto, C.M.; Grijalva, M.J. Influence of ecological factors on the presence of a triatomine species associated with the arboreal habitat of a host of Trypanosoma cruzi. *Parasit. Vectors* **2018**, *11*, 567. [CrossRef]
253. Bey, E.; Paucara Condori, M.B.; Gaget, O.; Solano, P.; Revollo, S.; Saussine, C.; Brenière, S.F. Lower urinary tract dysfunction in chronic Chagas disease: Clinical and urodynamic presentation. *World J. Urol.* **2019**, *37*, 1395–1402. [CrossRef] [PubMed]
254. Revollo, S.; Oury, B.; Vela, A.; Tibayrenc, M.; Sereno, D. In Vitro Benznidazole and Nifurtimox Susceptibility Profile of Trypanosoma cruzi Strains Belonging to Discrete Typing Units TcI, TcII, and TcV. *Pathogens* **2019**, *8*, 197. [CrossRef] [PubMed]
255. Oduro, B.; Grijalva, M.J.; Just, W. Models of Disease Vector Control: When Can Aggressive Initial Intervention Lower Long-Term Cost? *Bull. Math. Biol.* **2018**, *80*, 788–824. [CrossRef]
256. Carvache-Franco, M.; Carvache-Franco, W.; Carvache-Franco, O.; Hernández-Lara, A.B.; Buele, C.V. Segmentation, motivation, and sociodemographic aspects of tourist demand in a coastal marine destination: A case study in Manta (Ecuador). *Curr. Issues Tour.* **2020**, *23*, 1234–1247. [CrossRef]
257. Mestanza-Ramón, C.; Pranzini, E.; Anfuso, G.; Botero, C.M.; Chica-Ruiz, J.A.; Mooser, A. An Attempt to Characterize the "3S" (Sea, Sun, and Sand) Parameters: Application to the Galapagos Islands and Continental Ecuadorian Beaches. *Sustainability* **2020**, *12*, 3468. [CrossRef]
258. Carrión-Mero, P.; Loor-Oporto, O.; Andrade-Ríos, H.; Herrera-Franco, G.; Morante-Carballo, F.; Jaya-Montalvo, M.; Aguilar-Aguilar, M.; Torres-Peña, K.; Berrezueta, E. Quantitative and Qualitative Assessment of the "El Sexmo" Tourist Gold Mine (Zaruma, Ecuador) as A Geosite and Mining Site. *Resources* **2020**, *9*, 28. [CrossRef]
259. Herrera-Franco, G.; Carrión-Mero, P.; Alvarado, N.; Morante-Carballo, F.; Maldonado, A.; Caldevilla, P.; Briones-Bitar, J.; Berrezueta, E. Geosites and Georesources to Foster Geotourism in Communities: Case Study of the Santa Elena Peninsula Geopark Project in Ecuador. *Sustainability* **2020**, *12*, 4484. [CrossRef]
260. Diaz-Christiansen, S.; López-Guzmán, T.; Pérez Gálvez, J.C.; Muñoz Fernández, G.A. Wetland tourism in natural protected areas: Santay Island (Ecuador). *Tour. Manag. Perspect.* **2016**, *20*, 47–54. [CrossRef]
261. Muñoz-Fernández, G.A.; López-Guzmán, T.; López Molina, D.; Pérez Gálvez, J.C. Heritage tourism in the Andes: The case of Cuenca, Ecuador. *Anatolia* **2017**, *29*, 326–336. [CrossRef]
262. Jaramillo-Moreno, B.C.; Sánchez-Cueva, I.P.; Tinizaray-Tituana, D.G.; Narváez, J.C.; Cabanilla-Vásconez, E.A.; Muñoz Torrecillas, M.J.; Cruz Rambaud, S.C. Diagnosis of Administrative and Financial Processes in Community-Based Tourism Enterprises in Ecuador. *Sustainability* **2020**, *12*, 7123. [CrossRef]
263. Quezada-Sarmiento, P.A.; del Cisne Macas-Romero, J.; Roman, C.; Martin, J.C. A body of knowledge representation model of ecotourism products in southeastern Ecuador. *Heliyon* **2018**, *4*, e01063. [CrossRef]
264. Carvache-Franco, M.; Carvache-Franco, O.; Carvache-Franco, W.; Villagómez-Buele, C. From Satisfaction in Eco-tourism to Loyalty in a National Park. *Geoj. Tour. Geosites* **2020**, *28*, 191–202. [CrossRef]
265. Hudson, C.; Silva, M.-I.; McEwan, C. Tourism and Community: An Ecuadorian Village Builds on its Past. *Public Archaeol.* **2016**, *15*, 65–86. [CrossRef]
266. Lalangui, P.S.; Herrera, R.A.; Jaramillo, S.E.R. Female entrepreneurship and religious tourism in Ecuador. In Proceedings of the 11th Iberian Conference on Information Systems and Technologies (CISTI), Gran Canaria, Spain, 15–18 June 2016; pp. 1–6.
267. Rodríguez-Fernández, M.-M.; Artieda-Ponce, P.-M.; Chango-Cañaveral, P.-M.; Gaibor-Monar, F.-M. Gastronomy as a Part of the Ecuadorian Identity: Positioning on the Internet and Social Networks. In *Media and Metamedia Management*; Springer: New York, NY, USA, 2017; pp. 335–341.
268. López-Guzmán, T.; Serrano López, A.L.; Pérez Gálvez, J.C.; Carpio Álvarez, S.D. Food Motivations in a Tourist Destination: North American Tourists Visiting the City of Cuenca, Ecuador. *J. Int. Food Agribus. Mark.* **2017**, *29*, 308–327. [CrossRef]

269. López-Guzmán, T.; Uribe Lotero, C.P.; Pérez Gálvez, J.C.; Ríos Rivera, I. Gastronomic festivals: Attitude, motivation and satisfaction of the tourist. *Br. Food J.* **2017**, *119*, 267–283. [CrossRef]
270. Pérez Gálvez, J.C.; Torres-Naranjo, M.; Lopez-Guzman, T.; Carvache Franco, M. Tourism demand of a WHS destination: An analysis from the viewpoint of gastronomy. *Int. J. Tour. Cities* **2017**, *3*, 1–16. [CrossRef]
271. Páez-Quinde, C.; Torres-Oñate, F.; Rivera-Flores, D.; Chimbo-Cáceres, M. Tourism 3.0 and indigenous food cultures: Case study Pilahuín. In Proceedings of the International Conference on Technologies and Innovation, Guayaquil, Ecuador, 30 November–3 December 2020; pp. 166–178.
272. Chango-Canaveral, P.M.; Artieda-Ponce, M.P.; Salas Alvarez, W.T.; Quezada-Sarmiento, P.A. Used of Digital Marketing for Tourism and Gastronomic Route "Mancomunidad Bosque Seco Sabores y Tradiciones del Sur. In Proceedings of the 2019 14th Iberian Conference on Information Systems and Technologies (CISTI), Coimbra, Portugal, 19–22 June 2019; pp. 1–6.
273. Aparecido, L.M.T.; Teodoro, G.S.; Mosquera, G.; Brum, M.; de Barros, F.; Pompeu, P.V.; Rodas, M.; Lazo, P.; Müller, C.S.; Mulligan, M.; et al. Ecohydrological drivers of Neotropical vegetation in montane ecosystems. *Ecohydrology* **2018**, *11*, e1932. [CrossRef]
274. Wilson, M.; Zhao, K.; Hampson, H.; Frank, G.; Romoleroux, K.; Jiménez, M.; Tobar, F.; Larsen, B.; Pérez, Á.J. A new species of Pleurothallis (Orchidaceae: Pleurothallidinae) in subsection Macrophyllae-Fasciculatae with a unique, highly reduced, morphologically distinct labellum. *Lankesteriana* **2018**, *18*, 217–230. [CrossRef]
275. Lattke, J.E.; Aguirre, N. Two New Strumigenys F. Smith (Hymenoptera: Formicidae: Myrmicinae) from Montane Forests of Ecuador. *Sociobiology* **2015**, *62*, 175–180. [CrossRef]
276. Camacho, M.A.; Salgado, M.J.; Burneo, S.F. An accounting approach to calculate the financial value of a natural history collection of mammals in Ecuador. *Museum Manag. Curatorsh.* **2018**, *33*, 279–296. [CrossRef]
277. Duperre, N.; Tapia, E. Descriptions of four kleptoparasitic spiders of the genus Mysmenopsis (Araneae, Mysmenidae) and their potential host spider species in the genus Linothele (Araneae, Dipluridae) from Ecuador. *Zootaxa* **2015**, *3972*, 343. [CrossRef]
278. Roy, B.A.; Zorrilla, M.; Endara, L.; Thomas, D.C.; Vandegrift, R.; Rubenstein, J.M.; Policha, T.; Ríos-Touma, B.; Read, M. New Mining Concessions Could Severely Decrease Biodiversity and Ecosystem Services in Ecuador. *Trop. Conserv. Sci.* **2018**, *11*, 194008291878042. [CrossRef]
279. Fu, T.J.; Fu Xi, L.; Hulbert, A.; Hughes, J.P.; Feng, Q.; Schwartz, S.M.; Hawes, S.E.; Koutsky, L.A.; Winer, R.L. Short-term natural history of high-risk human papillomavirus infection in mid-adult women sampled monthly. *Int. J. Cancer* **2015**, *137*, 2432–2442. [CrossRef]
280. Cooper, P.J.; Chico, M.E.; Bland, M.; Griffin, G.E.; Nutman, T.B. Allergic Symptoms, Atopy, and Geohelminth Infections in a Rural Area of Ecuador. *Am. J. Respir. Crit. Care Med.* **2003**, *168*, 313–317. [CrossRef]
281. Cooper, P.J.; Rodrigues, L.C.; Cruz, A.A.; Barreto, M.L. Asthma in Latin America: A public heath challenge and research opportunity. *Allergy* **2009**, *64*, 5–17. [CrossRef]
282. Figueiredo, C.A.; Barreto, M.L.; Alcantara-Neves, N.M.; Rodrigues, L.C.; Cooper, P.J.; Cruz, A.A.; Pontes-de-Carvalho, L.C.; Lemaire, D.C.; dos Santos Costa, R.; Amorim, L.D.; et al. Coassociations between IL10 polymorphisms, IL-10 production, helminth infection, and asthma/wheeze in an urban tropical population in Brazil. *J. Allergy Clin. Immunol.* **2013**, *131*, 1683–1690. [CrossRef] [PubMed]
283. Cruz, A.A.; Cooper, P.J.; Figueiredo, C.A.; Alcantara-Neves, N.M.; Rodrigues, L.C.; Barreto, M.L. Global issues in allergy and immunology: Parasitic infections and allergy. *J. Allergy Clin. Immunol.* **2017**, *140*, 1217–1228. [CrossRef] [PubMed]
284. Moed, H.F. From Journal Impact Factor to SJR, Eigenfactor, SNIP, CiteScore and Usage Factor. In *Applied Evaluative Informetrics*; Springer: Cham, Switzerland, 2017; pp. 229–244. ISBN 9783319605227.
285. Donaldson, M.R.; Cooke, S.J. Scientific Publications: Moving beyond Quality and Quantity toward Influence. *Bioscience* **2014**, *64*, 12–13. [CrossRef]
286. Forthmann, B.; Leveling, M.; Dong, Y.; Dumas, D. Investigating the quantity–quality relationship in scientific creativity: An empirical examination of expected residual variance and the tilted funnel hypothesis. *Scientometrics* **2020**, *124*, 2497–2518. [CrossRef]
287. Kiri, B.; Lacetera, N.; Zirulia, L. Above a swamp: A theory of high-quality scientific production. *Res. Policy* **2018**, *47*, 827–839. [CrossRef]
288. Stephan, P. *How Economics Shapes Science*; Harvard University Press: Cambridge, MA, USA, 2012; ISBN 9780674062757.
289. Loyola, R.D.; Diniz-Filho, J.A.F.; Bini, L.M. Obsession with quantity: A view from the south. *Trends Ecol. Evol.* **2012**, *27*, 585. [CrossRef]
290. Michalska-Smith, M.J.; Allesina, S. And, not or: Quality, quantity in scientific publishing. *PLoS ONE* **2017**, *12*, e0178074. [CrossRef] [PubMed]
291. Haslam, N.; Laham, S.M. Quality, quantity, and impact in academic publication. *Eur. J. Soc. Psychol.* **2009**, *40*, 216–220. [CrossRef]
292. Van Raan, A.F.J. Universities Scale Like Cities. *PLoS ONE* **2013**, *8*, e59384. [CrossRef]
293. De Lima, C.; dos Santos Neto, M.F.; Costa, R.F.A.; Franco, J.O.; Calfi, G.S.; Paiva, B.S.R.; Paiva, C.E. Characteristics of Palliative Care Publications by South American Authors in the Last 20 Years: Systematic Literature Review With Bibliometric Analysis. *J. Pain Symptom Manage.* **2021**, *62*, e177–e185. [CrossRef] [PubMed]
294. UNESCO. *UNESCO Science Report: The Race Against Time for Smarter Development*; Schneegans, S., Straza, T., Lewis, J., Eds.; UNESCO: Paris, France, 2021; ISBN 978-92-3-100450-6.

295. Gallegos, R.; Larrea, M.; Cadena, P.; Hernández, P.; Analuisa, P.; Torres, R.; Montalván, A.; Palacios, J. Necesidades de Investigación en la Sociedad Ecuatoriana. *Rev. Investig. Científica* **2011**, *2*, 159–168. [CrossRef]
296. Armijos Valdivieso, P.; Avolio Alecchi, B.; Arévalo-Avecillas, D. Factors that Influence the Individual Research Output of University Professors: The Case of Ecuador, Peru, and Colombia. *J. Hispanic High. Educ.* **2021**, 153819272110086. [CrossRef]
297. Johnson-Toala, M.A. Higher Education Systems and Institutions, Ecuador. In *Encyclopedia of International Higher Education Systems and Institutions*; Springer: Dordrecht, The Netherlands, 2019; pp. 1–4.
298. Tobar-Pesántez, L.; Pérez-Torres, A.; Solano-Gallegos, S. Scholarships, and Opportunity for Development in Ecuador. *J. Leg. Ethical Regul. Issues* **2021**, *4*, 23.
299. Camacho, O.; Paz, J.L.; Celi, L.A.; Muñoz, S.; Páez, G.J.; Mora, J. An approach to measure the impact of Scientific Regional Journals: The Latindex case. *Rev. Ibérica Sist. Tecnol. Inf.* **2016**, *20*, 13–23.
300. Crespo-Gascón, S.; Tortosa, F.S.; Guerrero-Casado, J. Producción de revistas científicas en América Latina y El Caribe en Scopus, Journal Citation Reports y Latindex en el área de los recursos naturales: Su relación con variables económicas, ambientales y de inversión en investigación. *Rev. Española Doc. Científica* **2019**, *42*, 224. [CrossRef]
301. Ortiz, J.; Sumba, X.; Segarra, J.; Saquicela, V. Semantically Identifying Regional-Indexed Publications, a Web-Exploring Approach. In Proceedings of the 2018 XLIV Latin American Computer Conference (CLEI), São Paulo, Brazil, 1–5 October 2018; pp. 519–526.