

# ENVIRONMENTAL ACCOUNTING IN THE ACCOUNTING PRAXIS OF ECUADORIAN COMPANIES: A SYSTEMATIC REVIEW

Marcelo Eduardo Sánchez Salazar<sup>1</sup>, Fermin Andrés Haro Velastegui<sup>2</sup>, Diego Iván Cajamarca Carrasco<sup>3</sup>, Danilo Fernando Fernández Vinuesa<sup>4</sup>

<sup>1</sup>Escuela Superior Politécnica de Chimborazo, Sede Morona Santiago, Macas EC140101, Ecuador  
[marcelo.sanchez@esPOCH.edu.ec](mailto:marcelo.sanchez@esPOCH.edu.ec); <https://orcid.org/0000-0002-9859-098X>

<sup>2</sup>Escuela Superior Politécnica de Chimborazo, Sede Morona Santiago, Macas EC140101, Ecuador  
[fharov@esPOCH.edu.ec](mailto:fharov@esPOCH.edu.ec); <https://orcid.org/0000-0002-9421-4549>

<sup>3</sup>Escuela Superior Politécnica de Chimborazo, Sede Morona Santiago, Macas EC140101, Ecuador  
[diego.cajamarca@esPOCH.edu.ec](mailto:diego.cajamarca@esPOCH.edu.ec); <http://orcid.org/0000-0001-6619-0490>

<sup>4</sup>Escuela Superior Politécnica de Chimborazo, Sede Morona Santiago, Macas EC140101, Ecuador  
[danilo.fernandez@esPOCH.edu.ec](mailto:danilo.fernandez@esPOCH.edu.ec); <http://orcid.org/0000-0003-4929-9325>

## Abstract

A documentary review was carried out on the production and publication of research papers concerning the study of variable *Environmental Accounting* in the accounting practice of companies in Ecuador. The bibliometric analysis proposed in this paper was to know the main characteristics of the volume of publications registered in the Scopus database during 2017-2022, identifying 35 publications. The information provided by the said platform was organized using tables and figures, categorizing the information by Year of Publication, International Cocitation, Area of Knowledge and Type of Publication. Once these characteristics were described, a qualitative analysis was used to refer to the position of different authors on the proposed topic. Among the main findings of this research, it is found that Ecuador registered a total of 35 publications referring to Environmental Accounting and its use in the accounting practice of its companies. The area of knowledge that made the greatest contribution to the study's variables was Environmental Sciences, with 13 published documents. The type of publication that was most used during the period mentioned above was the journal article, which represents 86% of the total scientific production.

**Keywords:** Environmental accounting, Accounting, Ecuadorian companies, Ecuador.

## 1. Introduction

Environmental deterioration is defined as the wear and tear of the planet earth to the scarcity of natural resources, the destruction of the ecosystems and pollution; the negative impact on the environment is evident and perceptible to the naked eye, and the different changes in our ecosystems show the urgent need to take particular measures with companies and citizens, such as the intervention programs and policies of States. Environmental pollution is a threat to humanity

and to the living beings that inhabit the planet earth, which has generated an impact and awareness in the social action of the inhabitants, requiring the rulers to intervene before the commercial, industrial and product sectors, which must commit to the preservation of natural resources with branches such as economics, accounting, law and many other disciplines that have been introduced to the protection and care of the environment.

Given what was mentioned in the previous paragraph, environmental accounting, also known as ecological accounting, is brought into context, which is defined as the act of introducing in the financial statements of companies those elements that point to the environmental deterioration produced by their actions based on the implementation of new and avant-garde measures dedicated to preventing the deterioration of the environment. When mentioning the business sector, due to its nature, it implies defining diverse strategies of measures and moderation of the environment. However, the organizational philosophy shows that this is not entirely true since it presents certain limits regarding the contribution and commitment to the ecosystem. That is to say, the entities do not assume due responsibility before the environmental problem to obtain economic advantages.

For this reason, organizations and business sectors in the country of Ecuador should consider an environmental accounting program in their financial reports, which includes expenses, costs and environmental investments with labor performance. Ecuadorian companies require urgent training to mitigate the environmental accounting problems that provide adequate environmental registration, evaluation and communication of companies in Ecuador. For this reason, this article describes the main characteristics of the compendium of publications indexed in the Scopus database related to environmental accounting variables in the accounting practice of companies in Ecuador, as the description of the position of certain authors

affiliated with institutions, during the period between the years 2017 and 2022.

## 2. General Objective

To analyze from a bibliometric and bibliographic perspective, the production of research papers on the variable Environmental Accounting by Ecuadorian institutions registered in Scopus during 2017-2022.

## 3. Methodology

Quantitative analysis of the information provided by Scopus is performed under a bibliometric approach on the scientific production regarding the study of the variables of Environmental Accounting in the accounting practice of Ecuadorian companies. Likewise, it is analyzed from a qualitative perspective, with examples of some research works published in the study mentioned above, from a bibliographic approach to describe the position of different authors on the proposed topic.

The search is performed through the tool provided by Scopus, and the parameters referenced in Figure 1 are established.

### 3.1 Methodological design

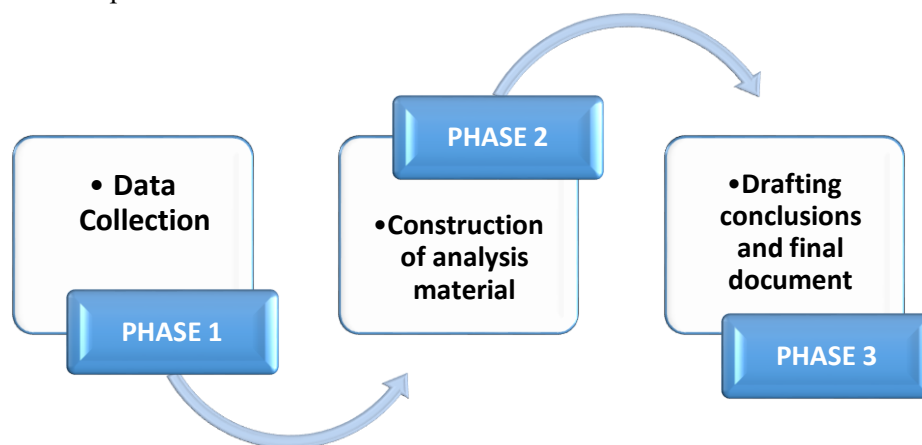


Figure 1. Methodological design

Source: Own elaboration

### 3.1.1 Phase 1: Data Collection

The data collection was carried out using the Scopus web page search tool, through which 35 publications were identified. For this purpose, search filters were established consisting of:

TITLE-ABS-KEY ( environmental AND accounting ) AND ( LIMIT-TO ( PUBYEAR , 2022 ) OR LIMIT-TO ( PUBYEAR , 2021 ) OR LIMIT-TO ( PUBYEAR , 2020 ) OR LIMIT-TO ( PUBYEAR , 2019 ) OR LIMIT-TO ( PUBYEAR , 2018 ) OR LIMIT-TO ( PUBYEAR , 2017 ) ) AND ( LIMIT-TO ( AFFILCOUNTRY , "Ecuador" ) )

- ✓ Published documents whose study variables are related to the study of the Environmental Accounting variable.
- ✓ Limited to studies from Ecuadorian institutions.
- ✓ Without distinction of area of knowledge.
- ✓ Without distinction of type of publication.

### 3.1.2 Phase 2: Construction of analysis material

The information identified in the previous phase is organized. The classification will be made employing graphs, figures and tables based on data provided by Scopus.

- ✓ Word Co-occurrence.
- ✓ Year of publication
- ✓ Country of origin of the publication.
- ✓ Knowledge area.
- ✓ Type of Publication

### 3.1.3 Phase 3: Drafting conclusions and final document

After the analysis carried out in the previous phase, the study drafted the conclusions and prepared the final document.

## 4. Results

### 4.1 Co-occurrence of words

Figure 2 shows the Co-occurrence of keywords within the publications identified in the Scopus database.

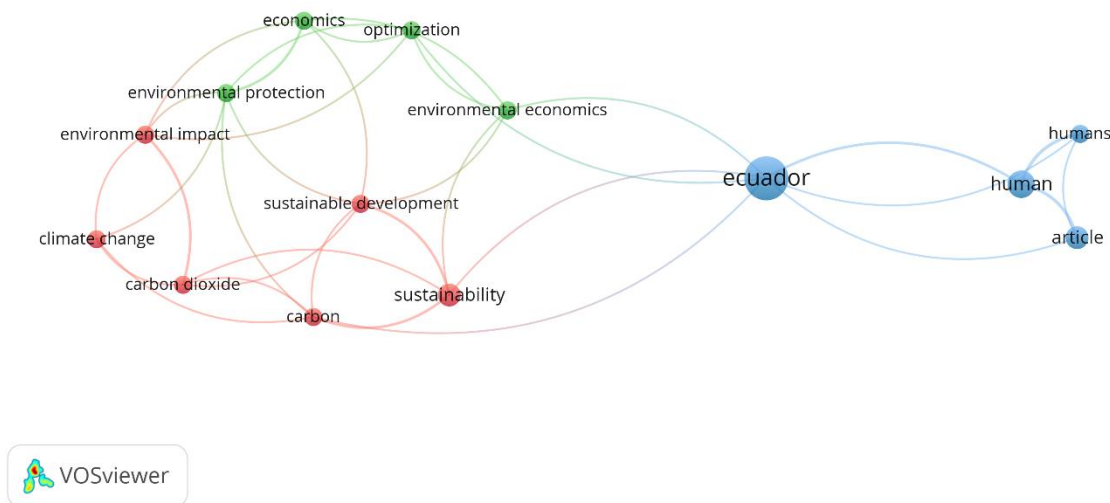


Figure 2. Co-occurrence of words

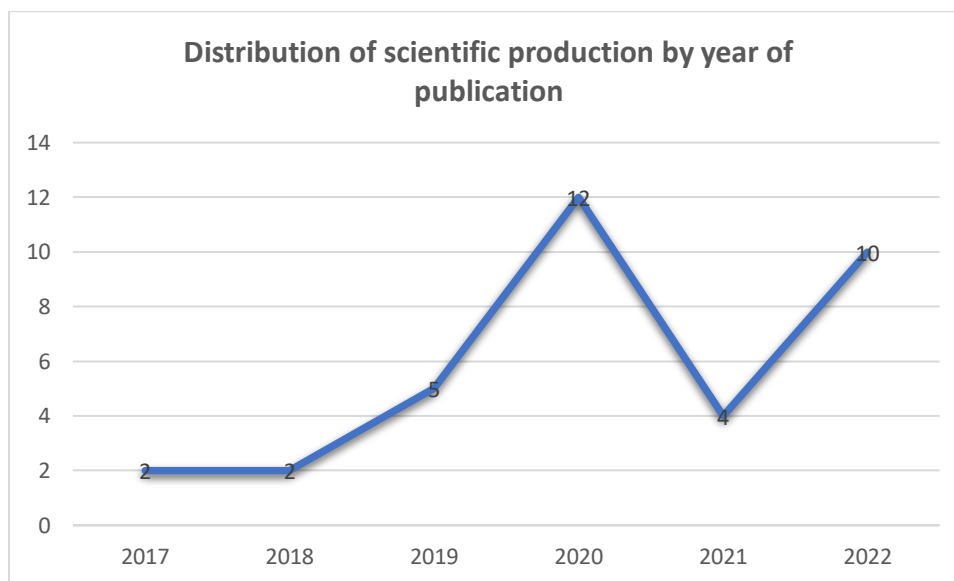
**Source:** Own elaboration (2023); based on data provided by Scopus.

Within the study of the research reported by the Scopus platform, referring to the variables of Environmental Accounting in the accounting practice of the companies in Ecuador, the object of this scientific debt, environmental accounting is defined as the presentation of financial information considering environmental aspects before the possible deterioration of natural resources and the lack of human activities friendly to the environment, the purpose of environmental accounting is the prevention, correction and compensation of the environmental sequels generated by the business activities that consequently have harmful effects on the environment. It is for this reason that through the interpretation of Figure 2, it is possible to determine as key words of the publications reported in Scopus, Ecuador, Environmental Economics, Sustainable, Sustainable Development; environmental accounting is a branch of accounting, which allows recording and disclosing economic-financial information of the

production activities of companies that directly and indirectly impact nature with their production activities, the results of environmental accounting in business praxis are important for the calculation of financial indicators and eco-efficiency. On the other hand, Ecuadorian companies do not perform this accounting, but it is done from the National Environmental Accounting through the Ministry of Environment of Ecuador (MAE), which aims to analyze the development and current situation of environmental accounting in Ecuador, obtaining economic-financial business information in an efficient, accurate and timely manner.

#### 4.2 Distribution of scientific production by year of publication.

Figure 3 shows how the scientific production is distributed according to the year of publication, considering that the period from 2017 to 2022 is taken.



**Figure 3.** Distribution of scientific production by year of publication.

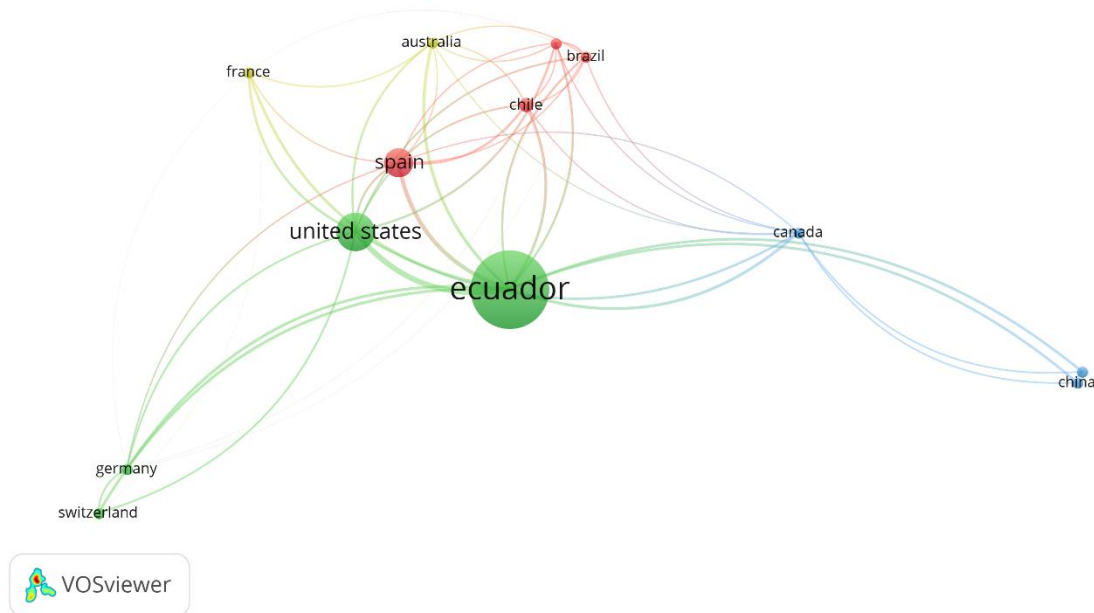
**Source:** Own elaboration (2023); based on data provided by Scopus.

Figure 3 shows the scientific production around the variables of *Environmental Accounting* in the accounting practice of companies in Ecuador in the period between 2017 and 2022, where the increase in production volume in the year 2022 is evidenced, with a total of 10 publications related to the keywords, among which stands out the article entitled “analysis of the water-energy-food nexus and its contribution to energy development” (Herrera-Franco, 2022), whose scope of study aims to analyze the scientific development of the WEF nexus during energy intervention processes, through bibliometric review models, for the knowledge of strategies in a bioenergy framework. The methodology consists of (i) information gathering (Scopus and Web of Science) and software selection; (ii) review of information on scientific production, author keywords and countries; and (iii) focus group analysis in an energy development framework. The results show scientific interest from 2007 onwards, with exponential growth from 2016 onwards.

Furthermore, the literature presents interest in implementing the WEF nexus in energy processes to reduce environmental pollution, such as ethanol in gasoline, biorefineries, sustainable agriculture, hydropower and renewable energy (solar, wind). This scientific approach is dominated by the US, China and the UK in environmental science, energy and engineering, which account for 60% of the production. The study shows that the WEF nexus approach to energy development creates new perspectives for decision-making in socioeconomic, political and environmental progress.

### 4.3 International quotation

Figure 4 shows how Ecuadorian institutions have interacted with institutions from different countries in producing scientific publications on environmental accounting.



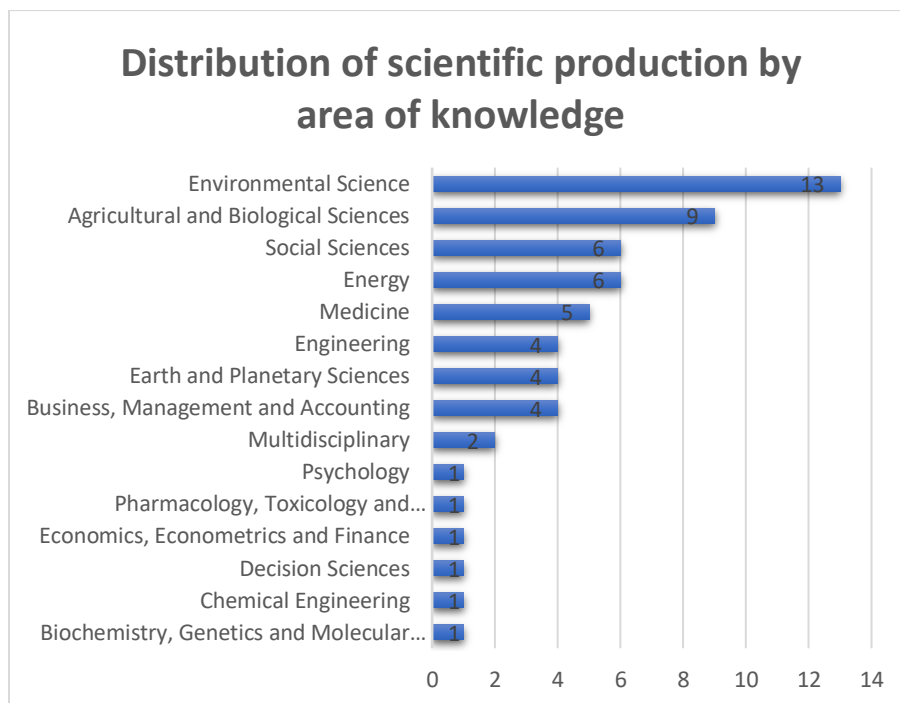
**Figure 4.** International quotient.

**Source:** Own elaboration (2023); based on data provided by Scopus.

Figure 4 shows how research is grouped according to international participation among authors affiliated with different Ecuadorian institutions. There is outstanding participation among authors affiliated with institutions in the United States and Spain, as well as Brazil with authors from Chile and collaboration with researchers from Ecuador and the United States.

#### 4.4 Distribution of scientific production by area of knowledge

Figure 5 shows how the production of scientific publications is distributed according to the area of knowledge through which the different research methodologies are executed.



**Figure 5.** Distribution of scientific production by area of knowledge.

**Source:** Own elaboration (2023); based on data provided by Scopus.

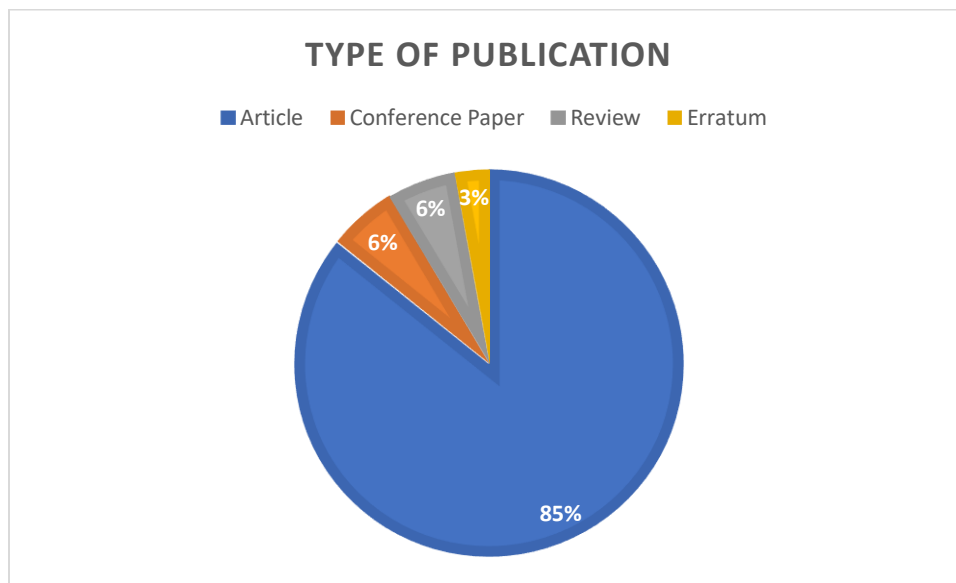
Environmental Sciences was the area of knowledge with the highest number of publications registered in Scopus, with a total of 13 documents that have based their methodologies on the impact of environmental accounting on the accounting practice of companies in Ecuador. In the second place, Biological Sciences and Agriculture with 9 documents. The above can be explained thanks to the contribution and study of different branches. The area of Environmental Sciences registered the article with the highest impact, entitled “Dynamics of international trade, technological innovation and environmental sustainability: evidence from Asia in accounting for cross-dependence” (Ali, 2021), whose object of study explores the mechanism of how trade

openness (TO) affects CO<sub>2</sub> emissions through scale and technical effects in the Asian region over the period 1990-2015. The results obtained by employing augmented cross-sectional estimators indicate that (i) trade-induced technological innovation (TI) reduces CO<sub>2</sub> emissions; (ii) trade-facilitated economic growth generates higher CO<sub>2</sub> emissions; (iii) the positive scale effect outweighs the negative technical effects. In addition, TO also produces a TI rebound effect on South and West Asia emissions. The Dumitrescu-Hurlin causality test reveals that TO Granger causes economic growth and TI, which in turn cause CO<sub>2</sub> emissions. Furthermore, four-way causality is observed between TO, IT, energy consumption and emissions, suggesting that these variables are

mutually reinforcing. The findings suggest that environmental sustainability goals can be achieved if the pace of domestic production growth is accompanied by environmental regulations and improvements in clean technologies by framing a comprehensive trade policy.

#### 4.5 Type of publication

Figure 6 shows how the bibliographic production is distributed according to the author's chosen publication type.



**Figure 6.** Type of publication

**Source:** Own elaboration (2023); based on data provided by Scopus.

The type of publication most frequently used by Ecuadorian researchers was the article; 85% of the total scientific production corresponds to this document. In the second place, section documents with 6% and reviews with 6%. In this last category, the one entitled “Analyzing China’s environmental sustainability factors: the role of fossil fuel energy and renewable energies” stands out (Abbasi, 2022), whose scope of study examines fossil fuel energy, renewable energy and GDP between 1980 and 2018 using novel dynamic ARDL simulations and frequency domain causality (FDC) models. The empirical findings show that fossil fuel energy intensely increases CO<sub>2</sub> emissions in the long and short run. On the other hand, GDP increases carbon emissions in the long run but significantly adversely affects China’s environment in the short run. At the same time, using renewable energy has a short-term

detrimental impact on CO<sub>2</sub> emissions. The FDC also supports the long-, medium-, and short-term causality hypotheses. Overall, these results imply that renewable energy consumption is crucial for achieving sustainable environmental goals and discourages using fossil fuels in the energy mix. In this sense, China should consider the empirical evidence and initiate long-term strategies to decrease carbon emissions for a sustainable environment.

#### 5. Conclusions

Through the bibliometric analysis carried out in this study, it was possible to establish that Environmental Sciences was the area of knowledge that has the largest number of published records regarding the variables of



*Environmental Accounting* in the accounting practice of companies in Ecuador, with a total of 13 publications in Scopus database during the period 2017-2022. Similarly, it was possible to establish that environmental accounting over the last few years has observed contributions, and a significant breakthrough is evident in that it seeks to mitigate the damage caused to the environment by human activity, focused on the various sectors of business production in Ecuador to achieve economic and environmental sustainability. To carry out this successful process, environmental audits are needed to certify compliance with standards and to make a greater effort to improve how organizations and productive sectors operate. These processes must be based on a regulation that governs good accounting practices. At the same time, Ecuadorian companies are willing to implement and apply environmental accounting, as well as require the accompaniment and support of external entities to provide guidelines and train personnel on how it should be implemented.

On the other hand, the guide for the implementation of the environmental accounting branch for production companies is based on the identification of environmental costs and expenses and environmental information in the financial statements and encourages taxpayers to be part of ecological activities to obtain an essential tool for proper registration, evaluation and environmental communication of companies in Ecuador. It is worth mentioning that these standards must be carried out under international standards, the parameters of IFRS and the law of the Internal Tax Regime (LORTI) in force in Ecuador

## References

- [1] Abbasi, K. R. (2022). *Analizar los factores de sostenibilidad ambiental de China: el papel de la energía de combustibles fósiles y las energías renovables*. china.
- [2] Ali, U. L. (2021). *Dinámica del comercio internacional, la innovación tecnológica y la sostenibilidad ambiental: evidencia de Asia al dar cuenta de la dependencia transversal*. quito.
- [3] Herrera-Franco, G. H.-F. (2022). *ANÁLISIS DEL NEXO AGUA-ENERGÍA-ALIMENTOS Y SU CONTRIBUCIÓN AL DESARROLLO ENERGÉTICO*. brasil.
- [4] Abbasi, K. R., Shahbaz, M., Zhang, J., Irfan, M., & Alvarado, R. (2022). Analyze the environmental sustainability factors of china: The role of fossil fuel energy and renewable energy. *Renewable Energy*, 187, 390-402. doi:10.1016/j.renene.2022.01.066
- [5] Ahmed, Z., Ahmad, M., Alvarado, R., Sinha, A., Shah, M. I., & Abbas, S. (2022). Towards environmental sustainability: Do financial risk and external conflicts matter? *Journal of Cleaner Production*, 371 doi:10.1016/j.jclepro.2022.133721
- [6] Alava, J. J., Calle, P., Tirapé, A., Biedenbach, G., Cadena, O. A., Maruya, K., . . . Fair, P. A. (2020). Persistent organic pollutants and mercury in genetically identified inner estuary bottlenose dolphin (*tursiops truncatus*) residents of the guayaquil gulf, ecuador: Ecotoxicological science in support of pollutant management and cetacean conservation. *Frontiers in Marine Science*, 7 doi:10.3389/fmars.2020.00122
- [7] Ali, U., Li, Y., Yáñez Morales, V. P., & Hussain, B. (2021). Dynamics of international trade, technology innovation and environmental sustainability: Evidence from asia by accounting for cross-sectional dependence. *Journal of Environmental Planning and Management*, 64(10), 1864-1885. doi:10.1080/09640568.2020.1846507
- [8] Bemmels, J. B., Wright, S. J., Garwood, N. C., Queenborough, S. A., Valencia, R., & Dick, C. W. (2018). Filter-dispersal assembly of lowland neotropical rainforests across the andes. *Ecography*, 41(11), 1763-1775. doi:10.1111/ecog.03473
- [9] Berroeta, H., Pinto de Carvalho, L., Castillo-Sepúlveda, J., & Opazo, L. (2021). Sociospatial ties and postdisaster reconstruction: An analysis of the assemblage in the mega-fire of valparaíso. *Journal of Community Psychology*, 49(1), 95-117. doi:10.1002/jcop.22431
- [10] Briones-Hidrovo, A., Copa Rey, J. R., Cláudia Dias, A., Tarelho, L. A. C., & Beauchet, S. (2022). Assessing a bio-energy



- system with carbon capture and storage (BECCS) through dynamic life cycle assessment and land-water-energy nexus. *Energy Conversion and Management*, 268 doi:10.1016/j.enconman.2022.116014
- [11] Cabezas Arellano, M. J., Pozo Hernández, F. M., & Aldaz Bombón, O. R. (2022). COMPETITIVENESS OF WATER PACKAGING COMPANIES IN SANTO DOMINGO. [COMPETITIVIDAD DE EMPRESAS ENVASADORAS DE AGUA EN SANTO DOMINGO] *Universidad y Sociedad*, 14(S2), 290-299. Retrieved from www.scopus.com
- [12] Campforts, B., Vanacker, V., Herman, F., Vanmaercke, M., Schwanghart, W., Tenorio, G. E., . . . Govers, G. (2020). Parameterization of river incision models requires accounting for environmental heterogeneity: Insights from the tropical andes. *Earth Surface Dynamics*, 8(2), 447-470. doi:10.5194/esurf-8-447-2020
- [13] Cansino, J. M., Sánchez-Braza, A., & Espinoza, N. (2022). Moving towards a green decoupling between economic development and environmental stress? A new comprehensive approach for ecuador. *Climate and Development*, 14(2), 147-165. doi:10.1080/17565529.2021.1895701
- [14] Carranco, A. S., Romo, D., de Lourdes Torres, M., Wilhelm, K., Sommer, S., & Gillingham, M. A. F. (2022). Egg microbiota is the starting point of hatchling gut microbiota in the endangered yellow-spotted amazon river turtle. *Molecular Ecology*, 31(14), 3917-3933. doi:10.1111/mec.16548
- [15] Cook, R. N., Ramirez-Parada, T., Browne, L., Ellis, M., & Karubian, J. (2020). Environmental correlates of richness, community composition, and functional traits of terrestrial birds and mammals in a fragmented tropical landscape. *Landscape Ecology*, 35(12), 2825-2841. doi:10.1007/s10980-020-01123-4
- [16] Cordova, C., Zorio-Grima, A., & Merello, P. (2020). Contextual and corporate governance effects on carbon accounting and carbon performance in emerging economies. *Corporate Governance (Bingley)*, 21(3), 536-550. doi:10.1108/CG-10-2020-0473
- [17] Córdoba, C. R., Zorio-Grima, A., & García-Benau, M. (2018). New trends in corporate reporting: Information on carbon footprint in Spain. [Novas formas de relatório corporativo: Informação sobre a pegada de carbono na Espanha] *RAE Revista De Administracao De Empresas*, 58(6), 537-550. doi:10.1590/S0034-759020180603
- [18] Costa, M. T., Ezcurra, E., Ezcurra, P., Salinas-de-León, P., Turner, B., Kumagai, J., . . . Aburto-Oropeza, O. (2022). Sediment depth and accretion shape belowground mangrove carbon stocks across a range of climatic and geologic settings. *Limnology and Oceanography*, 67(S2), S104-S117. doi:10.1002/lno.12241
- [19] Eldridge, D. J., Delgado-Baquerizo, M., Quero, J. L., Ochoa, V., Gozalo, B., García-Palacios, P., . . . Maestre, F. T. (2020). Surface indicators are correlated with soil multifunctionality in global drylands. *Journal of Applied Ecology*, 57(2), 424-435. doi:10.1111/1365-2664.13540
- [20] Fagundo-Rivera, J., Gómez-Salgado, J., García-Iglesias, J. J., Gómez-Salgado, C., Camacho-Martín, S., & Ruiz-Frutos, C. (2020). Relationship between night shifts and risk of breast cancer among nurses: A systematic review. *Medicina (Lithuania)*, 56(12), 1-18. doi:10.3390/medicina56120680
- [21] Félix, F., Zavala, M., & Centeno, R. (2019). Spatial distribution, social structure and conservation threats of a small community of bottlenose dolphins, *tursiops truncatus* (odontoceti: Delphinidae) in Ecuador. [Distribución espacial, estructura social y amenazas de conservación de una pequeña comunidad de delfines nariz de botella, *tursiops truncatus* (Odontoceti: delphinidae) en Ecuador] *Revista De Biología Tropical*, 67(4), 1059-1076. doi:10.15517/rbt.v67i4.35223
- [22] Freire Ordóñez, D., Halfdanarson, T., Ganzer, C., Shah, N., Dowell, N. M., & Guillén-Gosálbez, G. (2022). Evaluation of the potential use of e-fuels in the European aviation sector: A comprehensive economic

- and environmental assessment including externalities. *Sustainable Energy and Fuels*, 6(20), 4749-4764. doi:10.1039/d2se00757f
- [23] Friedlander, A. M., Goodell, W., Salinas-De-León, P., Ballesteros, E., Berkenpas, E., Capurro, A. P., . . . Sala, E. (2020). Spatial patterns of continental shelf faunal community structure along the western antarctic peninsula. *PLoS ONE*, 15(10 October) doi:10.1371/journal.pone.0239895
- [24] González-Zeas, D., Rosero-López, D., Walter, T., Flecker, A., Lloret, P., De Bièvre, B., . . . Dangles, O. (2019). Designing eco-friendly water intake portfolios in a tropical andean stream network. *Water Resources Research*, 55(8), 6946-6967. doi:10.1029/2019WR025190
- [25] Gould, C. F., Schlesinger, S. B., Molina, E., Lorena Bejarano, M., Valarezo, A., & Jack, D. W. (2020). Long-standing LPG subsidies, cooking fuel stacking, and personal exposure to air pollution in rural and peri-urban ecuador. *Journal of Exposure Science and Environmental Epidemiology*, 30(4), 707-720. doi:10.1038/s41370-020-0231-5
- [26] Herrera-Franco, G., Bollmann, H. A., Lofhagen, J. C. P., & Mora-Frank, C. (2022). ANALYSIS OF THE WATER-ENERGY-FOOD NEXUS AND ITS CONTRIBUTION TO ENERGY DEVELOPMENT. *WIT Transactions on Ecology and the Environment*, 255, 81-91. doi:10.2495/EPM220071
- [27] Hirschfeld, M., Dudgeon, C., Sheaves, M., & Barnett, A. (2021). Barriers in a sea of elasmobranchs: From fishing for populations to testing hypotheses in population genetics. *Global Ecology and Biogeography*, 30(11), 2147-2163. doi:10.1111/geb.13379
- [28] Hribljan, J. A., Suarez, E., Bourgeau-Chavez, L., Endres, S., Lilleskov, E. A., Chimbolema, S., . . . Chimner, R. A. (2017). Multidate, multisensor remote sensing reveals high density of carbon-rich mountain peatlands in the páramo of ecuador. *Global Change Biology*, 23(12), 5412-5425. doi:10.1111/geb.13807
- [29] Knoke, T., Paul, C., Rammig, A., Gosling, E., Hildebrandt, P., Härtl, F., . . . Bendix, J. (2020). Accounting for multiple ecosystem services in a simulation of land-use decisions: Does it reduce tropical deforestation? *Global Change Biology*, 26(4), 2403-2420. doi:10.1111/gcb.15003
- [30] Lowe, R., Stewart-Ibarra, A. M., Petrova, D., García-Díez, M., Borbor-Cordova, M. J., Mejía, R., . . . Rodó, X. (2017). Climate services for health: Predicting the evolution of the 2016 dengue season in machala, ecuador. *The Lancet Planetary Health*, 1(4), e142-e151. doi:10.1016/S2542-5196(17)30064-5
- [31] Naveda-Rodríguez, A., Utreras, V., & Zapata-Riós, G. (2020). A standardised monitoring protocol for the black caiman (melanosuchus niger). *Wildlife Research*, 47(4), 317-325. doi:10.1071/WR19135
- [32] Stanaway, J. D., Afshin, A., Gakidou, E., Lim, S. S., Abate, D., Abate, K. H., . . . Murray, C. J. L. (2019). Erratum: Global, regional, and national comparative risk assessment of 84 behavioural, environmental and occupational, and metabolic risks or clusters of risks for 195 countries and territories, 1990–2017: A systematic analysis for the global burden of disease study 2017 (the lancet (2018) 392(10159) (1923–1994), (S0140673618322256), (10.1016/S0140-6736(18)32225-6)). *The Lancet*, 393(10190), e44. doi:10.1016/S0140-6736(19)31429-1
- [33] Suello, R. H., Hernandez, S. L., Bouillon, S., Belliard, J. -, Dominguez-Granda, L., Van De Broek, M., . . . Temmerman, S. (2022). Mangrove sediment organic carbon storage and sources in relation to forest age and position along a deltaic salinity gradient. *Biogeosciences*, 19(5), 1571-1585. doi:10.5194/bg-19-1571-2022
- [34] Torres López, S., Barrionuevo, M. D. L. A., & Rodríguez-Labajos, B. (2019). Water accounts in decision-making processes of urban water management: Benefits, limitations and implications in a real implementation. *Sustainable Cities and Society*, 50 doi:10.1016/j.scs.2019.101676
- [35] Valencia, E., Changoluisa, I., Alulema, V., Rodriguez, D., Valencia, D., Nandar, J., . . .

- Cando, E. (2020). Power management strategies for small electric fixed wing uavs employed in natural resources mapping. Paper presented at the AIAA Propulsion and Energy 2020 Forum, 1-14. doi:10.2514/6.2020-3963 Retrieved from www.scopus.com
- [36] Vleminckx, J., Fortunel, C., Valverde-Barrantes, O., Timothy Paine, C. E., Engel, J., Petronelli, P., . . . Baraloto, C. (2021). Resolving whole-plant economics from leaf, stem and root traits of 1467 amazonian tree species. *Oikos*, 130(7), 1193-1208. doi:10.1111/oik.08284
- [37] Walker, W. S., Gorelik, S. R., Baccini, A., Aragon-Osejo, J. L., Josse, C., Meyer, C., . . . Schwartzman, S. (2020). The role of forest conversion, degradation, and disturbance in the carbon dynamics of amazon indigenous territories and protected areas. *Proceedings of the National Academy of Sciences of the United States of America*, 117(6), 3015-3025. doi:10.1073/pnas.1913321117
- [38] Zambrano, A. M., Diaz, C. E., Andrade, A. V., Mena, V. C., Salazar, P. D., Guanoluisa, K. C., . . . Ludeña, R. E. (2019). New biomarkers for the assessment of cardiovascular risk. [Nuevos biomarcadores en la evaluación del riesgo cardiovascular] *Revista Latinoamericana De Hipertension*, 14(6), 712-716. Retrieved from www.scopus.com