



**ISSN 2224-4980**

**International  
Journal of Ecosystems and Ecology Science  
(IJEES)**

<https://doi.org/10.31407/ijeess>



**Essays on Ecosystems and Environmental Research**

**Volume 14/4, 2024**

**October - December, 2024**

<http://ijeess.net/>

**International  
Journal of Ecosystems and Ecology Science  
(IJEES)**

<https://doi.org/10.31407/ijeess>







Scopus Status: September 2024,  
Accepted titles in the process of being added to Scopus  
<https://www.elsevier.com/products/scopus/content#4-titles-on-scopus>



ESCI Dec 2018-Mar 2023



# International Journal of Ecosystems and Ecology Science (IJEES), ISSN: 2224-4980

Volume 14, Issue 3, October 2024 - December 2024, (Serial Number 56)



## Editor in Chief

**Hysen Mankolli**, Professor, Ecologist, Plainfield, Illinois, USA; Health and Environment Association, Tirana Albania.  
Earth System Science Interdisciplinary Center (ESSIC), University of Maryland College Park, USA, Consultant Scientist.

## Deputy-Editor-in-Chief

**Sukru Dursun**, Professor, Konya Technical University, Environmental Engineering Dep., Konya-Turkey.  
**Massimo Zuchetti**, Professor, MIT, Massachusetts Institute of Technology, Cambridge MA, USA.  
**Cezar Kongoli**, Professor, University of Maryland College Park, Earth System Science Interdisciplinary Center (ESSIC), USA.  
**Selim Dogan**, Professor, Konya Technical University, Environmental Engineering Dep., Konya-Turkey.

## International Scientific Editorial Board

**Sukru Dursun**, Professor, Konya Technical University, Environmental Engineering Dep., Konya, Turkey;  
**Massimo Zuchetti**, Professor, MIT, Massachusetts Institute of Technology, Cambridge MA, USA;  
**Veselin Alexandrov**, Professor, National Institute of Meteorology and Hydrology, Bulgaria;  
**Nicola Senesi**, Professor, University of Bari, Bari, Italy;  
**Wander Michelle M**, Professor, University of Illinois at Urbana-Champaign, Urbana, Urbana, IL 61801, USA;  
**Vladimir Pesic**, Professor, University of Montenegro, Department of Biology, Podgorica Montenegro;  
**Ibraim Dincer**, Professor, University of Ontario, Faculty of Engineering and Applied Science, Ontario, Canada;  
**Hysen Mankolli**, Professor, Ecologist, Plainfield, Illinois, USA;  
**Lyudmyla Symochko**, Professor, Uzhhorod National University, Faculty of Biology, Uzhhorod, Ukraine;  
**Zacharoula S. Andreopoulou**, Professor, Aristotle University of Thessaloniki, Thessaloniki, Greece;  
**Mariana Golumbeanu**, PhD, National Institute for Marine Research and Development "Grigore Antipa", Constanta, Romania;  
**Antonis K. Kokkinakis**, Professor, Aristotle University of Thessaloniki, Thessaloniki, Greece;  
**Murat Yakar**, Professor, Geomatic Department, Mersin University, Turkey;  
**Olivia Cioboiu, PhD**, The Oltenia Museum Craiova, Popa Şapcă str. No 8, Rumania;  
**Nasser Modirshahla**, Professor, Islamic Azad University, Department of Applied Chemistry, Iran;  
**Nina Liogchii**, Professor, Institut of Ecology and Geografy, Republic of Moldova;  
**Trajce Talevski**, Professor, Hydrobiological Institute, Naum Ohidski 50, 6000 Ohrid - R.Macedonia;  
**Can Ozgur Colpan**, Professor, Ryerson University, Canada;  
**Roberto Mancinelli**, Professor, University of Tuscia, Viterbo, Italy;  
**Bahrive Gulgun**, Professor, Ege University, Izmir, Turkey;  
**Insaf Mekki**, PhD, National Research Institute for Rural Engineering, Water, and Forestry (I.N.R.G.R.E.F), Ariana, Tunisia;

**Hany Gaber El Shaer**, PhD, IUCN Centre for Mediterranean Cooperation / Global Marine, Egypt;  
**Ertugrul Esmeray**, Ph.D, Karabuk University, Engineering Faculty, Environmental Engineering Department Turkey;  
**Violeta Vidaček-Hainš**, PhD, Ass. Professor, University of Zagreb, Croatia;  
**Cezar Kongoli**, Professor, University of Maryland College Park, Earth System Science Interdisciplinary Center (ESSIC), USA;  
**Justas Kažys**, PhD, Assoc. Professor, Vilnius University, Department of Hydrology and Climatology, Vilnius –Lithuania;  
**Selim Dogan**, PhD, Assoc. Professor Selcuk University, Environmental Engineering Department, Konya Turkey;  
**Hisham Mostafa Alidrisi**, PhD, Assoc. Professor, King Abdulaziz University, Engineering College, Jeddah Saudi, Arabia;  
**Khalid A. A. Al-Ghamdi**, PhD, Assoc. Professor, King Abdulaziz University, Engineering College, Jeddah Saudi, Arabia;  
**Osman Taylan**, PhD, Assoc. Professor, King Abdulaziz University, Engineering College, Jeddah Saudi, Arabia;  
**Robert J. Kuligowski**, PhD, University of Maryland College P, Earth System Science Interdisciplinary Center (ESSIC), USA;  
**Mariia M. Fedoriak**, Professor, Chernivtsi National University, Dep. of Ecology and Biomonitoring, Chernivtsi, Ukraine;  
**Narayan Ramappa Birasal**, Associate Professor, KLE Society's G H College, Zoology Department, Karnataka state, India;  
**Rana P. Singh**, Professor, Babasaheb Bhimrao Ambedkar University, Dep. of Environmental Science, U.P., India;  
**Hayati AKMAN**, Dr., Selcuk University, Seed Department, 42430 Konya, Turkey;  
**Fatma ÇANKA KILIÇ**, Professor, Kocaeli University, Technology Faculty, Energy Systems Engineering Dep., Kocaeli, Turkey;  
**Ferim Gashi**, Dr., University of Pristina, Department of Geography, Faculty of Mathematical-Natural Sciences, Kosovo;  
**Altin Dorri**, Professor Assoc., Polytechnic University of Tirana, Tirana, Albania;  
**Alexander P. Sizykh**, Professor, Russian Academy of Sciences, Siberian Institute, Irkutsk, Lermonyova, Russia;  
**Zeynep EREN**, Professor, Ataturk University, Environmental Engineering Department, Erzurum, Turkey;  
**Sheida Korjani**, PhD, Department of Architecture, Tabriz Branch, Islamic Azad University, Tabriz, Iran;  
**Maan Maarroof**, PhD, Assistant Professor, University of Mosul, College of Veterinary Medicine, Iraq;  
**Koula Doukani**, Professor, University of Ibn Khaldoun, Zaaroura, Tiaret, Algeria;  
**Svetla Petkova Gateva**, PhD, Institute of Biodiversity and Ecosystem Research, Bulgarian Acad. of Sciences, Sofia, Bulgaria;  
**Rrahim Sejdiu**, Professor Assistant, PhD, University of Applied Sciences-Ferizaj, Kosovo;  
**Mouloud BOUHOUHOU**, Dr., ENS Assia Djebar - Constantine, Algeria;  
**Dinh Tran Ngoc Huy**, Dr., Banking University HCMC, Ho Chi Minh city Vietnam-International University of Japan, Japan;  
**Admir Jançe**, Professor Assoc., European University of Tirana, Tirana, Albania;  
**Nataliia P. Kovalenko**, Dr., Institute of Plant Physiology and Genetics of NAS of Ukraine, Kyiv, Ukraine;  
**Leila Soudani**, Dr. University of Tiaret, Faculty of Nature and Life Sciences, Tiaret Algeria;  
**Uchечи Emiri**, Professor Assoc., Rivers State University, Nkpolu-Oroworukwo, Crop Soil Science, Port Harcourt, Nigeria;

## Publication Information:

International journal of ecosystems and ecology science (IJEES), ISSN 2224-4980, publishing original articles, reviews and short communications of high scientific standard on ecosystems and science ecology. By: Hysen Mankolli, Professor, Ecologist, Plainfield, Illinois, USA; Health and Environment Association, Tirana, Albania;

ISSN International Centre, *Bibliographic Data Section*, PARIS, FRANCE;

Bib - ID 68337; ISO standard 3297;

Key title: International journal of ecosystems and ecology science

Abbreviated key title: *Int. j. ecosyst. ecol. sci.*

ISSN 2224-4980; <http://ijeess.net/>

Frequency: four times a year. IJEES Electronic Journal Publication: Plainfield, Illinois, USA;

DOI prefix: 10.31407, <https://doi.org/10.31407/ijeess>

ISSN Center responsible of the record: CIEPS - ISSN

<https://portal.issn.org/resource/ISSN/2224-4980>

IJEES, Volume 14/4, 2024

[https://ijeess.net/journal-98-International-Journal-of-Ecosystems-and-Ecology-Science-\(IJEES\)-Volume-14-4,-2024.html](https://ijeess.net/journal-98-International-Journal-of-Ecosystems-and-Ecology-Science-(IJEES)-Volume-14-4,-2024.html)

EBSCO's library products,USA

<http://www.ebscohost.com/for-publishers/for-publishers>



ELSEVIER

Scopus Status: September 2024,

Accepted titles in the process of being added to Scopus

<https://www.elsevier.com/products/scopus/content#4-titles-on-scopus>

<https://suggestor.step.scopus.com/progressTracker/index.cfm?trackingID=FE7895B0D2B46ECE>

Science gate Cited

<https://www.sciencegate.app/source/315335/top-cited>

Index Copernicus, **ICV= 2022: 100.00; ICV= 2021: 100.00; ICV= 2020: 100.00; ICV= 2017: 98.95;**

<https://journals.indexcopernicus.com/search/journal/issue?issueId=197247&journalId=31407>

CiteFactor, **IF 2019-2020=1.40**

<https://www.citefactor.org/impact-factor/impact-factor-of-journal-International-Journal-of-Ecosystems-and-Ecology-Science-IJEES.php>

Scientific Journal Impact factor, **SJIF: 2021: 6.121; 2020: 7.167; 2019: 7.64**

<http://sjifactor.com/passport.php?id=17557>

SCILIT

<https://app.scilit.net/publications?source-id=23651&type=journal-article>

Academic Resource Index Research Bible:

<http://journalseeker.researchbib.com/view/issn/2224-4980>

Google scholar Cited, **h-index: 10; Citations 510;**

<https://scholar.google.com/citations?user=W89N8qgAAAAJ&hl=en>

MIAR, **ICDS 2021: 9.5;**

<http://miar.ub.edu/issn/2224-4980>

Web of Science Master List 2018-2022

<https://rdmusm.files.wordpress.com/2020/01/journal-list-emerging-sources-citation-index-web-of-science-update-on-23-jan-2020.pdf>

UOI license: <http://u-o-i.org/1.01/ijeess>; <http://www.u-o-i.org/index.php/SearchLicense>



DPI Digital Library USA and assign unique digital no. DPI: 16.10047.IJEES

U.S. National Library of Medicine,

NLM ID: [101726509](https://www.ncbi.nlm.nih.gov/nlmcatalog/101726509) [Serial]; Other ID: (OCOLC)879805056;

<https://www.ncbi.nlm.nih.gov/nlmcatalog/101726509>

*This journal has the status of an international journal.*

## **Aims and Scope:**

The goals of the International Journal of Ecosystems and Ecology Science (IJEES), ISSN 2224-4980, are to bring together researchers and scientists with interests in the quality of the ecosystems research results, theories, technologies, systems, tools, applications, the work in progress and experiences on ecosystems used. The main topics of interest are:

- ✓ Ecosystems
- ✓ Agro ecosystems
- ✓ Forest ecosystems
- ✓ Ecology
- ✓ Plant Ecology
- ✓ Animal Ecology
- ✓ Human Ecology
- ✓ Lakes and Rivers ecosystems
- ✓ Applied Biology
- ✓ Applied Ecology
- ✓ Applied Chemistry
- ✓ Biodiversity
- ✓ Energy
- ✓ Geology
- ✓ Bioaccumulation
- ✓ Desalination
- ✓ Water
- ✓ Soil
- ✓ Air pollution
- ✓ Climate Change
- ✓ Ecosystem restoration
- ✓ Environment toxicology
- ✓ Environment protection
- ✓ Environmental radioactivity
- ✓ Environmental legislation
- ✓ Environmental management
- ✓ Environmental education.
- ✓ Green technology
- ✓ Socioeconomic aspects in Ecosystems
- ✓ Agro tourism and National Park
- ✓ Health Care
- ✓ Food security
- ✓ Rights and Environmental Laws
- ✓ Environment Engineering
- ✓ Environment Architecture
- ✓ Eco philosophy Issue

## Abstracted / Indexed / Impact Factor in:

International journal of ecosystems and ecology science (IJEES), ISSN 2224-4980,

IJEES: <http://ijeess.net/>

IJEES have an international status and has been indexed, abstracted, and have impact factors:

ISSN Center responsible of the record: CIEPS - ISSN

<https://portal.issn.org/resource/ISSN/2224-4980>

IJEES doi crossref

<https://doi.org/10.31407/ijeess>

IJEES, Volume 14/4, 2024

[https://ijeess.net/journal-98-International-Journal-of-Ecosystems-and-Ecology-Science-\(IJEES\)-Volume-14-4-,2024.html](https://ijeess.net/journal-98-International-Journal-of-Ecosystems-and-Ecology-Science-(IJEES)-Volume-14-4-,2024.html)

EBSCO's library products,USA

<http://www.ebscohost.com/for-publishers/for-publishers>



ELSEVIER

Scopus Status: September 2024.

Accepted titles in the process of being added to Scopus

<https://www.elsevier.com/products/scopus/content#4-titles-on-scopus>

<https://suggestor.step.scopus.com/progressTracker/index.cfm?trackingID=FE7895B0D2B46ECE>

Science gate Cited

<https://www.sciencegate.app/source/315335/top-cited>

Index Copernicus, ICV= 2022: 100.00; ICV= 2021: 100.00; ICV= 2020: 100.00; ICV= 2019: 100.00;

<https://journals.indexcopernicus.com/search/journal/issue?issueId=197247&journalId=31407>

CiteFactor, IF 2019-2020=1.40

<https://www.citefactor.org/impact-factor/impact-factor-of-journal-International-Journal-of-Ecosystems-and-Ecology-Science-IJEES.php>

Scientific Journal Impact factor, SJIF: 2021: 6.121; 2020: 7.167; 2019: 7.64

<http://sjifactor.com/passport.php?id=17557>

SCILIT

<https://app.scilit.net/publications?source-id=23651&type=journal-article>

Academic Resource Index Research Bible:

<http://journalseeker.researchbib.com/view/issn/2224-4980>

Google scholar Cited, h-index: 10; Citations 510;

<https://scholar.google.com/citations?user=W89N8qgAAAAJ&hl=en>

MIAR, ICDS 2021: 9.5;

<http://miar.ub.edu/issn/2224-4980>

exaly

<https://exaly.com/journal/102491/international-journal-of-ecosystems-and-ecology-science-ijeess/impact-factor>

Web of Science Master List 2018-2022

<https://rdmusm.files.wordpress.com/2020/01/journal-list-emerging-sources-citation-index-web-of-science-update-on-23-jan-2020.pdf>

WorldCat

[https://www.worldcat.org/search?qt=affiliate\\_wc\\_org\\_all&ai=Directory\\_ashok.drji%252540gmail.com&fq=&q=2224-4980&wcbtn2w=Go](https://www.worldcat.org/search?qt=affiliate_wc_org_all&ai=Directory_ashok.drji%252540gmail.com&fq=&q=2224-4980&wcbtn2w=Go)

US. National Library of Medicine, NLM ID: 101726509 [Serial]; Other ID: (OCoLC)879805056;

<https://www.ncbi.nlm.nih.gov/nlmcatalog/101726509>

CAS Chemical Abstracts Service – CAS database

<http://cassi.cas.org/search.jsp>

Environment-and-Nature/Biodiversity/Ecosystem.

<http://www.efita.org/Environment-and-Nature/Biodiversity/Ecosystem-Biodiversity/IJEES-details-28892.html>

NewJour : Electronic Journal&Newsletters

<http://gulib.georgetown.edu/newjour/nj2/index.html>

Environmental expert

<http://www.environmental-expert.com/magazines/?keyword=ecosystem+science>

Currently Indexing at Pro Quest

[http://www.proquest.com/en-US/catalogs/databases/detail/periodicals\\_index.shtml](http://www.proquest.com/en-US/catalogs/databases/detail/periodicals_index.shtml)

CABI

<http://www.cabi.org/default.aspx?page=1016&site=170&pid=40&xslttab=2&newtitlesonly=1&search=>

Academia.edu

[http://www.academia.edu/3834422/2013\\_Networking\\_approach\\_to\\_the\\_sustainable\\_development\\_of\\_European\\_Regions\\_bordering\\_major\\_rivers](http://www.academia.edu/3834422/2013_Networking_approach_to_the_sustainable_development_of_European_Regions_bordering_major_rivers)



## Manuscripts and correspondence are invited for publication

*Dear Professors, PhD, researchers and scholars of the field of ecosystems and related areas to, such as environmental engineering, agriculture, bio-chemistry, soil, water and air pollution, geology, forestry, urban ecology, resource economics, etc., at the moment, I declare the sending of scientific journal articles to International Journal of Ecosystems and Ecology Science (IJEES) is open. Sending of items can only be done electronically, to the following address: e-mail: [editorijeess@gmail.com](mailto:editorijeess@gmail.com); [2011ijeese@gmail.com](mailto:2011ijeese@gmail.com); [mjedisishendeti@yahoo.com](mailto:mjedisishendeti@yahoo.com); The confirmation of receiving these items will be announced within the period of one to three weeks after sending. Whether the article is accepted or not, will be announced within a period of two to three weeks. Only original articles will be accepted, validated, and not to have or be published in other journals. Publication lasts from two to six months. All Rights Reserved Copyright by © IJEES (the first or correspondent author have responsible for the accuracy of the article). Submission guidelines and Web Submission System are available at: <https://www.ijeess.net/page-6-Guide-for-authors.html>;  
**Note:** If the paper is published in another journal or if it includes false or inaccurate claims, it will be rejected or removed automatically as that constitutes a violation. Zero tolerance!*

## Editorial Office:

*IJEES Electronic Journal Publication: Plainfield, Illinois, USA; E-mail: [editorijeess@gmail.com](mailto:editorijeess@gmail.com);  
Health and Environment Association, Tirana, Albania; E-mail: [mjedisishendeti@yahoo.com](mailto:mjedisishendeti@yahoo.com);*

**International  
Journal of Ecosystems and Ecology Science  
(IJEES)**

DOI: <https://doi.org/10.31407/ijeess>

**Volume 14/4, 2024**

DOI: <https://doi.org/10.31407/ijeess14.4>

**Table of contents:**

**Melle Ekane Maurice<sup>1\*</sup>, Colins Mesue Kome<sup>1</sup>, Kome Elvis Ngome<sup>1</sup>, Mesumbe Bernsirene Ewange<sup>2</sup>, Blandine Lenyonga Tutuwan<sup>2</sup>, Arrey-tabot Chenilie Nena<sup>2</sup>, Nkamta Eric Junior Tchek<sup>2</sup>, Ngounoun Kangmeni Bernard<sup>2</sup>, Ochiafor Nelvis Onorakwa<sup>2</sup>**, THE EFFECT OF FRAGMENTED RAINFOREST VEGETATION ON THE ADAPTATION STRATEGY OF FRANCOLIN BIRDS (*FRANCOLIN BICALCARATUS*) IN BANGEM, SOUTHWEST REGION, CAMEROON, page 1-12;

DOI: <https://doi.org/10.31407/ijeess14.401>

**Olga Tertychna**, IMPACT OF HOSTILITIES ON THE ENVIRONMENT OF THE NORTHERN REGION OF UKRAINE, page 13-16;

DOI: <https://doi.org/10.31407/ijeess14.402>

**Vladimir Korotenko<sup>1\*</sup>, Osmon Togusakov<sup>2</sup>**, ECOLOGICAL CONSCIOUSNESS AND SUSTAINABLE DEVELOPMENT: BRIDGING ENVIRONMENTAL EDUCATION WITH GREEN ECONOMY PRACTICES, page 17-24;

DOI: <https://doi.org/10.31407/ijeess14.403>

**Rajmonda Tare<sup>1\*</sup>, Ilirjana Bakalli<sup>2</sup>, Dasantila Tahiraj<sup>1</sup>**, EPIDEMIOLOGIC DATA OF COVID-19 IN CHILDREN, page 24-30;

DOI: <https://doi.org/10.31407/ijeess14.404>