

Rwanda's Biodiversity Heritage

THE CENTER OF EXCELLENCE IN BIODIVERSITY
AND NATURAL RESOURCE MANAGEMENT (COEB)

COEB MONTHLY
NEWSLETTER, VOL.009
MARCH 2021



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Welcome to our new format and monthly newsletter! We will be bringing your news about the Center each month, as well as news from our nodes and partners. As a consortium of governmental and non-governmental organizations, in a hub and spokes model, we rely on partnerships and collaborations to achieve our mission. The pandemic has taught us how to collaborate effectively across space and time. We hope you enjoy reading our news.

Beth Kaplin, Director of CoEB

In this Issue

Project Updates

Launch of Rwanda Biodiversity Information System

International Collaboration

Solve Climate by 2030

CoEB Initiatives

Capacity Building through the National Herbarium of Rwanda

CoEB Activities

Webinar: "Ground Water for Water Security in Africa, Biodiversity, Natural Resource Management and Water-energy-food-nexus"

Education and Outreach

CoEB Seminar Series reaches more people than ever

Celebrating World Wildlife Day Video: Forests and Livelihoods

Post-graduate Student Highlight

Alphonse Nzarora

News from Our Nodes and Partners

The Dian Fossey Gorilla Fund

International Centre for Research in Agroforestry (ICRAF)



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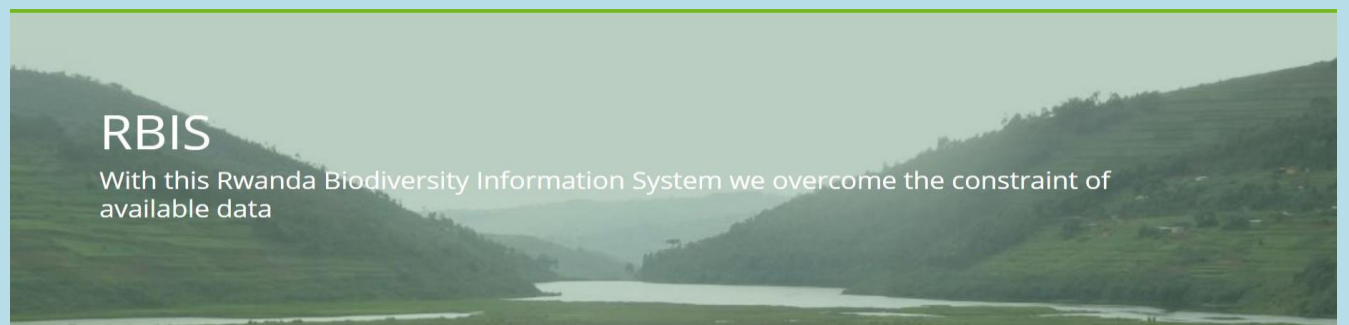
Rwanda Biodiversity Information System:

Overcoming the Constraints of Data Availability

A multidisciplinary team from the University of Rwanda (UR) that includes university academic staff and research associates from the Center of Excellence in Biodiversity and Natural Resource Management (CoEB) launched the first version of the Rwandan Freshwater Biodiversity Information System (RBIS) in March 2021 with a stakeholder workshop. RBIS is being developed to support the conservation, management and research of valuable habitats, like wetlands, and encourage the use of sustainable practices in Rwanda's freshwater ecosystems by developing bio-indicator indices to monitor the health of freshwater ecological systems. RBIS can be accessed at <https://rbis.ur.ac.rw/>

"The objective of the launch was to make the system public and start to be tested by different stakeholders, and receive feedback to improve further the system. Moreover, it was the opportunity to expose multiple challenges in the development of the system to call for a community of practice, and involve everyone to contribute to the success of the system. Some of the highlighted challenges include resistance of data holders to providing biodiversity data. The launch was virtual and the public came from different stakeholders including Governmental and Non-Governmental Organizations. Here is a story about the RBIS from a local news site: <http://www.igihe.com/amakuru/u-rwanda/article/hatangijwe-uburyo-bwo-kubika-amakuru-y-ibinyabuzima-hifashishijwe> Anyone involved in the management and conservation of wetlands in Rwanda and everyone in need of case studies and information on Rwandan freshwater systems status can now access and use the portal." - Mr Mapendo Mindje, team leader for biodiversity data management.

The system currently contains modules for dragonflies (Odonates), amphibians (Anurans, Caecilians), and invertebrates, but more are under development with the goal of creating a module for a diversity of taxonomic groups that includes mammals, reptiles, and birds. To date, the RBIS system has mobilized 831 records of dragonflies, 31,542 records of birds, 352 records of amphibians and 532 records of invertebrates. The invertebrate module which is forthcoming will comprise 534 species records and will be mobilized in late March 2021. "The Team will continue to build new modules that include plants, fish, and algae and incorporate the abiotic data such as meteorological data and water quality data to the system" said Mr. Mapendo Mindje. Moreover, the system includes interactive maps with spatial data that can intermingle with biodiversity data and help guide decisions on the monitoring of all ecosystems in Rwanda, both terrestrial and aquatic.



Solve Climate by 2030:

Fighting climate change
before it's too late



CoEB is collaborating with the Center for Environmental Policy (CEP) at Bard College, USA, to organize a webinar on climate change mitigation. This initiative was conceived by CEP under the "Solve Climate by 2030" campaign. Solve Climate by 2030 will engage more than 100,000 students globally in critical conversations about clean energy and topics related to climate change mitigation. Dialogues will focus on how transforming global energy and transportation during the coming decade can put us on the path to climate stabilization by 2030.

Why by 2030

According to the Intergovernmental Panel on Climate Change, there is only a ten-year window in which to make rapid reductions in the carbon pollution causing global warming to prevent warming beyond 3.6 degrees F. If we don't act, the destabilization of the global climate will lead to extreme weather events, droughts and floods, and sea-level rise that will devastate communities worldwide.

Why CoEB

With a mission "to enhance the knowledge of biodiversity and natural resource management for sustainable development", CoEB strives to understand, monitor, and catalogue biodiversity, ecosystem functioning, and climate change impacts and adaptation strategies. Additionally, CoEB emphasizes the value of communicating and sharing information that can guide effective conservation and economic transformation through science-driven decision making. Representing UR in this endeavor, CoEB is excited about the opportunity to help Rwanda accomplish its climate change goals.

Session 2021: Solve Climate by 2030 webinar

April 6th, 2021 from 3:00-4:30 pm, CoEB will host an online webinar focused on climate solutions, green energy, green jobs, green growth, and climate friendly transportation. [Click here](#) to register for the event.

The CEP team will begin with an introductory video which will be followed by three speakers who will each give 10-min presentations. Speakers will identify what is needed to help achieve a green economy, create and implement climate solutions, and transition fairly at the local, regional, and national level. Speakers will identify policies, solutions, and actions that individuals can take to help bring about change. The webinar will conclude with a 45-min question-and-answer session where attendees will also be encouraged to discuss getting involved with the solutions that were presented by the speakers.

WEBINAR

Solve Climate 2030

6th April 2021
3:00-4:30 p.m.

Registration link
bit.ly/30ixl9m

SPEAKERS

Egide Kalisa,
Lecturer at the University of Rwanda, Research Associate at the Center of Excellence in Biodiversity and Natural Resource Management and Postdoctoral Research Fellow at the University of Toronto

Dr. Patrice Habinshuti,
Chief Operations Officer at Envisage Rwanda

Grace Ineza,
Founder and Executive Director of the Green Fighter, a youth lead environmental NGO

Conserving biodiversity, raising awareness, and training the next generation

National Herbarium of Rwanda

[The herbarium project](#) continues to train students and young individuals in plant field collection techniques and herbarium management, which includes specimen mounting, digitalizing and databasing. On March 3rd, 2021, the herbarium team, with academic interns, collected plants from the Ruhande arboretum forest in an effort to grow and enrich the National Herbarium of Rwanda (NHR), building capacity within the country to maintain this valuable collection.

The herbarium is dedicated to the promotion and preservation of Rwanda's botanical diversity and the conservation of the country's natural resources by raising awareness about the importance of plants and the NHR ([see video here](#)). Also striving to increase international collaboration about NHR, staff member Raymond Umazekabiri gave a [presentation](#) in an international online [symposium](#) in February 2020 to expand the visibility of the herbarium and gain support for its activities.



Strategic Planning for Herbaria:

Course led by The Society of Herbarium Curators and iDigBio

The National Herbarium of Rwanda (NHR) was selected to participate in "Strategic Planning for Herbaria", an online course offered by The Society of Herbarium Curators and iDigBio. For 8-weeks, beginning March 23rd, 2021, herbarium staff will work closely with experts to develop a strategic plan for NHR that will articulate the vision, mission, values, stakeholders, strategies, goals, and objectives of the herbarium. In addition, CoEB hopes this course will build capacity of passionate Rwandan individuals working in the herbarium to bring this plan to life.

CoEB Seminar Series Reaches New Heights



The CoEB Seminar Series like so many other activities that usually require in-person gathering was shifted online in 2020 due to the Covid-19 pandemic. Excitingly, however, the new online platform has reaped unexpected benefits by increasing attendance and allowing for international accessibility that permits individuals from around the world to participate.

From January – March of this year we hosted numerous individuals through this platform who have covered a diversity of topics. For example, Anders Pedersen from the Rwanda Tree Seed Center spoke about Forest Thinning and Relative Spacing in his talk “How to Assess, Decide, Quantify, Time, and Control Tree Thinning”. Dr. Marc Johnson, Director of the Centre for Urban Environment at the University of Toronto – Mississauga, Canada talked about the importance of preserving and enhancing nature in the ‘urban jungle’. Richard Nasasira, Principal of IPRC Kitabi, highlighted Biodiversity Business Innovations based on his Masters research. Dr. Tammie Matson, Founding CEO of Matson & Ridley Safaris based in Australia, talked about “Combining Tourism, Technology & Field Techniques to Understand the Elephant Population of Akagera National Park, Rwanda”. Deogratias Tuyisingize, Biodiversity programmes manager at Karisoke research center, presented a chapter of his PhD research on the status and distribution of golden monkeys in Rwanda. Chacal Prosper Iradukunda is a fresh graduate from UR leading the Man and Biosphere (MAB) youth network in Rwanda and explained about MAB youth activities and Biosphere reserves during his presentation.

The series also sponsored talks about data availability and useful tools for scientists. Dr. Tracy Teal, Executive Director of Dryad in USA, highlighted the importance of data sharing and accessibility, expressing that “data is the foundation of research, and effective data publishing is key for understanding, accessing and advancing research to address challenges in science and society”. The Dryad Digital Repository (<https://datadryad.org>) is a researcher-led general-purpose repository providing curation and publishing of open research data. Built on the principles of open scholarly infrastructure and integrated with the scholarly literature, Dryad publishes more than 7000 datasets per year and works to advance open data sharing.

We were also lucky to host a group of researchers from the Society for Conservation Biology (SCB) that included Israel Borokini, Dr. John A. Cigliano, Badru Mugerwa, and Nate Spillman. The group discussed the upcoming International Congress for Conservation Biology which will be held in Rwanda from 12-16 December, 2021. They provided in depth information about SCB and the Africa section of the Society. Following this talk, >20 individuals associated with CoEB expressed interest to joining the Society and creating a Rwandan chapter.

Video recordings of the CoEB Seminar Series can be accessed here:

<https://www.youtube.com/channel/UCdr8ykoxB00DI7ywxpvBuWA>

Forests and Livelihoods:

Forest Conservation and Community Development in Rwanda



Every year, CoEB tries to acknowledge international events related to its mission through public lectures, social media posts, videos, and radio shows. In honor of World Wildlife Day, held on 3 March 2021, the CoEB communications team created a celebration video that compiled recorded video messages from the director of CoEB, Beth Kaplin, and Research Associates. Content of the video related to the use and value of forests for human well-being and the long-term conservation of forests in Rwanda. In the video, Prof. Beth Kaplin discusses ongoing efforts focused on the conservation and sustainable use of forest resources and biodiversity, as well as the millions

of livelihoods that directly depend on forests, particularly local communities who are often the guardians of these ecosystems. Other speakers in the video included Andrew Kibogo, a research associate at CoEB and academic staff in College of Agriculture, Animal Sciences and Veterinary Medicine (CAVM), who focused on forest wildlife management models and practices that accommodate both human well-being and the long-term conservation of forests in Rwanda. Peter Rwibasira, research associate at CoEB and academic staff in College of Science and Technology stated that no sustainable development is possible without protecting the environment. Nathan Taremwa, from CAVM, discussed the importance of traditional knowledge and how it can help efforts dedicated towards ecosystem restoration and sustainability.

See the video at: <https://www.youtube.com/watch?v=rW9Y7G3LUdg>

Upcoming CoEB Event



EARTH DAY 2021

April 22nd

“Restore Our Earth”

The Embassy of Israel in Rwanda and the Center of Excellence in Biodiversity and Natural Resource Management at the University of Rwanda will join together to celebrate Earth Day 2021, focusing on the rich plant diversity of Rwanda and the role of the National Herbarium of Rwanda (NHR) to help protect this national heritage. This 2-day event will include a plant collection fieldtrip to Nyungwe National Park and an herbarium training course at NHR.



Internship Learning Assessments:

Practice Makes Better!



As part of the CoEB mission is to build capacity within the young Rwandan generation to enhance knowledge about biodiversity and natural resource management for sustainable development, we try to provide our interns with professional experiences that can make them more competitive in the job market. To achieve our objective and support our graduating interns moving forward in academia and professional environments, we increased the number of skill-based trainings we offered to them based on their own recommendations. Since March 2021, our interns have received training in field techniques, the use of GIS and the Mendeley citation software, report writing, and data analysis. We also started a new activity where academic interns give short presentations upon the completion of their internship about their experience working in CoEB, the projects they worked on, and the skills they gained. The purpose of these presentations is to help interns gain professional experience and help improve the internship program.

Belise Niyonzima, a student from Protestant Institute of Arts and Social Science (PIASS) who interned at the herbarium, commented that attending the Seminar Series has pushed her to think more critically about her studies and the development of her own research project in the future. She said: "I have gained more skills and experiences from different presenters and this will help me to write my memoir". Another student from PIASS, Ange Isabelle Tuyizere, in response to being asked about the skills she gained that may help her find a job, said the information she gained about different species helped her create a botanical garden that she hopes can bring her money. And yet another student, Ange Sandrine Iradukunda, a student from Institut Catholique de Kabgayi (ICK), said she found the Mendeley training particularly helpful for writing her thesis.

Post-graduate Highlights: Alphonse Nzarora

Studying algae as bioindicators of water quality in freshwater ecosystems



Meet Mr Alphonse Nzarora, an assistant lecturer at UR where he has been working in the Biology department since 2011. He received his MSc in Biodiversity and Natural Resource Management at UR and is now a PhD student studying "*The relationship between land use, water quality and diatom diversity in the Akagera river and wetlands system, Rwanda*", a project funded by the African Research University Alliance (ARUA).

Why did you choose wetlands as your study area?

Wetlands play an important role in ecosystem nutrient cycling, carbon storage, water purification and supply, and flood protection. Yet, despite this importance, wetlands in Rwanda are threatened by anthropogenic activities that cause pollution and degradation. Eutrophication, resulting from excessive algae growth, is the leading threat to the Akagera River and wetland system. In this way, algae are recognized as useful bioindicators of pollution in aquatic habitats.

What problems does your research address regarding wetland conservation in Rwanda?

Nowadays, while Rwanda is investing in wetland restoration and climate resiliency, my study seeks to answer the question of how land use effects the physicochemical parameters of water and algae diversity in the Akagera River wetlands, as well as the potential use of algae as bioindicators of water quality. Data on algae diversity is currently scarce for wetlands and rivers in the region, which is a critical gap that limits our understanding of freshwater ecosystem functioning, the effectiveness of restoration efforts, and the impacts of management and policy decisions. Information on algae diversity can help guide effective sustainability measures in Rwanda to support important ecosystems services needed for economic transformation goals.

Why did you choose to study algae as bioindicators?

Algae are found in many freshwater environments including lakes, rivers and wetlands. As they play an important role in wetland functioning, they can serve as helpful indicators of wetland integrity. Various organisms are shown to be sensitive to hydrological changes, such as macroinvertebrates, fishes, and macrophytes, and have been used for biomonitoring around the world, but diatoms (a major group of algae) are reported to be the most suitable for assessing the chemical status of water bodies. For example, diatoms are shown to be extremely sensitive to nutrient and organic matter contamination. Moreover, diatoms can help assess water quality changes during a short timeframe because of their quick response to environmental change, species diversity, and wide range of ecological tolerances, making these organisms powerful indicators regarding the impacts of land use activities. Due to the importance of algae, especially diatoms, for environmental monitoring, I would like to invest more effort in studying and inventorying species presence and diversity across Rwandan rivers and wetlands.

African Research University Alliance (ARUA) Webinar

Ground water for Water Security in Africa, Biodiversity, Natural Resource Management and Water-Energy-Food Nexus

As part of the grant awarded from ARUA to CoEB to support postgraduate students, CoEB staff attended a webinar entitled "Ground water for Water Security in Africa, Biodiversity, Natural Resource Management and Water-Energy-Food Nexus". This webinar was organized under the framework of UNESCO Programmes, whose activities are intended to strengthen Member State capacity to respond to water security. Participants discussed how to develop and implement evidence-based groundwater policy and practices in Africa in order to improve the livelihoods of people and communities.

News From Our Nodes & Partners: The Dian Fossey Gorilla Fund International (DFGFI)

Celebrating United Nations World Wildlife Day

DFGFI implements conservation education programs in 17 primary and 10 secondary schools around mountain gorilla habitat in Rwanda. On March 3, 2021, 400 children from eight secondary school environmental clubs joined the Fossey Fund in celebrating

World Wildlife Day with a drawing competition that reflects the UN World Wildlife Day theme: "Forests and livelihoods: Sustaining people and planet." The DFGFI jury selected three winners—Kampanga school, Ruhengeri Islamic school and St. Vincent Muhoza school— that each

received school materials as a prize. The best drawing from Kampanga school illustrated sustainable cooking alternatives to cutting down trees.



Large mammal survey in Volcanoes National Park

The protection of great apes and their habitat can have direct and indirect benefits for other species as a result of reduced human activities. As part of a monitoring effort focused on species living sympatrically with mountain gorillas in Volcanoes National Park, DFGFI's biodiversity team recently completed a survey counting one of the most obvious signs of animal presence, its dung. While future analyses will provide more in-depth insight, initial estimates of large mammals in the Park suggest an increase of buffalos, elephants, bush-buck, and duiker since the previous count in 2008, which is in line with the observed increase in gorilla numbers over the same time period.



News From Our Nodes & Partners:

International Centre for Research in Agroforestry (ICRAF) Rwanda

Sustainable Management of Agricultural Landscapes



The presence and diversity of trees on farms plays a critical role in the ecological functioning of agricultural landscapes. To ensure the conservation of biodiversity in the country, ICRAF Rwanda seeks to foster the sustainable management of agricultural land. Through the use of a biodiversity monitoring tool used on farms, data were collected on birds, arthropods, and trees in the Gishwati-Mukura landscape and Nyungwe National Park and its surrounding districts of Nyaruguru and Nyamagabe. In order to increase the pace and scale of restoration efforts based on trees on farms, and improve land health and livelihoods, biodiversity assessments within the agroforestry systems of Kirehe and Nyagatare districts were also initiated in March 2021. Preliminary

results from Gishwati showed that 76 tree species (52.6% indigenous to Rwanda) were recorded, 60 of which were present in farmland. Additionally, 163 bird species and arthropods from 42 families were documented. A positive relationship was shown between the species richness of trees on farms and bird species richness. To better inform the sustainable management of farmland, further data analysis and write ups are underway.

The Government of Rwanda is committed to Centers of Excellence that will ensure research is available to meet national data needs for evidence-based decision making. University of Rwanda hosts several Centers which drive academic research and innovation in support of policy and management. The CoEB was formally established at University of Rwanda in 2016 and works across Colleges, Schools and departments. It engages with environmental scientists, biologists, social scientists, policy scientists, gender experts, ecological economists, anthropologists, chemists, pharmacists, molecular biologists, foresters, agronomists, climate scientists, and many others. We work with youth and seniors, with government and private sector, communities, NGOs and international partners to meet our mission.

We are developing opportunities for youth and junior staff to gain experience, we provide data for decision-makers, we are creating an academic/research culture, and making it pleasurable. We are creating a dynamic and welcoming atmosphere for academics and practitioners, we want science and research to be enjoyable and rewarding, and we are driven to contribute to sustainable development goals and achieving climate resiliency.