

SUSTAINABLE VISION JOURNAL



Summer 2024 - Edition 2

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**JACQUELYN JUSTINE
SANDERS FOUNDATION**
BUILDING VISION, REALIZING CHANGE



*Environmental Spotlight:
The Wetlands of the
Chesapeake Bay Maryland*



*Modular design for Scalability
the Grüner Würfel in
Bielefeld, Germany*

THE GARDEN OF EDEN PROPOSAL

*(Storm)Water Management
via constructed Wetlands
for Drinking Water & Ecology*



Sustainable Vision Journal

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Issue 1 Number 2

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JJSF - BUILDING PARTNERSHIPS

Eden Reforestation is a non-profit organization that focuses on reforestation efforts in impoverished communities around the world. Their mission is to reduce extreme poverty and restore healthy forests by employing local villagers to plant trees. This creates sustainable jobs, helps combat climate change, and restores ecosystems.



Eden
Reforestation
Projects



Planungsbüro Coman is a small engineering office, located in Lower Saxony, Germany. The design team provides planning support for local home and business owners - with specialization around technical planning for building infrastructure.

The **Sawyer Foundation** provides clean water to communities in developing countries through Sawyer's water filters and bucket systems. These are saving lives all over the world by combining our water filters with the tubing and accessories needed to convert a 5-gallon bucket into a low-cost and long-lasting gravity water filtration system

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The **University of Antananarivo**, located in Madagascar, is the country's oldest and largest university, offering a wide range of academic programs in various fields of study. Known for its strong focus on research and higher education, the university plays a significant role in the development of skilled professionals, as well as contributing to the advancement of knowledge and innovation in Madagascar and beyond.

The **Ecole Supérieure Polytechnique d'Antananarivo (ESPA)** is a prestigious engineering school located in Antananarivo, Madagascar. Known for its rigorous academic programs and focus on technical education, ESPA offers a variety of engineering disciplines to its students. The school aims to produce highly skilled engineers who can contribute to the development and innovation within Madagascar and beyond.



The **Université de l'Itasy** in Madagascar is renowned for its vibrant research program in water engineering. Situated in the heart of Madagascar, this university is dedicated to advancing knowledge and innovation in water engineering to address critical challenges related to water resources and sustainability.

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LETTER FROM THE EDITOR

Dear beloved Readers,

**“Central to our ethos is
a deep reverence for
ecological diversity”**

As we embark on the Summer edition of the Sustainable Vision Journal, I'm filled with a profound sense of gratitude for the journey we're undertaking together. With each issue, we reaffirm **our commitment to envisioning a better future** and actively working towards its realization through cooperation and collaboration.

At the heart of our mission lies the belief that by fostering partnerships, particularly with educational institutions like universities, we can harness the power of collective intelligence to address the pressing challenges of **our time**. Universities serve as crucibles of innovation and learning, where ideas are nurtured and transformative solutions take shape. Through our collaborations with these institutions, we strive to leverage their expertise and resources to propel us closer to our shared **vision of a sustainable world**.

Central to our ethos is a deep reverence for **ecological diversity**. We recognize that the health of our planet is intricately linked to the diversity of life it sustains, and we are steadfast in our dedication to preserving and protecting this precious tapestry of biodiversity including both flora and fauna. Our commitment extends beyond borders, as we actively **engage with communities in the developing world to co-create solutions** that address their unique challenges while honoring their cultural and ecological heritage.

Inspired by the example set by our mother Jackie, who demonstrated that even the humble art of crocheting could be a tool for helping others, the Jacquelyn Sanders Foundation carries forward her legacy of compassion and innovation. We embrace her spirit of creativity and resourcefulness as we seek out new ways to **make a positive impact on the world around us**. We simply seek to do what we are able with what we have been given. As that spark of good which lives in each of us urges action - we seek to answer it with Yes.

As we delve into the pages of this issue, may we be inspired by the visions of innovation, collaboration, and ecological advance that grace its pages. May we find hope in the collective efforts of individuals and organizations striving to make a positive impact, no matter how daunting the task may seem.

I invite you to join us on this journey of exploration, discovery, and action. Together, let us envision a future where sustainability is not merely a goal, but a way of life—a legacy we can be proud to pass on to future generations.

Kenneth D Coman Sr.

With gratitude and determination,
Ken Coman
Sustainable Vision Journal
JJSF

jjs JACQUELYN JESTINE
SANDERS FOUNDATION
BUILDING VISION, REALIZING CHANGE



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a Future for the next
generation ... is worth
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JACQUELYN JESTINE
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Creating a **SUSTAINABLE VISION** via **Engineered Solutions**

Erica RAKOTOMALALA
JJSF Fellowship 2024, Water Recycling Team



Scalability Goals

In the dynamic landscape of technology and business, the concept of scalability has become progressively crucial. Scalability refers to the ability of a system, network, or process to handle growing amounts of work, resources, or users efficiently.

Scalability goes beyond just accommodating growth; it involves creating solutions that can adapt, expand, and evolve over time while maintaining effectiveness and efficiency.

Scalable design encircles various disciplines, including architecture, software development, product design, and more.

Scalability then aims to address the challenges of variance in demand, or a change in demand. Designers can reduce unpredictability by offering flexible and adaptable designs.

Designing for Scalability allows easier eventual re-use of a working model to the demand of a new similar need situation.

Case Study in Design “Grüner Würfel”

In Bielefeld, Germany, a building called the “Grüner Würfel” or the “Green Cube” was constructed with novel characteristics.

This unique building sports creeping ivy plants on all sides - by design. The center of the “Green Cube district” of Bielefeld is located on the Kesselbrink. It is a hip corner of the neighborhood.

Community Center

This green building offers a wide range of possibilities. There are regular activities and events such as mobile games, dance activities for teenagers and young adults, yoga classes, painting classes, networking meetings and much more.



Good Design should be refined and improved

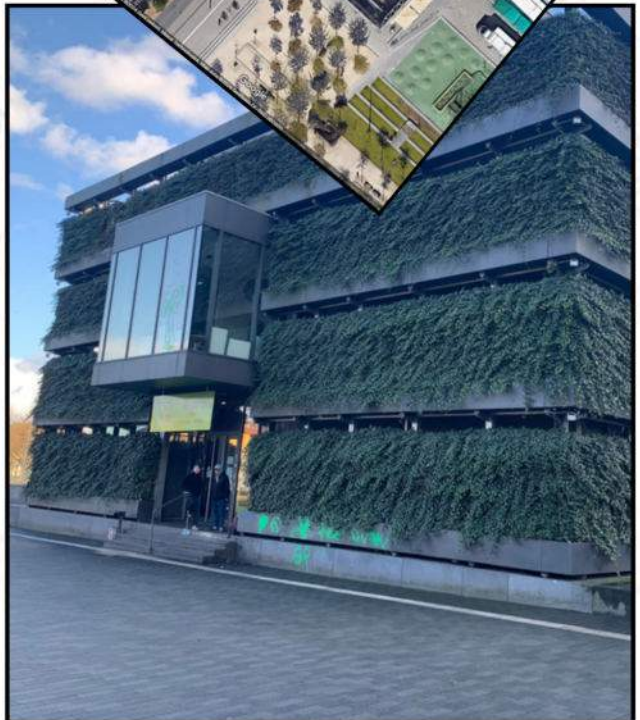
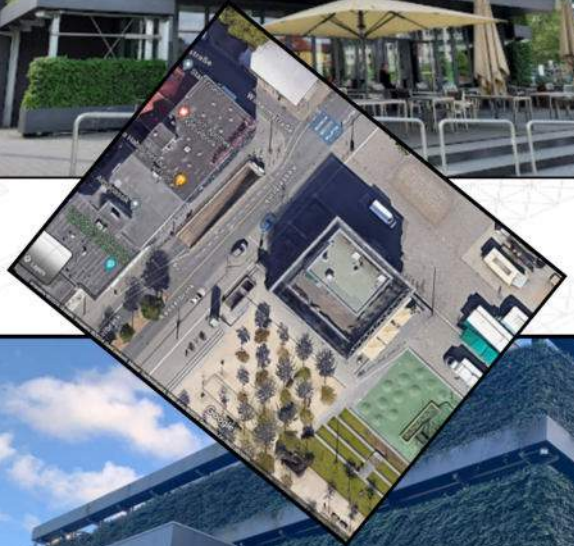
The concept of the "Green Cube" could and should be enhanced. For instance - by substituting groundcover like ivy with food crops - would that improve the result dramatically? Indeed, incorporating food production or flowering elements right onto the walls of buildings or houses is feasible and proven in this example.

By utilizing integrated planters within the structure for plants, a variety of creeping living walls such as grapevines, passion fruit, strawberries, or other desired food crops can be cultivated indoors or outdoors. This fusion of nature and practicality creates an ideal combination for a delightful living experience. Imagine the beauty of a plant cascading across your wall while simultaneously enjoying the fruits it bears.

This is where the Green Cube meets Scalability. This building could and should be scaled to other uses. The idea is worthy of rebuilding and improving.

Maintenance Efficiency

The wall plantings could thrive on water collected from the roof or even from groundwater. A photovoltaic system could be integrated with pumps to automatically irrigate the plantings integrated with the outer walls.





Integrated **Water management** offers an enhanced benefit of promoting plant growth while providing an innovative approach to reducing water needs from the local municipality.

In regions where infrastructure is lacking - Water independency is also quite an achievement. With such a building that strives to retain and recycle the rain that falls upon it - the possibility of water autarchy begins to look very promising.

Engineering Mandate

Engineers need to identify designs of merit such as the Grüner Würfel and refine and improve those plans - especially where Modular Planning is possible.

It would be a productive exercise to scale this working planning to alternative sizing and uses. Scaling could allow a broad audience to implement this concept at their desired location.

Fellowship Implications

The fellows in the Jacquelyn Jestine Sanders Foundation are working on water management for a green Madagascar. Several disciplines are demanded for this project such as wastewater treatment or recycling, storage, filtration, and capturing rainwater.

Scaling the “Grüner Würfel”

The concept of scalable design is exemplified by the creeping plants on the walls, A simple design decision that is making nature accessible to anyone utilizing such a building, whether it is built as a large office building or a small Green Cube house.

Modular Design

A key goal of the JJSF Fellowship Water Infrastructure Design Project is establishing scalable designs for each infrastructure component (or “Module”). These Module designs set the stage for implementations of scaled systems under varying circumstances or demands.

Using scalable design in the JJSF fellowship is opportune because the designs that the Fellows will show could be re-used and resized on any site that may need a similar concept or design. Clean scalable design will make this rescaling work easier later.

The Foundation is seeking to build modular, scalable designs that can be used not only at the University - but all across Madagascar. The Fellows should take the resulting plans and their experience out to the West and to the South .. and manage Water!

Scalable designs are built with flexibility in mind. They consist of modular components or elements that can be easily modified, replaced, or expanded without disrupting the overall functionality.

By separating the design factors and functionalities into independent modules, designers can scale specific parts of a system or product as needed, without a need to redesign the core structures.

A perfect example is the reduction of a large Water Infrastructure need, like that on the University Campus. We are breaking the large problem into “Design Chunks” which even a few dedicated Graduate Students can Analyze and solve with some professional support. i.e the Fellowship Program.

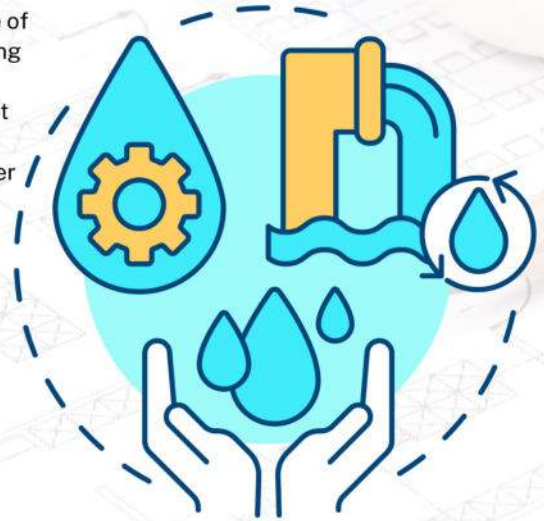
“Our assertion is that by designing Modules with scalability as a planning factor, we will raise significantly the value of our Engineering results”
- JJSF, Kenneth Coman

Optimized Cost Efficiency

In today's competitive and cost intensive economic environment, change is inevitable. We could have new needs arise in the middle of our project or a customer may want something to be changed because of many factors and circumstances. Scalable designs are resilient to change and can seamlessly adapt to evolving requirements, technologies, and user needs.

Whether it's accommodating new features, requiring additional services, or supporting different sizes of water demand, scalable solutions can easily incorporate changes without demanding extensive redesign or redevelopment.

Ideally - scalable design is more **Cost-Effective**. This Cost-effectiveness arises by optimizing resource utilization and minimizing overhead associated with scaling a re-design. By adopting cloud-based infrastructure, virtualization, or distributed computing techniques, organizations can scale their operations efficiently without incurring unnecessary expenses.



Additionally, scalable designs often offer a **pay-as-you-go** model, allowing businesses or universities to scale resources according to demand, thereby reducing upfront investment in Modules of Infrastructure. We are even sizing the operational costs. Parallels can be drawn in the water management sector as well.

For the case of Wastewater Filtration Systems, scalable design principles can be applied to wastewater treatment plants and filtration systems. By incorporating modular components and flexible infrastructure, these systems can be easily expanded or upgraded to accommodate increasing wastewater volumes or stricter water quality standards.



Thank you to the Designers and Investors in the Grüner Würfel. Your work has been an inspiration to us for good design that warrants a few more iterations of improvements for the future.



Automated monitoring and control systems enable real-time adjustments to optimize filtration efficiency and minimize energy consumption.

Scalable wastewater filtration systems ensure that communities can effectively manage and treat wastewater without overburdening existing infrastructure.

On the other hand, scalable design principles are also essential in rainwater harvesting and storage systems, which capture and utilize rainwater for various purposes, including irrigation, landscaping, and potable water use.

Scalable rainwater harvesting systems consist of modular storage tanks, filtration units, and distribution networks that can be customized to meet specific water demand requirements. Lagoons are another definite possibility.

Scalable rainwater harvesting solutions can be implemented at varying scale, from individual households to large commercial or institutional buildings, providing flexibility and adaptability to varying water management needs.



Focus on Sustainability

In the era of climate change and environmental awareness, scalable design also encompasses sustainability considerations. Designers strive to minimize the environmental impact of products, services, and infrastructure by incorporating energy-efficient technologies, optimizing resource utilization, and adopting eco-friendly practices. Scalable design solutions prioritize sustainability, ensuring that scalability does not come at the expense of environmental degradation or resource depletion.

Scalable design is - for JJSF - about designing in a way so that the resulting plans can easily be fitted to a new site specific demand. We are planning once for many different sites. This is asserted as highly efficient modular planning for the [developing] world.



A big Thank you to the local Universities of Madagascar for their support of the Jacquelyn Jestine Sanders Foundation Fellowship Program.



Principal Author
Erica "JoJo" RAKOTOMALALA



Layout, Editing & Commentary
Kenneth Coman

Modular, Scalable & Sustainable

In conclusion, scalable design represents a mind shift in how we proceed toward the creation of systems or products. By embracing flexibility, adaptability, cost-effectiveness at the design stage - designers can develop sustainable solutions that can grow and evolve alongside the ever-changing demands of the modern [developing] world. As technology continues to advance and business landscapes evolve, scalable design can play an increasingly vital role in shaping the future of innovation and progress where varying demand exists as barriers for development.

Let us encourage each and every fellow of the Jacquelyn Jestine Sanders Foundation Fellowship for the important and valuable work that they are doing. We seek, through this project, to realize a better future!

UNIVERSITY TREE CONSERVANCY

Botanical Garden



Luc RAKOTOARIVELONIRINA
JJSF Fellowship 2024, Lagoon Earthwork & Wells Team



Panoramic view of a lush forest section in the Botanical garden of the University of Ankatso

Preservation of Madagascar's Precious Trees

Madagascar, this island renowned for its incredible biodiversity, has unfortunately lost nearly 44% of its forests over the past 60 years, according to the International Union for Conservation of Nature (IUCN). Among these unique forests in the world are precious tree species such as *Dalbergia* (rosewood) and *Diospyros* (ebony), which today are endangered due to massive deforestation caused by illegal exploitation, fires, and the production of charcoal for cooking.

Faced with this unprecedented loss, a preservation project was born at the botanical garden of the University of Antananarivo in Ankatso, aiming to conserve these unique plant species through innovative propagation techniques. At the heart of the Department of Plant Biology of the Faculty of Sciences, this botanical garden has taken on the mission of protecting and regenerating endangered precious tree species.

Rosewood and Ebony

Among the rich diversity of tree species in Madagascar, the *Dalbergia* and *Diospyros* genera are of particular importance. The *Dalbergia*, commonly called rosewood, as well as the *Diospyros*, known as ebony wood, are rare and precious essences, highly coveted for their exceptional wood. Their natural beauty and remarkable qualities make them choice materials for making musical instruments, fine furniture and art objects.

Unfortunately, illegal overexploitation, devastating fires and intensive charcoal production have led to an alarming depletion of these trees in their natural habitats.

Their very survival is now gravely threatened by rampant deforestation. Faced with this unprecedented ecological crisis, the botanical teams of the Ankatso garden are determinedly working to reverse this trend by implementing innovative cloning programs. Their primary objective is to sustainably regenerate these unique species so that they can once again thrive, thus ensuring the perpetuation of an inestimable natural heritage for future generations



Green rosewood



Green ebony (*diospyros baronii*)

ADVANCED TREE CLONING

Air layering: A key conservation method?

air layering, an asexual vegetative propagation technique, is a key method used in the botanical garden to ensure the conservation of precious species. This ingenious approach allows faithful reproduction of a mother plant without resorting to seedlings, thus ensuring that the new generation is genetically identical and inherits the desirable characteristics.

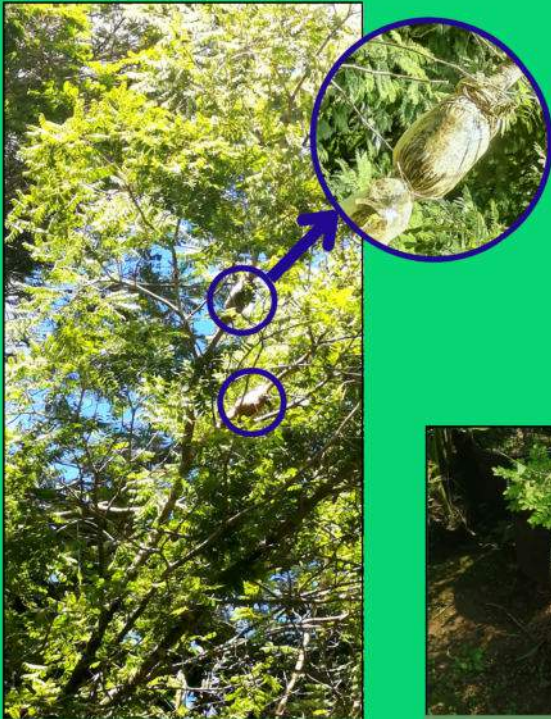
In contrast to terrestrial layering practiced on buried stems, air layering is carried out on branches exposed to open air.

This method offers a remarkably high success rate, proving particularly valuable for the multiplication of species that are difficult to reproduce by germination or have slow growth rates, such as the coveted rosewoods and ebonies.



Wrapping around the air layering zone of a rosewood branch

The process begins with the careful selection of a healthy and vigorous branch on the mother plant. A portion of the bark is then carefully removed to create an area conducive to rooting. This denuded zone is wrapped in a moist substrate, often composed of sphagnum moss or wood shavings, the whole being covered with a plastic film to maintain the necessary humidity. After a few months of patience, roots emerge from this area, allowing the new shoot, now an autonomous layer, to be gently separated and nurtured until fully mature



Air layering on a rosewood's branch, highlighted in blue



Rosewood air-layered cutting thriving independently from its parent plant

THE UNIVERSITY OF ANTANANARIVO SAFE HAVEN FOR PRECIOUS TREE SPECIES

At the heart of the University of Antananarivo, on the Ankatso campus, a devoted team of botanists is waging a fierce battle to safeguard the precious essences of trees unique to the world that Madagascar harbors, threatened with extinction. Their weapon? Remarkably ingenious plant cloning techniques such as air layering and cutting propagation. Thanks to these methods, they manage to faithfully regenerate these rare species, identically reproducing their invaluable genetic characteristics. Each new shoot thus represents a victory against the dramatic loss of this exceptional biodiversity.





A BIOLOGY TEAM DEDICATED TO TREE CONSERVATION

Driven by an unwavering passion, these seasoned scientists combine rigor, expertise, and dedication to multiply coveted essences such as rosewood and ebony from mother plants on the brink of extinction. Under the expert direction of Dr. Aro Vonjy, and in partnership with the Jacquelyn Jestine Sanders Foundation chaired by Kenneth Coman, they have implemented innovative projects for the sustainable management of the campus' wastewater, allowing it to be recycled for irrigating the greenhouses and botanical plots.

By perpetuating these unique plant wonders, the team from the University of Antananarivo is passing on a precious legacy to future generations, kindling hope for the rich Malagasy biodiversity to be reborn in all its splendor. Their enlightened devotion illustrates the path towards harmonious coexistence between Humans and Nature on this island of exceptional natural treasures.

ADVANCED TREE CLONING

Propagating through Cuttings

In addition to air layering, taking cuttings is another asexual vegetative propagation technique frequently employed at the botanical garden as part of efforts to conserve precious plant species. This skillful method involves taking a living part, such as a stem, branch or leaf, from a mother plant, and rooting it to generate a new genetically identical individual.



A flourishing ebony cutting displaying its health and vigorous growth, showcasing the effectiveness of propagation through cuttings.

Taking cuttings is particularly suitable for regenerating woody species such as rosewoods and ebonies, thus offering a promising way to ensure their perpetuation. The meticulous process begins with a rigorous selection of the segments to be cut, favoring vigorous semi-woody or herbaceous shoots with healthy buds. These cuttings are then carefully trimmed, keeping only an optimal number of leaves, before being dipped in a hormone solution that stimulates root formation.

Once prepared, the cuttings are delicately planted in a light, moist and well-drained substrate, generally composed of a carefully dosed mixture of peat and sand.

The top portion of the cutting without roots is separated and transferred to be placed under a greenhouse, a confined environment where humidity conducive to rooting prevails. Regular but measured watering is essential during this critical phase, which can last for several weeks.

When the young shoots are firmly rooted, they can finally be individually repotted, thus beginning a new stage of their development towards maturity.



Young cutting of an ebony tree (*Diospyros pervilleana*)

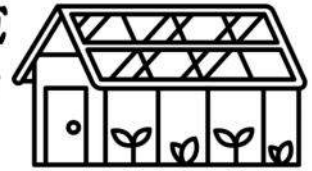


Cuttings undergoing root development phase, cultivated in a shaded plot to promote optimal growth conditions



THE GREENHOUSE

The Magic of Greenhouses for Regenerating Rare Plants



The strategic utilization of greenhouses plays a pivotal role in the success of cutting and air layering techniques employed at the botanical garden. These ingenious structures, veritable plant incubators, facilitate the recreation of an optimal microclimate, ideally suited for promoting root development and the establishment of cuttings and air-layers derived from sometimes delicate species.



Air-layers and cuttings undergoing critical rooting phase, meticulously cultivated in the confined greenhouse environment for precise control of humidity and temperature levels. Recording of 38°C at 2:27 PM inside during the visit on March 14, 2024.



Misting irrigation system for cuttings and air layers

The greenhouse aimed at the botanical garden comprises a transparent plastic enclosure located outdoors. Its main advantage lies in its ability to maintain high and consistent humidity levels around the developing plants. This moderate humidity prevents detrimental desiccation of the tender shoots during the critical rooting phase. A misting or fog irrigation system provides precise and uniform irrigation, essential for the cuttings without disturbing the delicate rooting substrate. The water is finely atomized into minute droplets, mimicking a natural drizzle, in order to delicately moisten the substrate and shoots without damaging them.

Beyond regulated humidity, mini-greenhouses also engender a gentle greenhouse effect by trapping thermal energy, thereby maintaining temperatures slightly elevated relative to the external environment. This privileged microhabitat actively stimulates growth of cuttings and air-layers, particularly those originating from tropical species such as precious woods. Regular monitoring and adjustments of aeration, shading, and irrigation are imperative to preclude the proliferation of undesirable molds, while concomitantly providing optimal conditions conducive to the emergence of this nascent plant life.



New greenhouse under construction



WATER MANAGEMENT CASE STUDY

Case Study in Water Management in an expansive metropolitan area, composed of millions of households in Africa - Nairobi, Kenya.

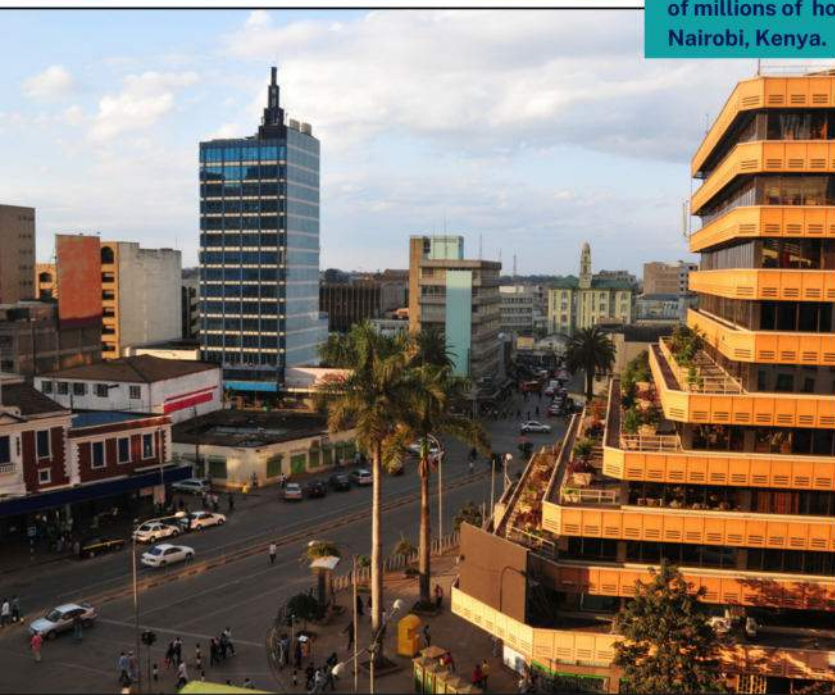


Image credits: Canva Stock

NAIROBI

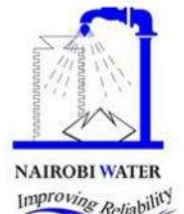
Nairobi is an expansive metropolitan area, composed of numerous households. Within these households, everyday activities such as cleaning, cooking, showering, waste disposal among many other domestic water applications occur. Furthermore, Nairobi houses numerous industries, which are prone to release waste.



Image credits: NCWSC

N.C.W.S.C.

Nairobi City Water and Sewerage Company
Head Offices



Water & Wastewater Treatment in Kenya



By Jeffrey Kibe
International Correspondent, Kenya



Image Credits: Google Earth Pro

DANDORA, KENYA WASTEWATER TREATMENT PLANT

Dandora Estate Sewerage Company treats about 120,000 cubic meters of waste water daily, but has a capacity of 160,000 cubic meters. Physical treatment is the initial process, which involves passing the waste water through a series of screens to filter out cloth, plastics, and paper, which would cause clogging and machine damage. Next, the water undergoes biological treatment within anaerobic ponds, for a period of 5 days, which reduces anaerobic bacteria by 60%. Over a period of 35 days, both anaerobic and aerobic bacteria are used to further reduce the organic load in the facultative ponds. Finally, maturation ponds, allow for sunlight to penetrate the water and eliminate pathogens such as E-Coli. Monitoring is done daily to check waste water quality at different stages from the intake to the outflow.



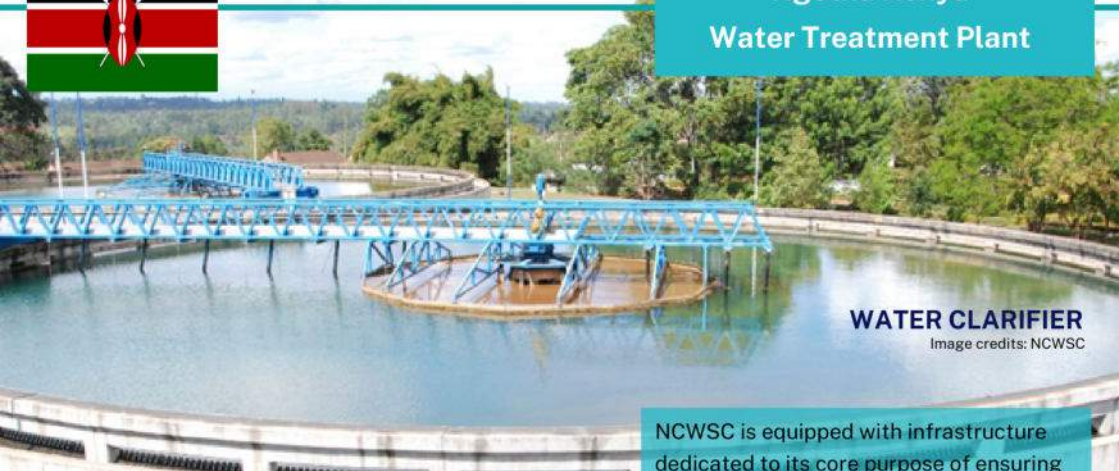
Image credits: Sustainable Sanitation Alliance

**Water Inlet Distribution
Channels, Dandora treatment
plant**

Water Management Case Study



Ngethu Kenya Water Treatment Plant



WATER CLARIFIER

Image credits: NCWSC

NCWSC is equipped with infrastructure dedicated to its core purpose of ensuring Nairobi residents receive water and sewerage services at affordable rates and within government regulations. The company's infrastructure is scattered across various locations within the central region, Kenya. For waste water treatment and disposal, dedicated plants namely; Dandora Estate Sewerage Treatment Plant and Kariobangi Sewerage Treatment works are stationed at Ruai and Outering road respectively, while for water treatment, the company has stationed water treatment plants at Ngethu, Sasumuwa, Kabete, and Kikuyu Springs. Within these treatment plants, there exist frameworks for auditing the processes applied in both the treatment of water and waste water. The process adhered in either scenario differs in that one is aimed at removing waste and pollutants and releasing water back into the ecosystem through the Nairobi River, whilst the other, is aimed at ensuring Nairobi residents receive clean and safe water that adheres to the quality standards proposed by the world Health Organization guidelines.



AERIAL VIEW OF NGETHU TREATMENT PLANT

Image Credits: Google Earth Pro



NAIROBI RIVER

Image credits: Visualisation via Canva - Nairobi River



Waste Water Treatment Process

Waste water treatment at both plants is done through both physical and biological processes to extract solids, remove pollutants, and break down organic waste matter. Dandora Estate Sewerage Company treats about 120,000 cubic meters of waste water daily, but has a capacity of 160,000 cubic meters. Physical treatment is the initial process, which involves passing the waste water through a series of screens to filter out cloth, plastics, and paper, which would cause clogging and machine damage. Next, the water undergoes biological treatment within anaerobic ponds, for a period of 5 days, which reduces anaerobic bacteria by 60%. Over a period of 35 days, both anaerobic and aerobic bacteria are used to further reduce the organic load in the facultative ponds. Finally, maturation ponds, allow for sunlight to penetrate the water and eliminate pathogens such as E-Coli. Monitoring is done daily to check waste water quality at different stages from the intake to the outflow.



KARIOBANGI TREATMENT PLANT, PERSPECTIVE VIEW

Image credits: NCWSC



Image Credits: Google Earth Pro



Image credits: Sustainable Sanitation Alliance

WATER

Similarly, at Kariobangi waste water treatment plant, both physical and biological treatment process are utilized. However, it has a lower capacity of approximately 32,000 cubic meters during a dry weather flow and a hydraulic storm capacity of 96,000 cubic meters. Furthermore, it includes a waste water laboratory to analyze the adherence of waste water quality to legal requirements. The treatment process starts at the screening, where screens are installed to extract solids from the waste water. In the biological process, treatment begins within sedimentation tanks where primary clarification is done. This process allows for the clarification of the waste water and separation of sludge. The water is directed to trickling filters, while the sludge gets fed into anaerobic digesters. Secondary sedimentation occurs in humus tanks where the tanks aid in removing the trace slime. Organic matter is broken down within anaerobic tanks releasing carbon dioxide, hydrogen sulphide, and methane. The solids are then removed and exposed to the sun for drying on sludge drying beds to be sold to farmers at low prices for tree planting, while the supernatant is fed back in the inlet for recycling. Notably, although the sludge is good for tree planting and flower cultivation, it is unsuitable for crop production due to its high concentration of heavy metals.

At both sewerage treatment plants, effluent is released into Nairobi river for reuse, while the sludge is sold to farmers at very low prices.

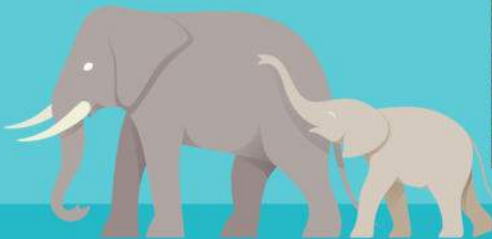
Water Treatment Process

The process begins with the reception of raw water from the source, in the case of Kabete Treatment plant, water comes from Ruiru Dam. Screening is the initial stage after the inlet works to prevent solids from entering the system through the intake pipes. Then, the water flows into a sump and is pumped to the next stage. In the clarification stage, suspended impurities are targeted and removed through a combination of chemical processes; flocculation and coagulation. The latter and former involve the use of chemicals such as Aluminium Sulphate, which form the flocs. Afterwards, the water undergoes filtration to remove any remnant suspended materials. Filtration is followed by disinfection, which is aimed at killing harmful microorganisms and improve the water quality through chlorine dosing. Finally, before the water is pumped to the Reservoir for distribution, it is allowed to settle in clear well tanks, which are dosed with soda ash.

Final Effluent at Dandora Treatment Plant, Green due to algae



Image Credits: Sustainable Sanitation Alliance



WATER TREATMENT, NAIROBI

In conclusion, different processes are applied at NCWSC depending on the source of the water. For raw waste water (sewage) both physical and biological processes are used to improve its quality before effluent discharge into Nairobi river, reducing pollutants in the environment. On the other hand, water treatment for raw water involves a combination of physical and chemical processes, before it is clean and safe for consumption. Nevertheless, a bit needs to be done, as according to the Athi Water Works Development Agency, the asset holding body of NCWSC, due to overloading, the effluent released into the Nairobi river is short of meeting the quality standards.



Image Credits:Canva Stock



Image Credits:Canva Stock



Jeffrey Kibe





MARYLAND

America's Largest Estuary Provides Haven for Numerous Rare & Endangered Species

Meet the diverse ecosystems of the Chesapeake Bay, where water meets land, and a multitude of species face the threat of extinction. In this exploration, we'll encounter a variety of aquatic creatures, terrestrial animals, avian species, and plants, each struggling to survive in the face of environmental challenges. Alongside these familiar inhabitants, we'll also delve into the realm of cryptids, exploring the legend of a mythical creature known as "Chessie."



Photo Credit: Tom Patterson, Public Domain

The Blue Crab



Join us as we unravel the intricacies of Chesapeake Bay's biodiversity and delve into the mysteries of its endangered inhabitants.

Chesapeake Bay is a biome of immense environmental value due to its unique location and nature. It supports varied wildlife, including hundreds of at-risk species just like Chessie. The seagrass beds, oyster reefs, and tidal marshes offer a sanctuary to numerous plants and animals, forming a complex food web that is crucial for environmental health. Let's look at a few of these at-risk species more closely, starting with the sea-loving inhabitants. One of the most famous at-risk species of Chesapeake Bay is the blue crab.

A blue crab with its signature blue colored claws.

Photo Credit: James St. John on Flickr. CC BY 2.0 DEED

In Chesapeake Bay, the blue crab reigns supreme, embodying the delicate balance of this unique ecosystem. More than a third of the United States' blue crab catch comes from Chesapeake Bay. With its captivating cerulean hues and formidable claws, the blue crab plays a crucial role as both predator and prey. However, it faces threats from overfishing, habitat destruction, pollution, and climate change, endangering its population. From the mid-1990s to the late 2000s, the blue crab population dramatically decreased. A decrease in underwater grass abundance caused by warming waters, irregular weather patterns, and pollution has been linked to the population decline. Overfishing also puts pressure on the population. There may be some hope. In 2022, crabbers harvested only 19% of the female blue crab population. This was below the target of 28%, and well under the overfishing threshold of 37%. Conservation efforts led by The Chesapeake Bay Program strive to protect the blue crab habitat and promote sustainable practices, offering hope for its future. Another at-risk species living in the waters of the Bay is the Atlantic Salmon.


Water rich natural environment invites thriving biodiversity



Atlantic Salmon

In Chesapeake Bay's intricate ecosystem, the absence of the Atlantic salmon looms large, once a vital component now scarce due to centuries of human impact. Historically, these fish undertook epic migrations, heralding seasonal changes and sustaining both wildlife and communities.

A wildlife biologist releases an Atlantic Salmon after taking health data.
Photo Credit: John Cameron on Unsplash

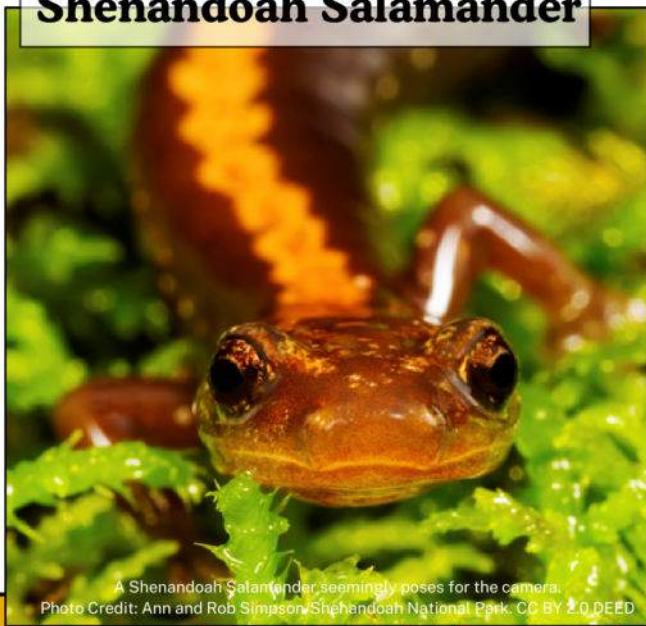


Atlantic salmon showing the kype (hook) in the lower jaw, a characteristic of the male during spawning season. The kype is used to battle with rival mates and is absorbed at the end of spawning season.

However, habitat destruction, overfishing, pollution, and barriers like dams have pushed the Atlantic Salmon to the brink of extinction. This decline mirrors a broader trend along the Atlantic coast. Restoration efforts, including habitat restoration, fish passage initiatives, and stocking programs, aim to revive populations. Despite challenges like habitat degradation and climate change, hope endures.

In addition to crustaceans and fish, there are several land-based amphibians and insects at risk in Chesapeake Bay — amphibians such as the Shenandoah Salamander.

Shenandoah Salamander



A Shenandoah Salamander seemingly poses for the camera.
Photo Credit: Ann and Rob Simpson, Shenandoah National Park. CC BY 4.0/DEED



While the Shenandoah Salamander primarily inhabits the rugged slopes of Shenandoah National Park, its existence is intricately linked to the broader Chesapeake Bay region. The health of the bay's watershed, encompassing diverse habitats from mountain streams to estuarine wetlands, directly influences the survival of species like the Shenandoah Salamander. As a sentinel of ecosystem health, the salamander serves as an indicator of environmental conditions, reflecting the impacts of human activities such as habitat fragmentation and climate change. Furthermore, the protection of the Shenandoah Salamander and its mountainous habitat contributes to the overall biodiversity and ecological resilience of the Chesapeake Bay watershed. By recognizing and conserving the interconnectedness of species and habitats across the region, we can ensure the preservation of not only the Shenandoah Salamander but also the entire ecosystem that sustains life within Chesapeake Bay and its surrounding landscapes.

Along with amphibians, there are several insect varieties that are at risk in this area such as the Puritan Tiger Beetle.



Puritan Tiger Beetle



The Puritan tiger beetle has been on the federal endangered species list since 1973. Photo Credit: Susan Wojtowicz / U.S. Fish and Wildlife Service. CC BY 2.0 DEED

The Puritan Tiger Beetle, a rare insect species, holds a unique presence in two distinct regions: the Connecticut River Valley in New England and along the shores of Chesapeake Bay in Maryland. These beetles thrive in habitats characterized by naturally eroding cliffs and sandy beaches, where vegetation is sparse. Playing a pivotal role in the local food web, they prey on insects and crustaceans while also serving as prey for other insects and birds.

Since 1973, the Puritan Tiger Beetle has been listed as federally endangered, primarily due to habitat loss.

By 2010, their numbers had dwindled to just around 5,000 individuals, with the majority, approximately 4,500, found in Maryland. The precarious balance of their existence is threatened by various factors, including shoreline development and bank stabilization efforts aimed at protecting human infrastructure. While eroding cliffs pose risks to coastal properties, certain engineered structures, like segmented offshore breakwaters, offer a potential solution to prevent erosion while preserving vital habitat for the Puritan Tiger Beetle. By addressing these challenges with innovative conservation strategies, we can strive to safeguard the future of this remarkable species within the Chesapeake Bay region.

The Saltmarsh Sparrow

As we've discovered so far, there are at-risk species in the water and on land. We also find airborne species of animals that are at-risk such as the Saltmarsh Sparrow.

The Saltmarsh Sparrow, with its melodious chirps echoing through Chesapeake Bay's saltmarsh habitats, faces numerous threats endangering its survival. Relying on these vital habitats for nesting and foraging, the bird confronts challenges from sea-level rise, coastal development, and invasive species. Between the years 1990 and 2010, this species saw a 75% decrease in population.

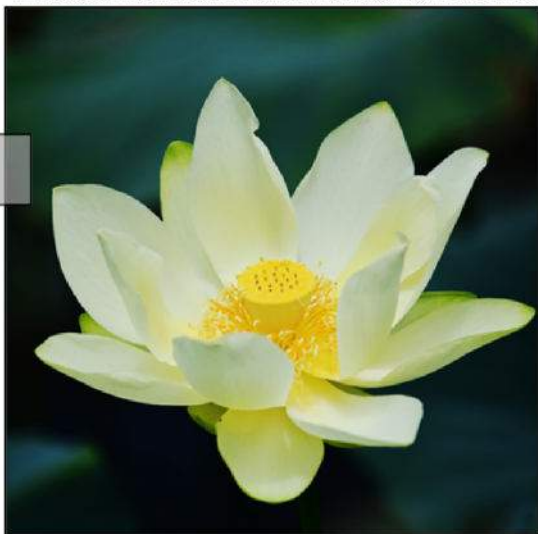
Animals aren't the only inhabitants of Chesapeake Bay that are at risk. There are also several cases of plant species which find themselves at-risk due to various factors. The American Lotus is a great example.

American Lotus

Within the tranquil waters and sun-drenched shores of Chesapeake Bay, the American Lotus is a botanical gem that graces the landscape. With its striking yellow flowers and large, round leaves, this native aquatic plant species adds a splash of vibrant color to the bay's marshes and freshwater ponds. As a keystone species in the bay's wetland ecosystems, the American Lotus plays a vital role in providing habitat and food for a diverse array of wildlife. Its floating leaves offer shelter and nesting sites for waterfowl and other aquatic birds, while its submerged roots provide refuge for fish and amphibians. However, the American Lotus faces threats from habitat loss, water pollution, and invasive species such as water chestnut.



A Saltmarsh Sparrow with its characteristic yellow, black, and white coloring
Photo Credit: Peter Paton. U.S. Fish and Wildlife Service. Public Domain



American lotus flower
Photo Credit: Steve Fung. CC BY-SA 2.0 DEED

The aggressive growth of water chestnut can lead to the displacement and decline of the American lotus, disrupting the balance of aquatic ecosystems within Chesapeake Bay.

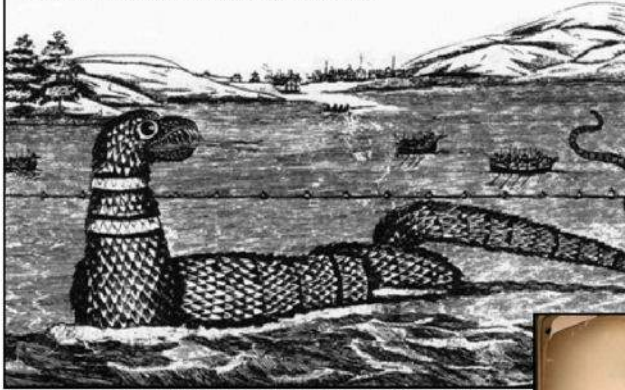


So far, we've seen several examples of at-risk species in Chesapeake Bay spanning the brackish waters, on land and in the air. Species include both animals and plants. But there is also another category of species at-risk in the Chesapeake Bay — a species of the cryptid variety. A cryptid is a creature whose existence has been suggested, or claimed by eyewitnesses, but is not recognized by mainstream science. The cryptid at-risk in Chesapeake Bay is “Chessie the Sea Monster” of course!



Artistic rendering of what Chessie the Sea Monster may look like.
Photo Credit: Image created by DALL-E, an artificial intelligence developed by OpenAI

Photo Credit: Olaus Magnus's book History of the Northern People. Public Domain.



Chessie, reputedly a great water reptile possibly up to 20 meters long living in the depths of Chesapeake Bay, has been part of local folklore since the first reported sighting in 1936. Described as snake-like, with a head reminiscent of a football and movements that suggest an aquatic serpent, Chessie has been spotted intermittently by locals and visitors alike.

The most famous documentation of Chessie came in 1982 when Robert and Karen Frew captured footage of what they claimed was the bay monster near Kent Island.



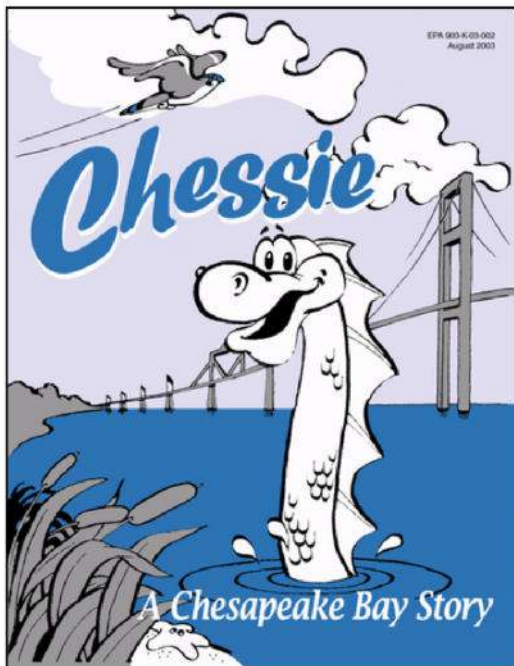
Artistic recreation of footage captured by Robert and Karen Frew
Photo Credit: Image created by DALL-E, an artificial intelligence developed by OpenAI

Biodiverse Wetlands

Originally dismissed by many, Chessie has grown into more than just a cryptid tale; it has become a symbol of the Bay's ecological challenges and a reminder of what could exist beneath the surface, unbeknownst to us. The U.S. Fish and Wildlife Service even adopted Chessie as an icon for environmental protection during the 1980s, demonstrating the creature's transition from mythical beast to environmental beacon.



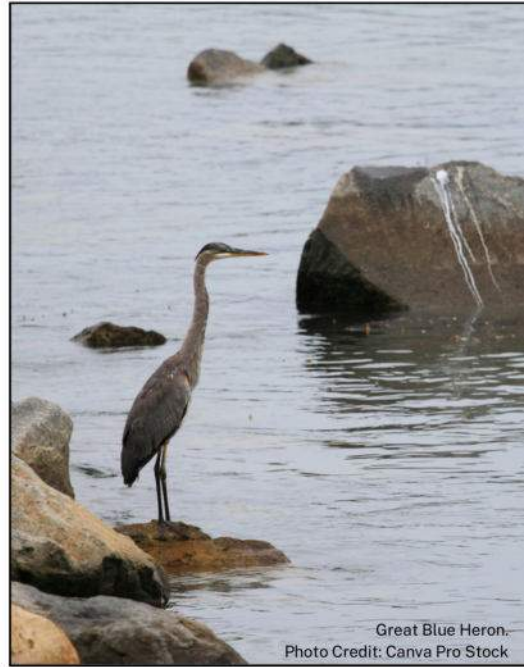
Chessie and his fellow water reptiles have undoubtedly been impacted by human development and climate change. What makes the story of Chessie and Chesapeake Bay truly fascinating is not just the debate over the existence of a mysterious sea creature but also what this legend symbolizes for conservation efforts. It underscores the need for an open-minded approach to the unknown aspects of environmental science and the exploration of biodiversity. Chessie, real or not, encourages a protective attitude towards the mysteries of the natural world and the unseen species that may quietly dwell within.



The biodiversity of Wetlands.
Photo Credit: Canva Pro Stock



In summary, our exploration of several emblematic species within the Chesapeake Bay ecosystem reveals the intricate tapestry of life and the challenges faced by each. The Blue Crab, symbolizing resilience and vitality, grapples with threats from overfishing, habitat destruction, and climate change. The Atlantic Salmon, once abundant, now teeters on the brink of extinction due to habitat loss and overfishing. The Shenandoah Salamander, confined to dwindling habitats, underscores the fragility of mountain ecosystems. The Puritan Tiger Beetle, endemic to unique coastal habitats, faces habitat loss and shoreline development. The Saltmarsh Sparrow, emblematic of coastal resilience, battles rising sea levels and habitat degradation. The American Lotus, cherished for its beauty and ecological significance, confronts threats from invasive species like water chestnut. Lastly, the legend of Chessie the Sea Monster embodies the mysteries and wonders of Chesapeake Bay, prompting us to explore the unknown depths of our environment with curiosity and reverence. As we strive to protect and conserve these species, we affirm our commitment to preserving the biodiversity and ecological integrity of Chesapeake Bay for future generations.

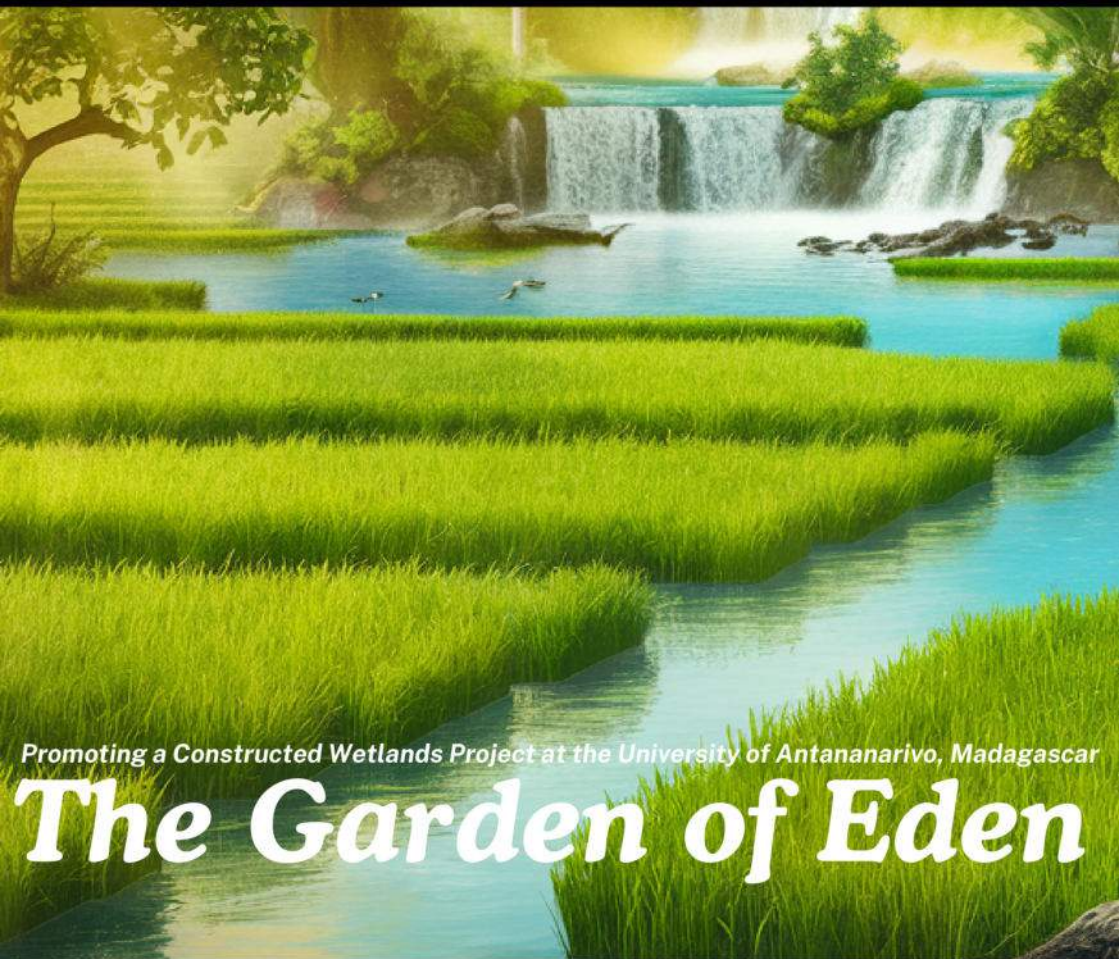


Great Blue Heron.
Photo Credit: Canva Pro Stock



Article Authors:
Williams, Barrett (Texas)
Coman, Kenneth: (Maryland born and raised)

Great Blue Heron.
Photo Credit: Canva Pro Stock



Promoting a Constructed Wetlands Project at the University of Antananarivo, Madagascar

The Garden of Eden



Introduction

The University of Antananarivo, nestled in the vibrant capital city of Madagascar, is home to acres of lush rice fields. These fields, which receive abundant stormwater from the expansive 50-hectare university grounds, present a unique opportunity to transform the campus and address critical infrastructure challenges.

By converting these rice fields into constructed wetlands, the university could create a stunning ecological feature that not only enhances the local environment but also provides a sustainable solution to water scarcity. This ambitious "Garden of Eden" project holds the potential to make the university a beacon of ecological innovation and a magnet for eco-tourism.

Fruit Tree Shaded Lagoon Storage & Biological Water Treatment

[Drinking] Water Management and Storage: Constructed wetlands can effectively capture and store stormwater, reducing the risk of flooding and ensuring a steady supply of water throughout the year. This is particularly crucial for the university, which currently struggles with water infrastructure challenges.

Biodiversity and Habitat Creation: Wetlands are known for their rich biodiversity. By creating these ecosystems, the university would support a variety of plant and animal species, contributing to conservation efforts and enhancing the local environment.

Educational and Research Opportunities: The constructed wetlands would serve as a living laboratory for students and researchers, providing hands-on learning experiences in ecology, environmental science, and sustainable water management.

Aesthetic and Recreational Value: A beautifully designed wetland area would offer serene landscapes for relaxation and recreation, enhancing the campus's appeal to students, staff, and visitors.

Solution

Vision for the Constructed Wetlands

The concept of transforming the rice research fields into constructed wetlands involves designing a series of interconnected water bodies that mimic natural wetland ecosystems. These wetlands would serve multiple purposes:



The Garden of Eden Solution

Addressing Water Infrastructure Challenges

One of the most pressing issues facing the University of Antananarivo is the lack of reliable water infrastructure. Students and staff often face water shortages, which can disrupt daily activities and academic work. The "Garden of Eden" project aims to tackle this problem head-on by:

Rainwater Harvesting: The constructed wetlands would act as a massive rainwater harvesting system, capturing runoff from the university grounds and storing it for future use.

Groundwater Recharge: By facilitating the infiltration of stormwater into the ground, the wetlands would help recharge local aquifers, improving the overall water availability in the region.

Water Quality Improvement: Wetlands are natural filters, capable of removing pollutants from water through physical, chemical, and biological processes. This means that the water stored in the wetlands would be cleaner and safer for use.



**Southern Side
Rice Permaculture
Research Fields**

Image © 2024
Image Landsat / C
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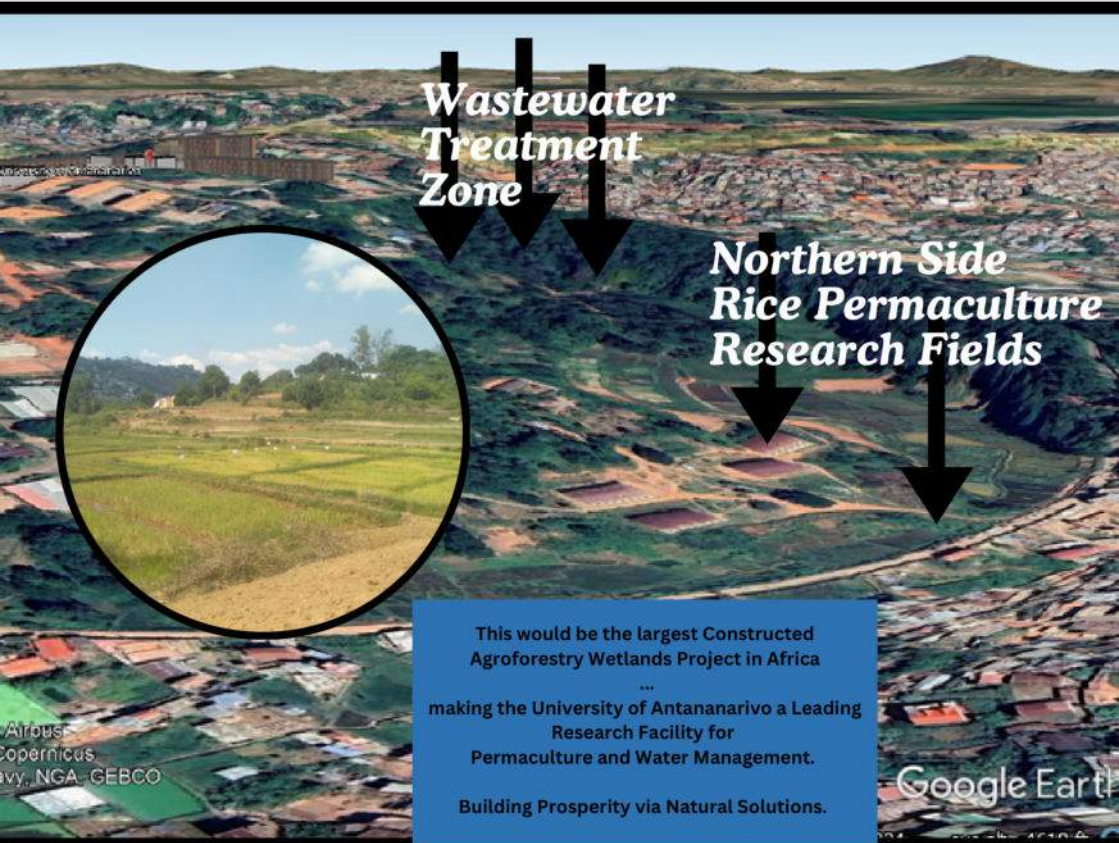
Constructed Wetlands for Stormwater Management

Academic Research and Foundation Support

In 2024, the Jacquelyn Jestine Sanders Foundation generously funded a pivotal academic research initiative at the University of Antananarivo.

This research, encapsulated in the Sustainable Vision Academic Journal, has provided a comprehensive analysis of the university's water infrastructure challenges. The findings from this study have led to the development of the "Garden of Eden" proposal as the optimal solution.

The research highlighted the critical need for innovative water management strategies to address the university's ongoing water shortages. The proposed constructed wetlands emerged as a core component of this solution, offering a multifaceted approach to sustainable water management. This project represents the heart of the proposed water management strategy, promising to transform the university into a water-rich, ecologically vibrant campus.



Wastewater Treatment Zone

Northern Side Rice Permaculture Research Fields

This would be the largest Constructed Agroforestry Wetlands Project in Africa ... making the University of Antananarivo a Leading Research Facility for Permaculture and Water Management. Building Prosperity via Natural Solutions.

Google Earth

Predicted Flora

Madagascar is renowned for its unique and diverse ecosystems, home to many species found nowhere else on Earth. By converting the rice research fields at the University of Antananarivo into constructed wetlands, this "Garden of Eden" project could attract a vibrant range of plant and animal species, enhancing biodiversity and ecological value. Here's a prediction of the flora and fauna that might flourish in this new wetland habitat.

Aquatic Plants:

- **Water Lilies (Nymphaeaceae):** Known for their beautiful, floating flowers, these plants will thrive in the still waters of the constructed wetlands.
- **Papyrus (Cyperus papyrus):** Common in wetland areas, this plant can create dense, green stands that provide habitat and protection for wildlife.
- **Duckweed (Lemna spp.):** Small, floating plants that can quickly cover the surface of the water, providing food for various aquatic creatures.



Water Lilies / Photo Credit: Canva Pro Stock

Emergent Vegetation:

- **Cattails (Typha spp.):** These tall plants with distinctive brown flower spikes will establish along the water's edge, helping with filtration and erosion control.
- **Bulrushes (Schoenoplectus spp.):** Found in shallow water, these plants offer nesting material and shelter for birds and other wildlife.



Cattails / Photo Credit: Canva Pro Stock

Wetland Trees and Shrubs:

- **Willows (Salix spp.):** These trees thrive in wet conditions and can help stabilize the soil along the wetland margins.



Duckweed / Photo Credit: Canva Pro Stock



Papyrus / Photo Credit: Canva Pro Stock

and Fauna for the "Garden of Eden" Wetlands

Birds:

- Madagascar Pond Heron (*Ardeola idae*): An endangered species that could find a new habitat in the wetlands, benefiting from the abundant food supply.
- Madagascar Jacana (*Actophilornis albinucha*): These birds, with their striking appearance, would thrive in the wetland environment.
- Kingfishers (*Alcedinidae*): Various kingfisher species would be attracted to the wetland for hunting fish and insects.

Amphibians and Reptiles:

- Tomato Frog (*Dyscophus antongilii*): This brightly colored frog species is native to Madagascar and would find the wetlands a suitable habitat.
- Madagascar Tree Boa (*Sanzinia madagascariensis*): These boas could inhabit the riparian zones, preying on small mammals and birds.



Madagascar Jacana / Photo Credit: Canva Pro Stock



Dragonfly / Photo Credit: Canva Pro Stock

Invertebrates:

- Dragonflies and Damselflies (*Odonata*): These insects are vital indicators of a healthy wetland ecosystem and would flourish in the new habitat.
- Butterflies (*Lepidoptera*): Species such as the Madagascar Giant Swallowtail (*Papilio antenor*) would be attracted to the diverse plant life.



Tomato Frog / Photo Credit: Canva Pro Stock

Fish and Aquatic Species:

- Cichlids (*Cichlidae*): Diverse species of cichlids, native to Madagascar's waters, could inhabit the constructed wetlands, contributing to the aquatic biodiversity.
- Freshwater Crabs (*Potamonautidae*): These crabs play a crucial role in the wetland ecosystem, helping to decompose plant material.



Freshwater Crab / Photo Credit: Canva Pro Stock

Wetlands Agroforestry Research Center

Antananarivo Leading Africa in Rice Permaculture

Ecotourism Potential

The "Garden of Eden" project is not only about solving water problems; it also has the potential to position the University of Antananarivo as a prime research and ecotourism destination. Madagascar is already renowned for its unique biodiversity and natural beauty, attracting tourists from around the world. By creating an exemplary ecological feature within the capital city, the university can:

- **Attract Visitors:** The constructed wetlands, with their diverse flora and fauna, could become a major attraction for eco-tourists, nature enthusiasts, and researchers.
- **Boost Local Economy:** Increased tourism would bring economic benefits to the local community, creating job opportunities and supporting local businesses.
- **Promote Environmental Awareness:** The project would serve as a model for sustainable development, inspiring visitors and local residents to engage in conservation efforts and adopt eco-friendly practices.

Research Team at the University gets modern Rice Permaculture Research Facility.

WIN

The University Community gains access to clean drinking water all year long - without reliance on JIRAMA.

WIN

The University advances it's position as a Research and thought leader in Africa.

WIN



Wetlands Agroforestry Research Center, Antananarivo. Photo Credit: Coman/OpenArt.ai



Wetlands Agroforestry Research Center, Antananarivo. Photo Credit: Coman/OpenArt.ai

Madagascar is renowned for its extraordinary biodiversity, with a high percentage of flora and fauna that are found nowhere else on Earth. A wetlands agroforestry agricultural research center would highlight the island's unique ecosystems and offer visitors a chance to observe rare species in their natural habitat. This center would serve as a living museum of biodiversity, attracting ecotourists keen to experience Madagascar's rich natural heritage.

Educational Opportunities

The research center could offer guided tours, workshops, and educational programs that engage visitors in hands-on learning experiences. These programs could cover topics such as wetland restoration, agroforestry techniques, and sustainable farming practices. By integrating education with tourism, the center would foster a deeper understanding and appreciation of ecological and agricultural research among tourists.

Community Engagement

Such a center would likely involve local communities in its operations, providing them with employment opportunities and involving them in conservation and research activities. This engagement would enhance the ecotourism experience by allowing visitors to interact with local people and learn about their culture, traditions, and sustainable living practices. This kind of community-based tourism can help uplift local economies and ensure that the benefits of tourism are shared widely.

Benefits for Other Universities and Agricultural Research Centers - Collaborative Research

Involving other universities and agricultural research centers in this project would foster collaborative research and knowledge exchange. Institutions could share expertise, resources, and data, leading to more robust research outcomes and innovations in sustainable agriculture and conservation.



Wetlands Agroforestry Research Center, Antananarivo.
Photo Credit: Coman/OpenArt.ai

Global Impact

The involvement of multiple institutions could elevate the project's profile, attracting international attention and funding. This global collaboration could lead to the development of best practices that can be applied in other parts of the world, enhancing the global impact of the research conducted at the center.

Enhanced Research Outputs

By collaborating with a diverse group of researchers, the center could produce comprehensive and interdisciplinary research outputs. These publications could address a wide range of topics, from ecological restoration and biodiversity conservation to sustainable agriculture and climate resilience, contributing significantly to the scientific community.

In summary, a wetlands agroforestry agricultural research center in Madagascar would not only serve as an excellent ecotourism destination but also provide substantial benefits through collaborative research, educational opportunities, and community engagement. By involving other universities and research centers, the project could achieve a broader impact, fostering global solutions to environmental and agricultural challenges.

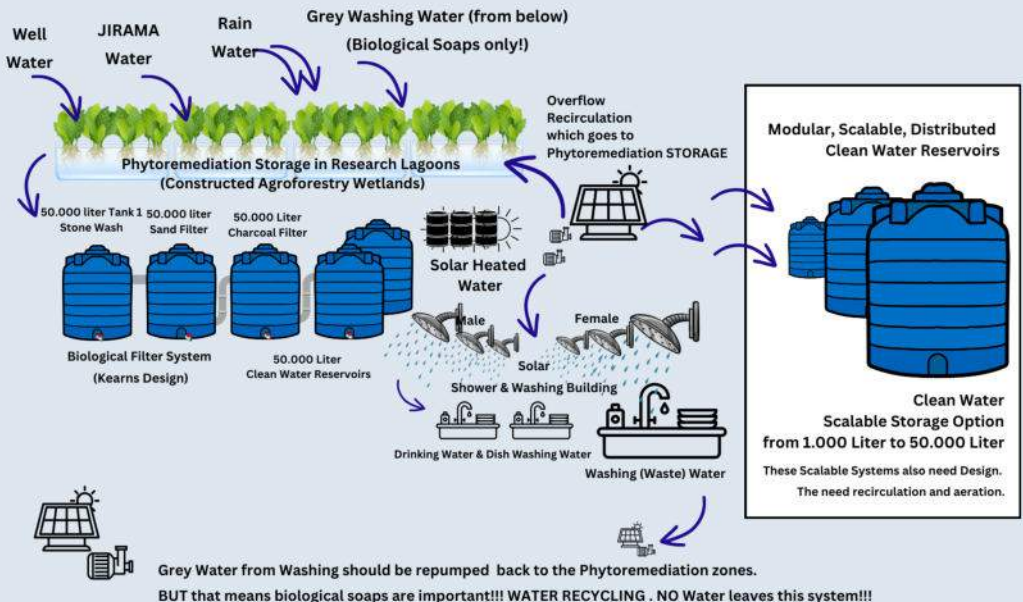
Constructed Wetlands as part of the Central Water Infrastructure

The proposal to incorporate constructed wetlands as a central element of the university's water infrastructure marks a significant advancement in sustainable water management. The primary objective is to establish an extensive water storage system capable of effectively managing stormwater, which currently is not being utilized to its full potential. The plan involves directing stormwater into the university's Research Facility Lagoons, which have been engineered to accommodate up to 10 million liters of water. Preliminary assessments suggest that these lagoons could potentially store as much as 25 million liters, far exceeding the university's current water demand.

To maximize the utility of this stored water, the project aims to develop 100 defined research pads. These pads are designed for easy access and optimal testing conditions, providing a controlled environment for various research activities. By slowing down and storing stormwater, the constructed wetlands will not only enhance water conservation efforts but also support diverse research opportunities within the university, thereby aligning with both environmental sustainability and academic excellence.

This initiative not only addresses the immediate need for improved stormwater management but also sets a precedent for innovative water conservation practices in academic institutions. The integration of such a large-scale water storage system within the university's infrastructure highlights a commitment to sustainable development and resource efficiency, potentially serving as a model for other universities and organizations aiming to enhance their environmental stewardship.

Central Water Infrastructure in Technical Planning by the JJSF Fellowship



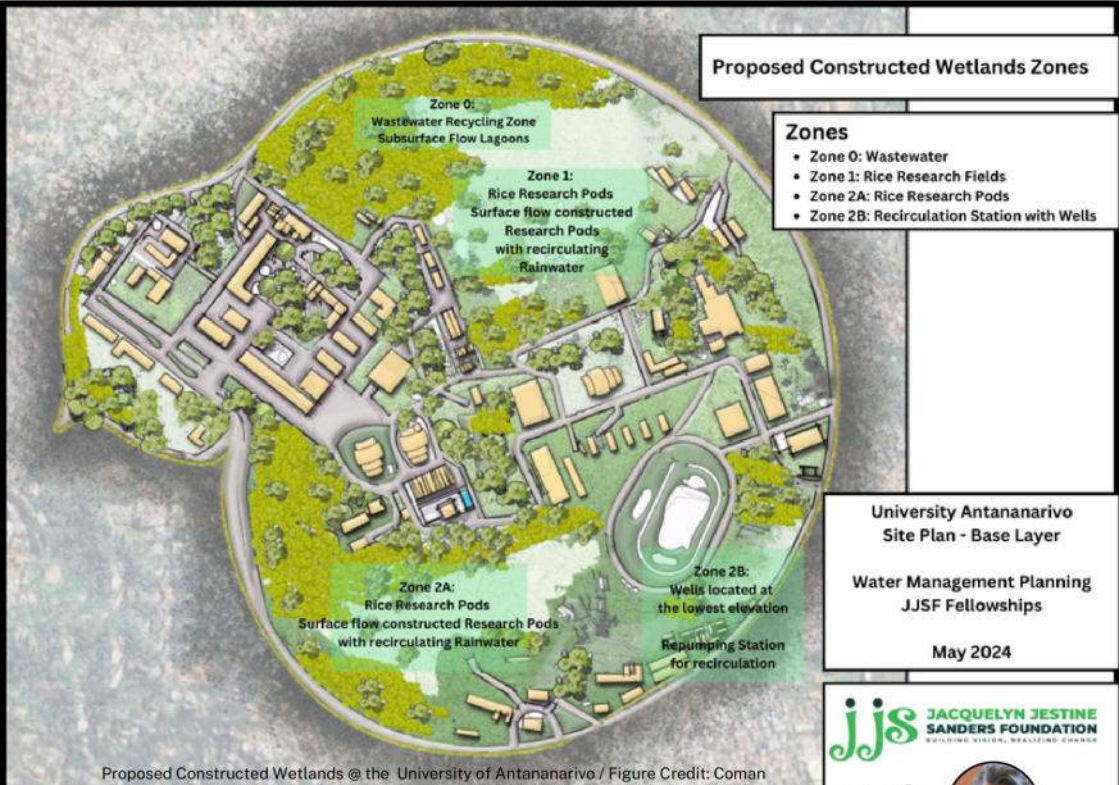
Constructed Wetlands: returning to the Garden of Eden to address Water Needs

Conclusion

The "Garden of Eden" project at the University of Antananarivo represents a visionary approach to addressing water infrastructure challenges while enhancing the ecological and aesthetic value of the campus. By converting the rice research fields into constructed wetlands research facility, the university can create a sustainable water management system, support biodiversity, and attract ecotourism. This initiative, backed by the Jacquelyn Jestine Sanders Foundation and grounded in rigorous academic research, has the potential to transform the university into a leading example of ecological innovation and sustainability. It is an opportunity to create a lasting legacy that combines environmental stewardship with practical solutions, truly embodying the spirit of a modern-day Garden of Eden.



Rice Research at the University of Antananarivo / Photo Credit: FINARCH



Proposed Constructed Wetlands @ the University of Antananarivo / Figure Credit: Coman





By Kenneth Coman
Sustainable Vision Journal Editor

Artificial Intelligence - Is it valuable?

Artificial Intelligence is all the rage at this time. There are a whole collection of applications arising where "AI" can be used for doing useful things - they say. Well - that is an offer I can't refuse without a little exposure to the tool. What is the catch?

So - I decided to explore the usefulness of this developing technology to see what are its limits? The next few pages - will reveal some details about my journey into this mysterious and intriguing set of tools which is becoming nearly "mainstream."

So - consider the next few pages a study of the capabilities of a few AI engines which may just allow us to test the usefulness of AI in the form of a technical case study.

I am going to demonstrate the capabilities of AI to respond to my wishes for graphically representing a concept. Follow a few pages and judge for yourself if this toolset is somehow worthy of all the hype.

First off - the ground rules.... I will leave some of the realization of how much AI was used - for the reader to realize for themselves.

You can begin by looking at the photos to the left and ask which ones are photos and which are computer generated. Can you tell for sure?

Take it away Roxie! What kind of AI adventure can you share with us?

Photo? or AI?



Lemur, Photo Credit: Boris Edelmann, Canva Pro Stock



"Lemur in the Wild", Photo Credit: AI assisted using DALL-E engine



"Lemur in the Wild", Photo Credit: AI assisted using Ideogram



Welcome to Roxie's Corner - AI Edition. In the Summer Journal - you will get a special treat - the Vegan Family has lots of photos from our AI visit to Madagascar to show!

If you have been following the Vegan Family Comic Strip - you would know that these pictures were imminent!

The Vegan Family



WELL... THIS IS MOSTLY WORK...THE FOUNDATION WANTS ME TO GO TAKE PICTURES OF THE LANDSCAPE AND TREES FOR THE SUMMER JOURNAL. I AM SO EXCITED!



HEY ROXIE... DO YOU THINK WE WILL SEE THOSE AMAZING BAOBAB TREES WHEN WE ARE THERE?



COMAN PRODUCTION 2024/ ILLUSTRATOR : SHARAD KUMAR



THE LEMURS ARE ENDANGERED. THE KIDS BETTER SEE THEM NOW BECAUSE THEIR HABITAT HAS BEEN DESTROYED.



LEMURS ARE DEFINITELY ON OUR LIST NEXT WEEK! THE FOUNDATION WILL LOVE THOSE PHOTOS!



COMAN PRODUCTION 2024/ ILLUSTRATOR : SHARAD KUMAR

In the next few pages - you will get a look at some real information about Madagascar. We will also analyze along the way whether Artificial Intelligence was of any use in this story telling exercise.



TECHNOLOGY SPOTLIGHT: ARTIFICIAL INTELLIGENCE



Lisa Vegan - AI Edition

Photo Credit: AI assisted using ideogram

Case Study in training a Fixed Model of Lisa Vegan

This is the Vegan Family daughter, Lisa, after some multiple attempts to get her look right using the ideogram AI engine ... this is actually just about correct according to the original mental vision. It is that same vision that is translated when an illustrator begins to work his craft. In this case the creator is using a digital tool to realize the vision. A rough estimation of time to get to this 3 dimensional look as desired and to get a suitable pose and attire was maybe 15 minutes. With practice - this kind of image can be produced within 5 minutes - once you are good at defining your characters. However, the real Art and science is in making a character that is reproducible. That requires some practicing - and most likely also a subscription so that you can save your settings will be needed.



Lisa Vegan - Analog Edition

Photo Credit: Coman



Photo Credit: AI assisted using ideogram

However, even a static character can be achieved for free if discipline is used in the defining of the construct variables. Is this kind of graphical representation useful only for illustration of comic characters?

Chat GPT Request for Guidance

What about the text value of AI? Let us turn for a moment to Chat GPT and ask a relevant question: **“What are the most endangered Lemurs in Madagascar?”**

And Chat GPT gives back: “Madagascar is home to many species of lemurs, and unfortunately, **a significant number of them are endangered**. Some of the most critically endangered lemurs include:”

These are just a few examples, but unfortunately, many other lemur species in Madagascar are also facing threats to their survival. Conservation efforts are crucial to protect these unique primates and their habitats.

- **Greater Bamboo Lemur** (*Prolemur simus*): This lemur is one of the rarest primates in the world and is **critically endangered** due to habitat destruction and fragmentation, as well as hunting.
- **Northern Sportive Lemur** (*Lepilemur septentrionalis*): This small nocturnal lemur is also **critically endangered** due to habitat loss and hunting.
- **Saha Forest Lemur** (*Lepilemur sahamalazensis*): This species was only recently discovered, and it's already listed as **critically endangered** due to habitat loss and fragmentation.
- **Madame Berthe's Mouse Lemur** (*Microcebus berthae*): The smallest primate in the world, it's **critically endangered** due to habitat destruction and fragmentation.
- **Perrier's Sifaka** (*Propithecus perrieri*): This sifaka species is **critically endangered** primarily due to habitat loss and hunting.



Photo



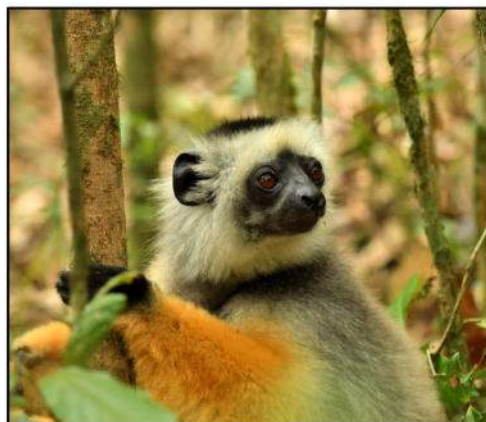
Bamboo Lemur, Photo Credit: Canva Pro Stock



Photo Credit: Canva Pro Stock



Photo Credit: Canva Pro Stock



Sifaka, Photo Credit: Canva Pro Stock

vs: AI Simulation

- **Greater Bamboo Lemur** (*Prolemur simus*): This lemur is one of the rarest primates in the world and is **critically endangered** due to habitat destruction and fragmentation, as well as hunting.



Photo Credit: AI assisted using OpenArt



- **Northern Sportive Lemur** (*Lepilemur septentrionalis*): This small nocturnal lemur is also **critically endangered** due to habitat loss and hunting.



Photo Credit: AI assisted using DALL-E

- **Perrier's Sifaka** (*Propithecus perrieri*): This sifaka species is **critically endangered** primarily due to habitat loss and hunting.



Photo Credit: AI assisted using OpenArt



TECHNOLOGY SPOTLIGHT: ARTIFICIAL INTELLIGENCE

Further Case Study in training a "Fixed Model" - Testing of Ty Burrell as Christian Vegan

It is possible to maintain a fixed model even across AI engines. How is that possible? The most commonly used tactic is to base your model (and the corresponding recipe or "prompt") on as many photos of some individual as possible. And, in the public databases are many many photos of celebrity actors and actresses. Thus - these are often used as a starting point for creating a stable reproducible Model - even across platforms. Here you see 4 representations of the same Celebrity, produced by several engines with comparable prompts. These may look like photos of your favorite actor - but they are not. They are AI representations of varying graphical quality and style. But do you see the consistent thread based on the "trained model" in the background?



AI Photo Credit:
comicsmaker

AI Photo Credit:
comicsmaker

AI Photo Credit:
aicomicfactory

AI Photo Credit:
openart.ai

Are there useful Engineering Applications?

One can see that where a story is to be told - the ability of AI to carry a visual character through various permutations at the behest of the "prompt" - is definitely compelling - even if models show up with a third arm occasionally. Those failed simulations need to be recycled or ignored. In between are found the successful simulations which may prove useful for an author or maybe even a designer. How far can the usefulness be extended?

One can also see a hint of promise in terms of the usefulness of this kind of technology for automating layout of planning documents or in simulating possible build scenarios - IF the AI can be "trained" to understand the relevant terminology (analog to the character training which is already fairly advanced).

How far away from giving text inputs that lead to a rough draft of a site Map? or a rough draft of a foundation for instance?



Simulation of a Medium Scaled
Biological Filter System,

AI Photo Credit: ideogram





AI Prompt to represent the Garden of Eden

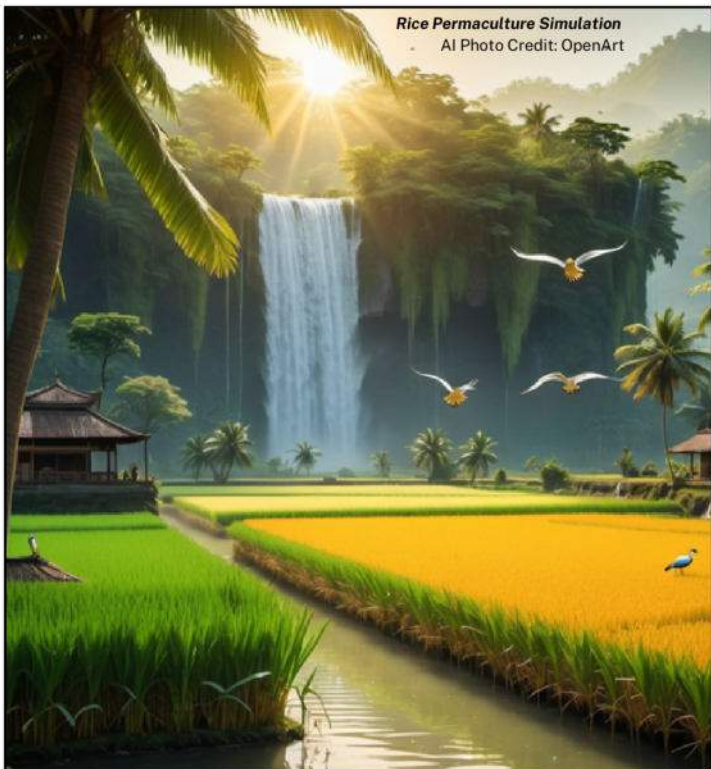
"Constructed wetlands with fruit trees growing in the midst, birds flying about. The water is pure and flowing."

Thus, one can see that having an AI may allow one to share the imagination first in words, that then flows into a graphical image - which the computer can then fit into a recognizable graphical image for sharing with others.

This is potentially a valuable tool. However, there are limitations.

Some encountered AI limitations:

1. When it comes to trying to prompt for multiple characters, the AI loses its ability to deliver a predictable result. This means there is much growth and quality potential for improvements in the ability of the AI for managing multiple trained or fixed models. This may be addressed by subscribing to advanced pay services. The extent of this test has not crossed that financial threshold just yet.
2. Describing or "prompting" around technical design topics requires more specialized algorithms than those found so far. It is not very easy to prompt for technical drawings in the engines that are available (for free) today online.



Rice Permaculture Simulation
AI Photo Credit: OpenArt

3. Visualization is qualitative. Where Fantasy is desired - the results are acceptable. However, where technical accuracy is needed - there are definite shortcomings of the tested AI engines. They proved to deliver results often which in comparison to photo images of the desired results - failed to meet the threshold of plausibility. That limits greatly our ability to use freely available AI tools today for reliable simulation of endangered species, for instance. The AI representations shown earlier in this article of endangered Lemurs are a great display of the inaccuracy which can be expected when relying on AI as a source of species visualization.

The Artificial Intelligence does not have a plausibility Meter that is reliable.

4. The largest problem encountered is that the model can only be as intelligent as the database of phrases that can be linked to concepts. There is a strong disconnect between the capability of the AI to know how many tails or hands belong in a simulation. There are many instances of extra fingers, or of extra hands even showing up in simulations. We must chalk this up to a lack of maturity in the learning model that is presently in use. Without doubt - the AI must be programmed to learn to be better over time right?



Biodiversity of Madagascar

Let us use some AI to guide some remote photo-journalism adventure.

Chat GPT on Chameleons:

Some notable chameleon species endemic to Madagascar include:

- Panther Chameleon
- Parson's Chameleon
- Nosy Be Pygmy Chameleon
- Labord's Chameleon (
- Antsingy Leaf Chameleon

These are just a few examples, but Madagascar's chameleon diversity is vast, with many species found nowhere else in the world.

There are around 160 species of chameleons in the world, belonging to the family Chamaeleonidae. These fascinating reptiles are known for their ability to change color, their unique eyes that can move independently, and their long, sticky tongues used to catch prey. They're mainly found in Africa and Madagascar, with a few species also found in parts of southern Europe, Asia, and the Middle East.

Madagascar is home to a significant number of chameleon species, and unfortunately, many of them are threatened or endangered due to habitat loss, deforestation, and illegal pet trade. Exact numbers can vary due to ongoing research and changes in conservation status, but a considerable portion of Madagascar's chameleon species are listed as endangered or vulnerable by organizations like the International Union for Conservation of Nature (IUCN). It's crucial to continue efforts to conserve these unique species and their habitats to prevent further decline.



Chamaeleo calytratus (Panther Chameleon)

Photo Credit: Canva Pro Stock



Chameleon on the Island of Nosy Be

Photo Credit: Canva Pro Stock



Madagascan Sunset Moth

Photo Credit: Canva Pro Stock



Madagascan Swallowtail

Photo Credit: Canva Pro Stock



Green-veined Charaxes

Photo Credit: Florida Museum

Chat GPT on Butterflies of Madagascar

Madagascar is home to a diverse array of butterfly species, including many that are endemic to the island, meaning they are found nowhere else on Earth. Some of these special butterflies include:

- **Madagascan Sunset Moth** : This is one of the most famous and beautiful butterflies from Madagascar, known for its striking iridescent colors.
- **Madagascan Swallowtail** : Another stunning butterfly species native to Madagascar, known for its large size and intricate wing patterns.
- **Madagascan Green-veined Charaxes**: This butterfly species is characterized by its green wings with white veins and **is found exclusively in Madagascar**.
- **Madagascan Emperor** : A large and impressive butterfly species with brown wings adorned with blue and red markings.
- **Madagascan White Peacock** : A species of butterfly belonging to the family Nymphalidae, known for its white wings with black and orange markings.

These are just a few examples, but Madagascar's butterfly fauna is incredibly diverse and includes many species with unique adaptations and beautiful appearances.



Our Assessment will not be complete without reviewing the ability of AI to represent Trees!

Surely AI has a great grip on how to represent endangered tree species right?



Baobabs of Morombe, Eastern Madagascar

Photo Credit: Canva Pro Stock



Baobabs of Eastern Madagascar

AI Photo Credit: ideogram

What other plant Species are native to Madagascar?

Madagascar boasts a rich diversity of orchid species, many of which are endemic to the island. These orchids come in various shapes, sizes, and colors, and they play an essential role in Madagascar's ecosystems.



White Orchid Flower in the Madagascar Rainforest

Photo Credit: Canva Pro Stock



Vanilla Orchid Flower

Photo Credit: Canva Pro Stock

Artificial Intelligence?

Like every other digital tool available to us today - the "Artificial Intelligence" which is getting so much hype - is pretty cool! but it has limitations. No - it is not ready to take over the world. It is a tool for visualization for now.



Roxanne Vegan





THE **Vegan** FAMILY *AI*
Vacation Scrapbook



Enjoying a little AI shade in a Baobab



*AI Roxie doing her Photography Gig!
Who do you think
is the celebrity behind this one?*



Anticipating the AI Adventure ahead!



*AI Christian
enjoying some Madagascar sun!*



*Buddy... marvelling
at the AI Fireworks.*



"The AI Lemur Whisperer"



AI Kenny should have NOT fed that one stray dog!



Lisa Vegan cuddling an AI Lemur.

Our Working Madagascar Safari! 2024



*How the AI trouble started...
How SHALL we ignore all those poor stray dogs on the street?*



AI Lisa and Kenny ready for a Safari!



Launch of Sustainable Vision Academic Journal

We are thrilled to announce the launch of the Sustainable Vision Academic Journal, a groundbreaking platform dedicated to showcasing innovative research in sustainability from emerging scholars worldwide. Our inaugural issue celebrates the remarkable achievements of our fellowship students, whose pioneering research is now being shared on an international stage.

Sustainable Vision Academic Journal aims to drive global progress in sustainability by providing a prestigious venue for cutting-edge research. We invite universities and researchers to join us in this endeavor and submit their work for publication. Together, we can amplify the impact of sustainable solutions and inspire positive change worldwide.

Be part of a movement that transcends borders and disciplines. Submit your research today and join a growing network of scholars committed to a sustainable future.

Submit your research paper for consideration to:

info@jacquelynsandersfoundation.org
Subject: Academic Submission



JJSF & WATERBUDDY SPONSOR COMMERCIAL MEMBRANE FILTER TESTING IN MADAGASCAR



20 FILTER STATIONS TO BE INSTALLED

info@jacquelynsandersfoundation.org
Subject: Filter Program



Invitation for Villages to Apply for Community Water Filters

Are you a village near Antananarivo with a community well? We invite you to apply for a water filter to improve the quality of your community's water supply. Our goal is to ensure safe and clean drinking water for all. If your village is interested in participating, please contact us for more details on how to apply. Together, we can create a healthier future for your community.



Redefining WATER MANAGEMENT AT THE UNIVERSITY OF ANTANANARIVO

Empowering Change for a Greener Tomorrow
Prepared By : Kenneth Coman, JJSF

Antananarivo, Madagascar — Over the recent Easter break, The Jacquelyn Sanders Foundation convened a pivotal gathering of its Fellows, professors from the University of Itasy, and students from the University of Antananarivo. This week-long event was dedicated to brainstorming and strategizing the foundation's upcoming recommendations for the University of Antananarivo, focusing on fostering innovation and enhancing educational methodologies.

The assembly, which spanned an entire week, was a melting pot of ideas and collaborative efforts aimed at shaping the future of academic excellence and innovation. The Fellows, selected for their outstanding academic and professional achievements, worked hand-in-hand with the students and esteemed professors to outline a comprehensive strategy and establish a realistic timeline for their project.

The goal of this event was to harness the collective expertise and creativity of our Fellows, students, and professors to develop actionable recommendations that can significantly impact the educational landscape at the University of Antananarivo.

Throughout the week, the participants engaged in intensive workshops, discussion sessions, and strategic planning meetings. These sessions were designed to identify the current challenges faced by the University of Antananarivo and to brainstorm innovative solutions that could be implemented effectively within the university's unique context.

One of the highlights of the week was a series of thematic workshops focusing on various aspects of university education, including curriculum development, research innovation, and community engagement. Each workshop concluded with a presentation of ideas, which were then debated and refined in subsequent sessions.

The collaborative efforts also aimed at ensuring that the final recommendations would be both comprehensive and practical. "We are committed to not just providing theoretical solutions, but creating plans that are feasible and can be implemented with the resources available," emphasized Maria Robinson, a Fellow of The Jacquelyn Sanders Foundation.





In an exciting development, the students and professors decided to establish a new Association dedicated to promoting sustainability and environmental conservation in Madagascar. This Association, which will welcome students, professors, graduated professionals, and even the general public, aims to unify efforts towards creating a greener Madagascar. The initiative reflects a shared commitment to environmental stewardship and community involvement, aiming to leverage collective expertise and passion for a sustainable future.

By the end of September, the team aims to have a detailed set of recommendations and research findings ready. These will be presented at the large Innovation Convention hosted by the University of Antananarivo at the beginning of October. The convention is anticipated to be a significant event, attracting educators, policymakers, and industry leaders from across the region, all eager to witness the unveiling of these forward-thinking plans.

“The Innovation Convention will be a landmark event for us - an opportunity to showcase the hard work and innovative ideas generated through this Fellowship, and we hope it will set the stage for transformative changes at the University of Antananarivo.”

The Jacquelyn Sanders Foundation's initiative reflects a growing recognition of the importance of collaborative approaches in addressing educational and environmental challenges. By bringing together diverse minds and fostering a spirit of innovation, the foundation aims to contribute meaningfully to the academic and professional growth of students and educators alike.

As the team works diligently towards their September deadline, there is a palpable sense of excitement and anticipation about the positive changes their efforts could bring. The outcomes of this week-long event are eagerly awaited by all stakeholders, who look forward to the potential advancements in educational practices and policies, as well as significant strides towards environmental sustainability, that could emerge from this ambitious project.



Objectives & Goals

GOAL: Employ developing world Graduate Students as active Analysts and Planners to design solutions to pressing environmental issues of today (10 Fellowships were initially Planned for 2024 - 16 assigned so far)

Graduate Students

**30+ Students applied
16 Graduate Students have signed Contracts (~40 discrete Design Tasks assigned)
Some additional Research Tasks are planned for Summer 2024 which will increase numbers.**

Professors

**Tafita Ralijaoana, Université d'Itasy
Andolalao Rakotoarison, Université d'Itasy**

Universities Involved

**Université d'Antananarivo : 11 Research Fellows
Université d'Itasy : 2 Professor Reviewers / Research Fellows to be added in Summer
Polytechnic School of Antananarivo : 5 Research Fellows**



The Filtration Team is currently working on engineering a scalable design with three different target-sized biological filters:

- **Residential Scale:** Four 200-liter units, designed to deliver 200 liters of potable water per day. Shells will be used as regenerative filter media for the final filtration stage.
- **Laboratory Scale:** Four 1,000-liter units, designed to deliver 1,000 liters of potable water per day. A prototype is being built in Germany and will utilize biochar as regenerative filter media.
- **Large Scale:** Four 10,000-liter units, designed to deliver 10,000 liters of potable water per day. This design is currently in the scaled design phase only.

Prototype Location at University is needed. Water for filtration should be nearby.

TEAM PLAYERS



Fellow:
ANDRIANTSIFERANA, Eliasy
University Antananarivo
Water and Environmental
Science



Fellow:
TOLOTRA, Michela
University Antananarivo
Environmental Engineering



Fellow:
FINARCH, Rafatro
Polytechnique
d'Antananarivo
Petroleum Engineering



Fellow:
**RANDRIATSIHOARANA,
Manjaka**
Polytechnique d'Antananarivo
Hydraulic Engineering



Residential Scale: Four 200-liter Barrels based on Dr. Joshua Kearns biological filter design.



TEAM PLAYERS

The Rainwater Team is currently working on the scalable design of the following:

- **Rain Tower:** Featuring photovoltaic panels and DC pumping systems.
- **Supply and Demand Analysis**
- **Rain Harvesting Analysis**
- **Site-Specific Rain Analysis:** Including average, minimum, and maximum rainfall.
- **Storage Economics Analysis and Planning**
- **Freshwater Ponds Feasibility, Analysis, and Planning**



Fellow:
ANDRIAMAHOLY, Vahatra
Polytechnique
d'Antananarivo
Electrical Engineering



Fellow:
RANDRIANARISOLO, Tokiniaina
Polytechnique
d'Antananarivo
Electrical Engineering



Fellow:
ANDRIAMAHENINTSOA, Charles
University Antananarivo
Chemistry, Water &
Environment



Fellow:
FINARCH, Rafatro
Polytechnique
d'Antananarivo
Petroleum Engineering

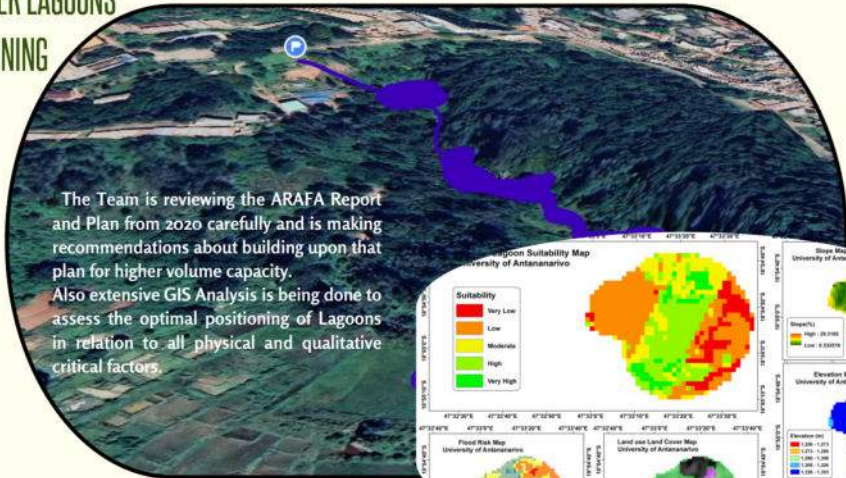


The Team is doing extensive review of the Stormwater Management on the 50 Hectares. Here, we are assessing the condition of underground stormwater drains.



WASTEWATER LAGOONS PLANNING

How Large and Where should the Lagoons be built?



The Team is reviewing the ARAFA Report and Plan from 2020 carefully and is making recommendations about building upon that plan for higher volume capacity. Also extensive GIS Analysis is being done to assess the optimal positioning of Lagoons in relation to all physical and qualitative critical factors.

The Wastewater Team is doing engineering right now for Scalable Design of:

- Biological Natural Lagoons for treating BOD
- Volume Assessment
- Location Assessment
- GIS Analysis for Suitability based on all critical Factors

Additional Tasks will be assigned - seeking a few students from Itasy.

TEAM PLAYERS

	<p>Fellow: ANDRIAMAHOLY, Zo Universite d'Antananarivo Water Treatment Engineering</p>	
	<p>Fellow: RAKOTOMALALA, Jojo Polytechnique d'Antananarivo Chemistry, Water & Environment</p>	
	<p>Fellow: FINARCH, Rafatro Polytechnique d'Antananarivo Petroleum Engineering</p>	

FELLOWSHIP SPECIAL PROJECTS TEAM UPDATE



Some Fellows are working on Special Projects.
Their roles are listed here:

Fellow for Project Management
RANDRIANIAINA, Nomena Sariaka
University Antananarivo
Economics



Fellow for Grant Writing
SIBO, Jeschick
University Antananarivo
Economics



Fellow for Wells Planning
RAMIANDRISOA, Tatiana
University Antananarivo
Environemtnal Engineering



Fellow for Wells Planning
RAKOTOARIVELONIRINA, Luc
University Antananarivo
Water Treatment Engineering



Professional Interpreter
RANDRIANARISOLO,
Tokiniaina
Polytechnique d'Antananarivo
Electrical Engineering



Structural Engineering Planner
RANDRIAMAHERINIAINA, Stenny
University Antananarivo
Environmental Engineering



Earthwork Engineering Planner
FINARCH, Miadana
University Antananarivo
Water Environmental & Process Engineering





“GREEN MADAGASCAR”



WATER INFRASTRUCTURE ENGINEERING ASSOCIATION



Fellowship Students have voiced an Agreement around the idea of a Water Competency Center in Antananarivo (for all the Universities)



Green Madagascar (Water & Tree Conservancy)



Should be open to current Students, Alumni, Professors, and Interested Parties interested in a Green Madagascar.



FELLOWSHIP MONITORING AND REPORTING



Extensive Testing will be done of the two Filtration Prototypes being built.

APA Format for all Research documentation is being demanded of the Students.

Academic Research Results will be published in the JJSF Sustainable Vision Journal in Summer and Fall of this year.



Other Universities seeking support for their Water Infrastructure Planning are invited to engage with the Jacquelyn J Sanders Foundation in order to plan for possible design activities in 2025.



SITE ANALYSIS



Site Plans are being developed for the University

We expect to deliver some drafted overviews of the 50 Acre University facility which will assist in general site planning for all teams and the University Infrastructure Team as well.



GEOGRAPHIC INFORMATION SYSTEM (GIS) ANALYSIS - 3D SIMULATION



**Continuing GIS Analysis by our
International Correspondent in Kenya!**



By Jeffrey Kibe
International Correspondent, Kenya



GEOGRAPHIC INFORMATION SYSTEM (GIS) ANALYSIS - 3D SIMULATION



THE SOUTHERN RICE LAGOONS (ZONE 2A)



Zoom in on The University Rice Field - South



THE NORTHERN VALLEY OF THE UNIVERSITY



Zoom in on The University Northern Valley



BIRD'S EYE VIEW OF THE LAGOONS



Zoom in on the Rice Fields Today



Question & Answers about the Foundation:

Question: How much of a Contribution to JJSF goes into Overhead?

Answer: It is a respectful question to ask "How much of my donation is going to be used to pay the Managers of the Project?"

One thing that we are proud of at the Jacquelyn Jestine Sanders Foundation - is that none of us take any salary. **Like you - we are donors. We take no salaries nor do we gain any profits.** We give our time and our money to support the goals of the Foundation.

As a 501c3 Non-Profit Organization - All donations going into the Foundation account are on a one way street towards being used for Realizing Positive Change. This is the one reason why we exist. The Foundation exists for the purpose of a better tomorrow. We invest in tomorrow as a lifestyle. In fact - to invest in tomorrow is to invest in continuing thriving life on Planet Earth. We use donations exactly for these purposes.

So - be at ease. A donation to the Jacquelyn Jestine Sanders Foundation - is simply - an investment in tomorrow for all of our children.

We have had roughly zero overhead up until this year. As we look forward into the projects ahead - some overhead costs are likely to arise. But our continuing efforts remain to keep our overhead as low as is humanly possible. Furthermore - our Annual Report for 2024 will detail all of the finances for those who are interested.

“Like you - we are donors. We take no salaries nor do we gain any profits“

Question: Why is the JJSF Charitable Strategy Unique?

Answer: Let us take our **Cornerstone 2024 project in Madagascar** this year as an example. We are investing this year to help Graduate Engineering Students at the University to make first use of their engineering skills to design a desperately needed Drinking Water and Wastewater Management Infrastructure for the University. 30 thousand students and the related Faculty will benefit greatly from modernized water infrastructure. But that is only the tip of a very large iceberg we are standing upon. The real winner is the country which is exercising the use of it's educated human capitol.

Now - normally - the planning of such a Project alone - would cost 10's of thousands of dollars. But - without such a set of detailed plans - how will the University build a solution that is efficient, complete, correctly sized, and maintainable? So - this means that a University with a failing Water Infrastructure System - must first invest very significantly in Engineering. This can be prohibitive in critical projects getting started.

This is where JJSF comes into the picture. We are organizing and financing the Engineering Planning for the University. The unique approach we are using saves money and does much more in the process. Why? How?

The Foundation is simply a facilitator of the solution. We are encouraging Graduate Engineering Students to USE their training - to address a very real problem facing not only their University - but their entire country. The Water Infrastructure of the Country - needs attention on all levels. Who should address this desperate need?

Question: What do you mean by Win-Win-Win?

Answer: All parties in an activity can win together. We call this Win-Win-Win activities where there are no losers. We are actively engaged in practicing multi-layered investing in the future. Our goal is to demonstrate that giving in love - is actually profitable in that we can all win together. If many parties win because of any activity - the return on the (time and energy) investment is higher.

We assert that the latent solution to the technical dilemmas facing developing nations today - is residing right at their Universities. The living solutions to the problems are there studying and also living the problems facing their land first hand. They are in the very best position to see and understand the problems. And with some assistance - they are probably also the best positioned to also realize the engineered solutions, based on sound engineering.

We, at the JJS Foundation, believe it is far better to support a solution for the problems by working with those living in the impacted zone. This means for us - cooperating with a University to fund engineering by the students. When we succeed, the University will not only solve it's Water Problems - but it is also building a Center of Competency around a critical engineering need facing the country. This empowers the Competency Center to use those skills again on the next site in the region. This is scalable, efficient, and allows the joy and pride of solving the problems to be owned by the landmen. That pride of success is priceless. It is also part of the profits that come from cooperating with a University that is rich in human capitol.

This is a Model we are actively seeking to practice, refine, and hone. It is a hallmark of the JJSF charitable strategy - building bridges and making central use of human capitol in the impacted region to solve the engineering challenges.

Question: What can I do to aid the Foundation?

Answer: This is the way. This is the way to help developing nations develop. Let us assist them in bringing their intellectual resources into action to solve the problems of the day.

This is the way that we do more than solve the Water Management problems of a University. If we do this work well - we can begin to impact the future of the region by teaching the young engineers in the land how to employ those critical problem solving skills they have been training.

Where you come in: We need help in funding our Fellowships Program. We can fully fund a Research Fellowship for a graduate Student for \$350. That investment will pay much or even all of the costs of a student for a year in many developing nations. It also allows some budget for ensuring a Professor is involved in the review of the work. We pay for study costs while directing research that is relevant for solving real problems. This is Win-Win-Win type of activity.

If you would like to invest in the future with us - Support a Fellowship. \$350 will cover nearly all the study and living costs of a graduate student for one year. We will partner with that Student to make use of their engineering skills. We will team them with other students strategically and facilitate real engineering planning ... in preparation for Realization grant applications. Our next step is to build the engineered solutions with the young engineers.

We believe that: This IS the way.

Will you join us in Building Vision & Realizing Positive Change?

Waterfalls and Solar Disinfection (SODIS)

How Nature Cleans Water

UV CLARIFYING WATERFALL



Image Credits: eawag (www.sodis.ch)

- Nick Coman
Board Member, JJSF

Image credits: Diego Madrigal / Canva

Waterfalls are quite beautiful, but also serve a valuable purpose: They are one of the ways nature cleans water.

In the photo on the left, we see how in Indonesia drinking water is purified by exposing water bottles to bright sunlight. UV light from the sun effectively kills bacteria, viruses, and pathogens in water.

Waterfalls and cascades spread water in a thinner, wider area as it passes, maximizing UV light penetration, as it also oxygenates and ionizes it. This greatly improves water quality, and lowers bacterial and viral content.

Ultraviolet light can penetrate a meter of water and still be effective, as it shines through a waterfall.

Ozone is also created when UV light from the sun interacts with excited water molecules in a waterfall, benefiting the atmosphere and improving air quality.

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