



Fellowship Program – 2024

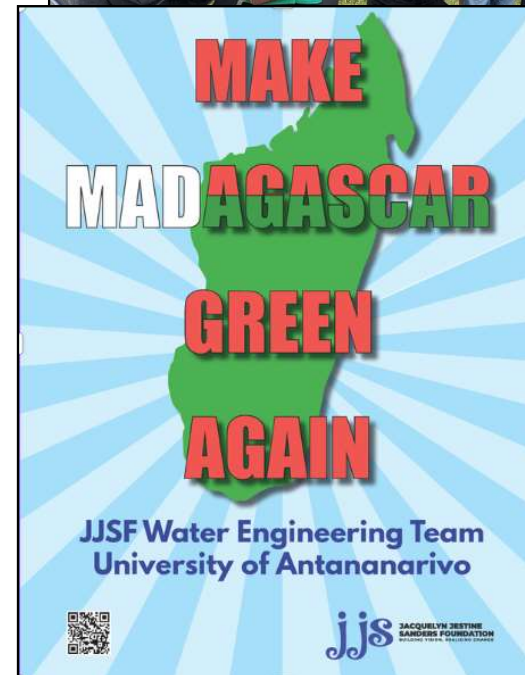
University of Antananarivo  
Water Infrastructure Initiative  
**„The Garden of Eden Project“**



# Introduction: 2024 JJSF-Fellowships @ Antananarivo

- Introduction
- Key Learnings and Challenges
- 2024 Fellowship Achievements
- The Constructed Wetlands Solution
- Prototype Development and Costs
- Academic Journal Insights
- The Path Forward: 2025 and Beyond
- Conclusion

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# Introduction

## The 2020 ARAFA Study and JJSF's Expanded Vision

- The 2020 ARAFA study identified constructed wetlands as a solution to the Biology department's water needs, specifically for wastewater treatment for tree conservation. JJSF used this as a foundation to explore broader water infrastructure solutions for the entire University needs.
- Confirmation: The expanded study concluded that the **constructed wetlands** approach could meet **all** the University's water needs. This comprehensive solution is now referred to as ***the Garden of Eden Project*** at Antananarivo.
- Initial focus: Getting the cleansing Wetlands built for the Tree Conservation efforts.
- Expansion: JJSF expanded the project to address the University's broader freshwater crisis – what is the best way to maintain fresh water?
- Collaborative effort: 18 students from the University of Antananarivo & Polytechnic worked on examining the real-world water challenges. They conducted design studies in key areas such as **rainwater capture, filtration, water storage, and photovoltaic pumping.**



Preliminary design for wastewater treatment at the University of Antananarivo

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# Key Challenges and Risk Management

## • Key Challenges:

- **Lack of regular face-to-face meetings** due to poor internet infrastructure.
- **Security concerns** over the filtration prototype, which represented a significant investment. Fear of theft or damage hindered trust in the investment.

## • Risk Management:

- The **filtration prototype was relocated to Germany** to ensure its security and enable detailed testing. This location allowed for extensive learning opportunities related to pond construction, pump and component sizing and filtration system construction and maintenance.
- While the findings are extensive, the prototype has played a critical role in finalizing the plans, which will soon be published in the **2024 Academic Journal**.

## • Communications:

- It has been noted for future iterations of Fellowships, that a better internet or face-to-face communication strategy needs to be developed, and the program will improve because of our experience this year.

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# 2024 Fellowship Achievements

## 2024—A Year of Significant Success

### • Key Achievements:

- Expanded the **2020 ARAFA project** into a comprehensive water infrastructure solution for the University water in needs in total.
- Completed **numerous in-depth reports and studies**, analyzing the University's water needs and proposing actionable solutions.
- A **450-page research compendium** related to the University's water crisis and proposed solution will be published in November as the **Sustainable Vision Academic Journal 2024**.
- Developed and testing a **working prototype** of the **Garden of Eden landscape**, undergoing continuous improvement. Extensive documentation on the prototype's progress is available on the Foundation's website.

[www.jacquelynsandersfoundation.org](http://www.jacquelynsandersfoundation.org)

# The Constructed Wetlands Solution

## The Garden of Eden Model

- Capture rainwater, store it, circulate, clean, and recycle it to meet the University's freshwater needs.

## Application of the Model:

- The University faces 9 months without rain, making rainwater storage essential for year-round use.
- Constructed wetlands are identified as the most cost-effective method to store millions of liters of water.
- While wetlands for wastewater treatment are widely used across Africa and globally, using them for drinking water storage and treatment requires advanced biological and UV filtration.
- This model not only cleans the University's water, but also:
  - Creates natural habitats,
  - Provides water for tree conservation,
  - Supplies clean water for students and staff.
- Trees are critical for shading freshwater storage, and they also support the development of a community food forest at the University.



# Prototyping the Solution

## The Garden of Eden Model in Action

- **Prototyping:**

- The filtration and lagoon prototype was relocated to the New World Garden in Lower Saxony Germany to ensure its security and enable detailed testing.
- This location allowed for extensive learning opportunities related to pump sizing and filtration system maintenance.
- The prototype now includes water storage in manmade lagoons, with a capacity to capture and store approximately 35,000 liters of rainwater.
- A habitat has been created in Germany to mirror the environment proposed for the Garden of Eden project in Madagascar.
- Covers all water needs: showering, laundry, dishwashing, and drinking.



## Constructing Water Storage Lagoons: Design Factors during Planning & Construction

September 17, 2024 Uncategorized Comments: 0



Coman, September 2024 – Lower Saxony, Germany  
Abstract This technical guide is a comprehensive exploration of the key factors involved in the planning and construction of synthetic-lined water storage ponds. It draws upon the experiences from the New World Garden “Garden of Eden” Prototype Site in Lower Saxony, where methods and designs are being tested ...

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# Sustainable Vision Academic Journal

## Journal Insights

- **Journal Status:** In final editing stages; publishing release expected by November 2024.
- **Content:**
  - Expanded design plans for water solutions at the University.
  - Findings and research outcomes from 2024 fellowships.
  - Will provide detailed documentation and future recommendations.

## Funding Tool:

- The Hardcover Journal can be sent to the funding agencies so that they have a clear plan in hand, for the use of the proposed funding.





# The Path Forward: 2025 and Beyond

- **Implementing the Vision:**
  - Presentation of designs and journal findings to international funding organizations.
  - Objective: Secure funding for the "Garden of Eden" water project in 2025.
  - Construction of the Garden of Eden solution projected to begin in 2026, if funding is secured.
- **Letter of Intent** from the University essential for securing funds has been delivered by the President to the Foundation. The Foundation will be making use of this soon, to begin applying **with** the University for financial support of the planned water infrastructure overhaul.



# Conclusions

## Final Message:

- 2024 was a year of great success in research and prototype development for constructed wetlands as a creative fresh-water solution for the University, and other similar sites.
- The future holds significant potential, with plans to secure funding and begin implementing a sustainable and comprehensive water solution for the University by 2026 – assuming funding is achieved.

## Acknowledgments:

- Thank you to the graduate students who have participated from Madagascar, from Pakistan, from Kenya, from the USA, and from Germany. This global effort has been a joy!
- Thanks to the University of Antananarivo and the Biology Department for their ongoing collaboration.

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