



Pass NetZero Research Progress Report

Reporting Period: Sept-October 2025

Report Date: November 4, 2025

Executive Summary

Pass NetZero achieved significant milestones during September-October 2025, with 5 student researchers (3 at NUST, 2 at LUANAR) advancing their aquatic carbon sequestration studies. Key accomplishments include successful procurement of experimental materials despite supply chain challenges, plant acclimatization protocols implementation, and transition to active experimentation phases.

Organizationally, Pass NetZero strengthened its capacity through successful recruitment of two fundraising interns and one volunteer, implementing a commission-based compensation mechanism that enhanced operational efficiency. Strategic expansion continues with a research agreement proposal submitted to UNZA (Zambia) targeting \$4,250/master's student budget (same as for other universities participating in the project), recognizing the region's mining-related water contamination and wetland methane emission challenges. International collaboration interest emerged from West Ukrainian National University for greenhouse gas monitoring systems. While COP30 accreditation was not obtained, the president will attend the green zone for networking opportunities.

Key Metrics:

- **Active researchers:** 5 students (3 NUST, 2 LUANAR)
- **New team members:** 2 fundraising interns, 1 volunteer recruited
- **Expansion initiatives:** UNZA proposal submitted, Zimbabwe LOI in development
- **International interest:** West Ukrainian National University collaboration
- **Equipment procured:** 45 experimental drums, plant materials secured
- **COP30:** participation of president confirmed

Research Progress

NUST (Namibia)

- Three students in active experimentation phase
- Successfully procured all plant species despite 10-15% transport mortality

- Adapted experimental design (140L drums vs 210L) for cost optimization
- Partnership with SANUMARC addressing laboratory limitations
- Collaboration with City of Windhoek for water sampling access

LUANAR (Malawi)

- Students November defense scheduled, ready to initiate phase 2
- 8m × 6m macrophyte cultivation plots established
- Kauma Sewage Treatment Plant prepared for field studies

Strategic Developments

Regional Expansion

- **Zambia:** UNZA research agreement proposal (\$4,250/master's student)
- **Zimbabwe:** Letter of Intent under development pending funding
- **Ukraine:** West Ukrainian National University expressing collaboration interest

Organizational Growth

- Commission-based compensation mechanism successfully implemented
- Additional volunteer recruitment planned for enhanced online visibility
- Strengthened communications and fundraising capacity

Challenges & Mitigation

- **Procurement delays:** Managed through parallel processing and early submissions
- **Equipment access:** Resolved via municipal partnerships for boat access
- **Laboratory constraints:** Addressed through SANUMARC collaboration
- **Plant stress:** Recovery protocols implemented successfully

Upcoming Milestones (November-December 2025)

- LUANAR proposal defenses
- NUST experimental trials commencement
- Water quality analysis initiation (analytical standards arriving)
- Biobrick production trials using *Ulva rigida*
- COP30 networking activities

Contact Information

Pass NetZero | www.passnetzero.org | info@passnetzero.org

Annex: Student Advancement Reports

Institution:	Namibia University of Science and Technology (NUST)
Title:	Concentration-Dependent Phytoremediation of Eutrophic Dam Water in Namibia: A Microcosm Assessment of Native and Adaptive Aquatic Macrophytes
Name(s):	Dumeni, Veruschka
Date:	18/10/2025

Current Progress

- All plants (three species) have been acquired and have arrived.
- Plant recovery (stress damage during transportation and warehouse storage) and root generation underway, followed by plant acclimatization.
- Experimental drums successfully procured, after intense market survey and scarcity of the quantity needed.
- Changes to experimental design: drum size in the experimental design was changed from 210Lt to 140Lt due to available stock and cost reduction. Similarly, the number of treatments were reduced from 4 to 3, reducing the number of drums required from 52 to 45. Lastly, the research timeline now stands as: Phase 1 - Plant health recovery, Phase 2- Pre-trial acclimatization, and Phase 3 - Experimental set up.
- Procurement of wooden pallets for drum elevation from ground (to avoid ground temperature influences).
- Submersible water pump and generator (all rental services) has been sourced and secured, including piping at cost.
- Formed an enthusiastic team of engineers (students and laboratory technicians) for the creation of demo models of the floater platform structures for the drums (to include both natural and plastic materials to compare which works best and involves less expenses).

Challenges

- Plant stress amidst transportation led to ~ 10-15% *V. zizaniodes* mortality. Assessment of recovery is underway. *C. papyrus* less mortality, but more shoot damage
- Difficulty in finding affordable small boat rentals for representative sampling of the dam (far enough from the shoreline, deep enough).
- Delayed water analysis standards (arriving first week of November), and machine components for analysing heavy metals. This potentially delays pre-trial analysis.

Next Steps

- Strategic aerial mapping of sampling points, with respect to available resources and extent for sampling.
- In communication with City of Windhoek (municipality) to utilize their boats during their routine water sampling, perhaps by aligning sampling dates, sites and joining them.
- Acclimatization phase for plants.

Other Notes

- As sampling of large volumes will be carried out multiple times (3 to 4 times) across the experiment duration, it is advantageous to purchase an electric submersible water pump to avoid expenses of rentals and issues with availability. This tool can be continuously used in successive upscaling research. Quotation sourced.

Institution:	Namibia University of Science and Technology (NUST)
Name(s):	Fenni Magano Amadhila
Research Topic:	Evaluating the potential of <i>Ulva rigida</i> for carbon capture and the development of bio-bricks
Date:	21 October 2025

Current Progress
• Sieved the <i>Ulva</i> fine powder for characterization (Surface Morphology and Elemental analysis (CHNS)). • Visited Kelp Blue and Hangana Abalone in Lüderitz • Collected and grown <i>Ulva</i> in Lüderitz to study growth under controlled conditions.

Challenges
• Limited laboratory facilities at NUST

Next Steps

- Conduct laboratory experiments at SANUMARC (Sam Nujoma Marine and Coastal Resources Research Centre) in Henties Bay.
- Perform other biomass characterization including: Moisture and ash content determination, UV-Vis spectroscopy, FTIR spectroscopy and Thermal stability analysis
- Produce biobricks

Other Notes

Institution:	Namibia University of Science and Technology (NUST)
Name(s):	Hilia N. Hatutale
Date:	04 November 2025

Current Progress

- Waiting on quotation for C. papyrus from local supplier
- Formulated a procedure on how to synthetically spike water with heavy metals
- that the study will focus on
- Finalizing quotation submissions

Challenges

- Looking for a new supplier as the first ones could not keep up to the job
- Getting the quotations in time
- Submitting the quotations
- Finding a local supplier of *C. papyrus*
- Finding a balance between work and my school work
- Missing school meetings due to time clashes

Next Steps

- Submission of quotes
- Mapping out the placement and setup for the NFT hydroponics system in the lab
- Acquiring the testing plants
- Carrying out the experimental procedure

Institution:	LILONGWE UNIVERSITY OF AGRICULTURE AND NATURAL RESOURCES (LUANAR)
Name(s):	ELLEN KACHULU
Research Topic:	EFFICACY OF <i>ARTHROSPIRA PLATENSIS</i> (SPIRULINA) IN CARBON SEQUESTRATION AND <i>OREOCHROMIS SHIRANUS</i> FISH GROWTH PERFORMANCE IN AQUACULTURE SYSTEMS
Date:	3 NOVEMBER, 2025

Current Progress

Current progress summary

The proposal on the *Efficacy of Arthrospira platensis (Spirulina) in Carbon Sequestration and Oreochromis shiranus Fish Growth Performance in Aquaculture Systems* is fully developed. Critical sections including the background, problem statement, objectives, and literature review have been completed with clear scientific justification. The draft methodology is in place, detailing the study site, experimental

design, and parameters to be measured. So far I am about to engage in Spirulina isolation at the farm.

Presentation Readiness

The research proposal is undergoing internal review. At this stage, I am finalizing the remaining sections and preparing the supporting documents required for submission. Once the internal review process is finalized fully, I will proceed towards readiness for presentation to the academic committee at LUANAR.

Challenges

LUANAR schedules for our presentation has delayed, so as we would start data collection. But it is promising soon I will defend the proposal and proceed to data collection.

Next Steps

Upon approval by LUANAR, the next phase will be experimental setup in selected study area and field data collection. The goal is to begin implementation immediately after the proposal is approved to remain on schedule with the research timeline.

Other Notes

Institution:	LILONGWE UNIVERSITY OF AGRICULTURE AND NATURAL RESOURCES (LUANAR)
Name(s):	STEVEN CHIRWA
Research Topic:	THE ROLE OF PHRAGMITES AUSTRALIS AND TYPHA LATIFOLIA IN WASTEWATER TREATMENT AND CARBON SEQUESTRATION (A CASE STUDY OF KAUMA SEWAGE TREATMENT PLANT)
Date:	1 November, 2025

Current Progress
Current Progress Summary As of November 2025, the research proposal is approximately 90% complete. It already includes a detailed introduction, clearly defined objectives, an extensive literature review, a comprehensive methodology, the expected outcomes, as well as a well-structured work plan and budget. The proposal critically outlines how each plant species, as well as their combined use, will be evaluated to determine their contribution to water purification and carbon sequestration at Kauma Sewage Treatment Plant. Presentation Readiness The proposal is currently undergoing internal review and will be finalized in due course. I am well-prepared to present it to the appropriate academic committee at LUANAR in November, 2025. All necessary supporting documents and presentation materials will be developed in readiness for the formal proposal defense.

Next Steps
Upon approval by LUANAR, the subsequent phase will involve the experimental setup at the selected study site, followed by field data collection. The aim is to commence implementation immediately after approval in order to remain aligned with the research timeline. The proposed implementation period is from November 2025.
Other Notes
As part of the preparatory activities for the research, <i>Typha latifolia</i> and <i>Phragmites australis</i> macrophytes have been successfully established on an 8 m × 6 m plot. This initiative is intended to ensure that the plants attain sufficient maturity prior to transplantation into the experimental units. Establishing the macrophytes in advance will help promote uniform growth and enhance their performance during the experimental phase. This marks a key milestone in the readiness of the project for subsequent field implementation.

Next Reporting Period: Nov-Dec-Jan 2025