



United for Change: Partnerships Driving Youth-Led Waste Innovations in Kenya

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Figure 1 Participants at the AFROHUN Kenya 2024 Student Case Competition pose for a group photo. Photo Credit: AFROHUN Kenya

Healthcare waste management continues to be a significant challenge in Kenya, especially in urban centers like Nairobi, where resource constraints and poor adherence to waste disposal guidelines exacerbate health and environmental risks. Hazardous materials such as sharps, infectious waste, and pharmaceuticals are often improperly segregated, increasing the proportion of infectious waste up to 50%, well above the global standard of 10-25%. This mismanagement contaminates water, soil, and air, posing severe public health hazards and environmental degradation. While only 23% of healthcare workers are adequately trained in waste management, practices like crude dumping

and substandard incineration remain prevalent, further highlighting policy and infrastructure gaps. Addressing this issue demands sustainable, locally-driven solutions, innovation, and strong leadership. Multi-stakeholder collaboration and innovative approaches, such as student-led initiatives, are emerging as powerful catalysts for change, offering hope for a cleaner, safer future for healthcare waste management in Kenya. AFROHUN Kenya's Student Case Competition has emerged as a model initiative, demonstrating how youth-led innovation and strategic partnerships can facilitate a powerful transformation in healthcare waste management.



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AFROHUN Kenya: Leading the Charge for Sustainable Solutions

AFROHUN Kenya, with funding support from the USAID

One Health Workforce Next Generation (OHW-NG) initiative, spearheaded the 2024 Student Case Competition to address public health challenges, including healthcare waste management. Collaborating with the University

of Nairobi, Moi University, and other multidisciplinary partners, AFROHUN Kenya provided a platform for students to design innovative and scalable solutions through a structured, One Health-driven competition.

Competition Structure

AFROHUN KENYA STUDENT CASE COMPETITION

14 Universities



60



41

Brought Participants from

Multiple Disciplines

Human Health; Animal Health;
Public Health; Computer Sciences;
Engineering & Environmental
Studies ...



101* Participants

Formed 19 Teams

07* Winning Teams



Our Partners

- Humanities & Social Sciences
- USAID
- USAID OHW-NG Consortium
- AFROHUN
- University of Nairobi
- Moi University
- Private Sector Engagement Program
- Kenya Medical Research Institute (KEMRI)

- Konza Technopolis Development Authority
- Nairobi City County
- YALI RLC East Africa
- Jhpiego
- FHI 360
- Medicine Technologies and Pharmaceuticals Services (MTaPS)
- Cardiff Met University, Wales

The competition attracted 101 students from 14 universities across Kenya, forming multidisciplinary teams to tackle healthcare waste management issues. The program featured:

- **Training Workshops:** Initial sessions to refine problem statements, develop concepts and enhance skills in designing practical solutions.
- **Mentorship:** Guidance from experts in healthcare waste management, technology, and sustainability.
- **Iterative Development:** Teams progressed through stages of ideation, prototyping, and evaluation, with mid-stage eliminations enhancing competitiveness.
- **Key Tools and Methodologies:** Training in intellectual property, prototyping standards, and effective pitching techniques.

The creative ideas generated in the competition exemplify the potential of youth-led innovation in tackling critical public health and environmental challenges. These innovations showcased how technology, when coupled with sustainability, can address real-world problems while promoting environmental stewardship.

Innovative Solutions Presented

Student teams proposed diverse, technology-driven approaches, including:

1

Team Afya Taka

A platform connecting waste generators with recycling services, incorporating reduce, reuse, and recycle (3R) strategies. The solution includes features such as mapping tools, educational resources, and user-friendly interfaces to promote sustainable waste management.

2

Darubini ya Afya

Cost-effective solutions for reducing emissions from healthcare incinerators and enhancing air quality.

3

Smartwaste Innovators

Automated healthcare waste segregation using AI and real-time monitoring, aiming to enhance regulatory compliance and streamline disposal processes.

4

EcoMed Solutions Innovators

Prototype for an automated waste classification system featuring capacity alerts and a mobile app, designed to improve efficiency, safety, and environmental compliance in medical settings.

5

Waste Warriors

Traceable and transparent waste management system in healthcare facilities, focusing on real-time monitoring, data analysis, and education to mitigate illegal dumping and support sustainable practices.

6

Technophiles

Touch-free motion-detection technology for waste bins to enhance hygiene and reduce infection risks. The design emphasizes energy efficiency and user convenience.

4

Medwaste Innovators

Solar-powered autoclaves for sterilizing medical waste, offering an environmentally friendly solution tailored to resource-limited settings, with options for mobile use and leasing.



Weekly engagements provided all-around guidance and focus on the issues at hand. The proposed solutions ranged from renewable energy-driven systems to recycling initiatives and educational campaigns targeting healthcare workers.



Figure 2 Partner Organizations in the AFROHUN Kenya 2024 Student Case Competition. Not in photo, Cardiff Met University



Figure 3 Competition adjudication team. From Left to Right: Boyd Ogonda-Konza Technopolis; Dr. Paul Gichuki-KEMRI; Beatrice Ndinda-YALI RLCEA; James Mwita-Nairobi City County Government; Rosemary Ndivo-YALI RLCEA; Cecilia Mwende-YALI RLCEA; James Munyao-YALI RLCEA. Not in Photo: Rosemary Njura-Jhpiego; Linet Kyule-Jhpiego; Dr. Joseph Mukoko-USAID MTaPS. Photo Credit: AFROHUN Kenya

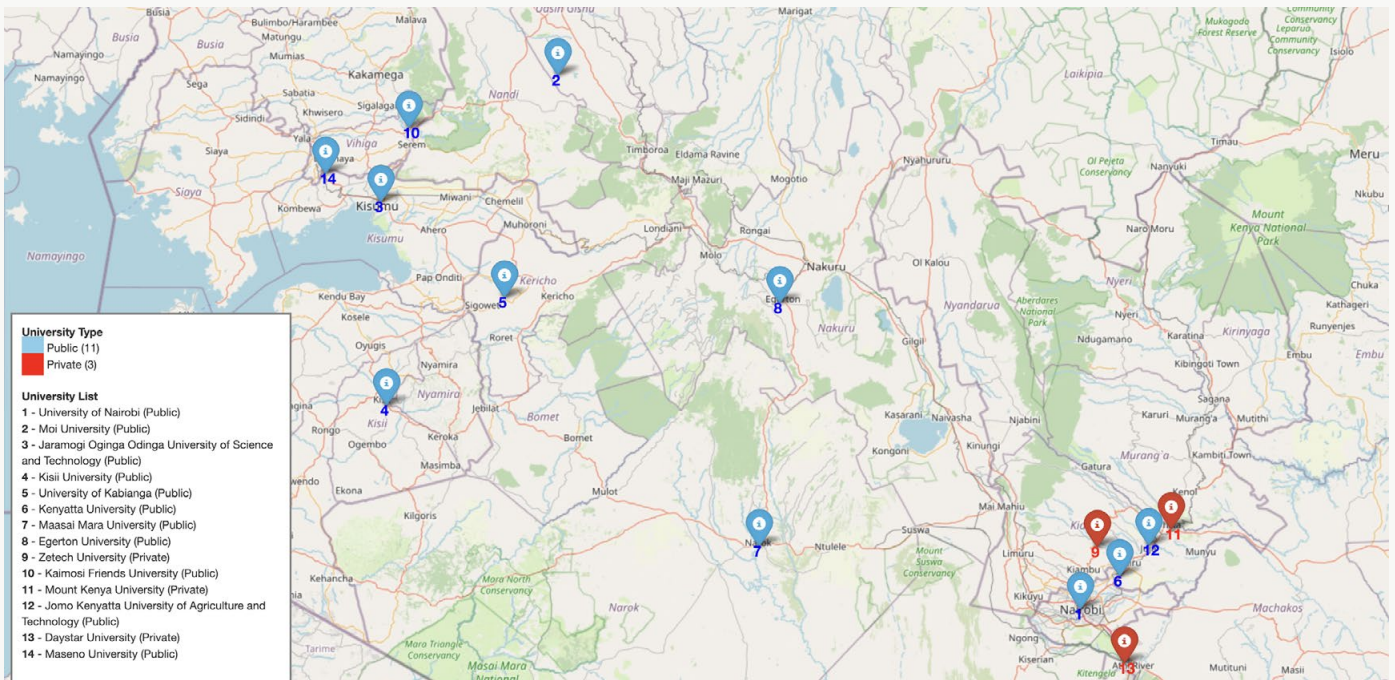


Figure 4 Location of Universities in Kenya that Participated in the AFROHUN Kenya 2024 Student Case Competition

Strategic Partnerships: Transforming Ideas into Impactful Solutions

The solutions showcased at AFROHUN Kenya's Student Case Competition were appreciated for their scalability and potential impact. However, the true strength of these innovations lies in the strategic partnerships that help transform ideas into viable, real-world applications. Multistakeholder partnerships and collaborations can facilitate the integration of these systems into existing health infrastructures through financial and in-kind support, technical expertise, and mentorship. Moreover, national and local government support, for example, from the Nairobi City County Government, plays a pivotal role in implementing environmentally friendly waste management practices in both urban and rural settings.

AFROHUN Kenya's efforts to engage with multistakeholder and multidisciplinary collaboration and its commitment to the One Health approach endeared various

partners to engage in the activity. Each partner brought specialized expertise and unique value that elevated the competition:

- **OHW-NG consortium:** Facilitated peer-reviewed reference resources on medical waste management and provided mentorship and technical expertise.
- **Konza Technopolis:** Provided expertise in technology integration and automation, which is crucial for technology-based solutions for waste segregation. They also participated in the review and selection of the most promising concepts for implementation.
- **YALI RLC East Africa:** Offered leadership training and reviewed innovative concepts for scalability.
- **University of Nairobi and Moi University:** Provided mentorship, hosted workshops and provided logistical support.
- **Jhpiego, Kenya Medical Research Institute (KEMRI), and FHI 360:** Linked students to healthcare facilities and industry experts, ensuring solutions were practical and aligned with infection control standards. Additionally, Jhpiego participated in the training of students during the hackathon as well in the review and selection of the most promising concepts for implementation, while KEMRI likewise participated in the review and selection.
- **USAID MtaPS:** Guided students on regulatory frameworks and private-sector collaboration. In addition, USAID MtaPS provided technical expertise, mentorship, and support to the students and linkages to industry experts, specifically healthcare waste facilities. They also participated in the review and selection of the most promising concepts for

implementation.

- **Nairobi City County Government:** Shared insights into sustainable waste management practices and provided technical expertise. Further, linked students to industry experts and contributed to the conceptualization of the competition theme.

- **Cardiff Met University:**

Delivered mentorship and feedback during key development stages.

The student innovations closely aligned with the goals of all partners, addressing healthcare waste management challenges with innovative, scalable, and sustainable solutions. By incorporating advanced technologies like AI and automation and prioritizing

environmentally friendly practices such as solar-powered sterilization and waste segregation, the projects reflected the shared focus on improving health outcomes, promoting sustainability, and driving innovation. These solutions also offered pathways to regulatory compliance, capacity building, and policy implementation, ensuring their relevance to partners across diverse sectors.

Konza Technopolis: Driving innovation through Smart City Solutions

Konza Technopolis, Kenya's leading innovation hub, recently partnered with AFROHUN Kenya as a key sponsor of the One Health Innovations and Sustainable Solutions for Healthcare Waste Management Student Case Competition. This collaboration exemplifies the power of partnerships in advancing innovation and sustainability.

Through this partnership, Konza Technopolis provides critical support to AFROHUN Kenya, including:

- **In-kind Contributions:** Access to cutting-edge tech infrastructure and mentorship for university students.
- **Network Linkages:** Connecting student innovators to a broad network of partners for resource mobilization.
- **Innovation Marketing:** Promoting student innovations to their partners for potential adoption and scaling.
- **Educational Tours:** Hosting students at the ultra-modern Konza Technopolis Smart City, home to one of the country's largest data centers. This exposure allows students to explore advanced facilities and



Figure 5 Daphne Nekoye, Konza Technopolis. Photo Credit: AFROHUN Kenya

leverage smart city systems in their innovations.

The collaboration enables participants in AFROHUN Kenya's case competitions to advance their prototype innovations while gaining practical insights into how smart city systems can enhance waste management, optimize resource utilization, and promote sustainability. This partnership bridges the gap between theoretical learning and real-world application, equipping students with the tools and knowledge to implement scalable solutions.

Konza Technopolis's involvement not only highlights its leadership in innovation but also underscores the pivotal role of partnerships in addressing societal challenges. By investing in young innovators, Konza is fostering long-term solutions to critical issues and reinforcing Kenya's position as a hub for technological advancement. Konza's vision for a smarter, more sustainable future inspires not only young innovators but also other organizations to embrace collaboration as a pathway to progress.

YALI-RLCEA: Nurturing Young Leaders

The Young African Leaders Initiative Regional Leadership Center East Africa (YALI-RLCEA) plays a crucial role in equipping student innovators with the leadership skills needed to tackle community challenges effectively. Through a partnership with AFROHUN Kenya, YALI-RLCEA will provide tailored mentorship and leadership training, which will help the student teams refine their solutions. By combining entrepreneurial skills with technical expertise, the collaboration will ensure that the solutions developed are not only innovative but also practical and scalable.

Rosemary Ndivo, Deputy Chief of Party at YALI-RLCEA, highlighted the

significance of youth-led innovation in addressing real-world issues:

“At YALI, we believe in the transformational power of youth-led innovation. This collaboration with AFROHUN Kenya provides a unique opportunity to equip young leaders with the competencies, resources, and mentorship needed to develop sustainable solutions for healthcare waste management. The leadership development programs at YALI encourage students to think creatively and develop the resilience needed to implement long-term solutions, setting a strong foundation for innovations.”

By joining initiatives bringing together organizations like AFROHUN Kenya, Konza



Figure 6 Rosemary Ndivo, Deputy Chief of Party YALI-RLCEA, presenting winners of the competition on behalf of the adjudicators. Photo Credit: AFROHUN Kenya

Technopolis, and YALI-RLCEA, stakeholders and partners can amplify their impact, contribute to the development of practical solutions, and play a pivotal role in shaping the next generation of

changemakers. Together, these partnerships can create a ripple effect of innovation, transforming communities and addressing global challenges in meaningful ways.

Lessons Learned and Vision for the Future

The Impact of Preparation and Resources on Student Participation

Adequate preparation and the availability of resources are critical in enhancing student participation and the success of innovation programs. Key lessons learned include:

- **Financial and Logistical Support:** Providing financial assistance and logistical resources ensures equitable opportunities for all participants, enabling them to develop prototypes effectively without resource-related barriers.

- **Tailored Mentorship:** Customized guidance and mentorship accelerate the refinement of innovative solutions, equipping students with the technical and practical skills needed to advance their ideas.
- **Early Partner Engagement:** Engaging partners early in the process facilitates access to crucial resources and data, ensuring that students have the support and information required to align their solutions with real-world challenges.

Building a Sustainable Innovation Hub through Multisectoral Collaboration

AFROHUN Kenya’s vision extends beyond competitions, aspiring to establish Kenya’s first One Health innovation hub. By integrating academia, industry, and government, this hub aims to support innovation through mentorship, training, and resource mobilization, enabling solutions to transition from concepts to implementation. The success of previous initiatives, such as hackathons and student-led innovation activities, highlights the

potential of fostering collaboration across diverse sectors. Continued partnerships with organizations like USAID, Konza Technopolis, and others ensure that these solutions

can be tested, refined, and scaled, leading to lasting improvements in public health and environmental sustainability. This collaborative approach not only strengthens

healthcare waste management efforts in Kenya but also sets the stage for similar innovations across Africa.

Conclusion

AFROHUN Kenya's Student Case Competition exemplifies the power of youth-driven innovation and strategic collaboration in addressing complex public health challenges. By leveraging the creativity of students, the expertise of partners, and the One Health approach, this initiative sets the stage for a cleaner, safer future in healthcare waste management. The lessons learned and partnerships forged will guide future competitions and strengthen Kenya's position as a leader in sustainable health innovations.



Figure 7 Winners of the AFROHUN Kenya 2024 Student Case Competition. From Left to Right: No. 1 Darubini Ya Afya from Mount Kenya University; No. 2 Ecomed Solutions Innovators from Maasai Mara University; No. 3 Smart Waste Pioneers from Moi University. Photo Credit: AFROHUN Kenya



Figure 8 David Mungai, Country Team Lead FHI360 Kenya, engaging with Wesley Njenga, Mount Kenya University (Darubini Ya Afya team leader) during the competition.

ABOUT AFROHUN

Africa One Health University Network (AFROHUN) is an international network, currently in 28 higher education institutions of public health, veterinary medicine, pathobiology, environmental sciences, medicine and global health, in 10 countries in Africa. The countries are *Cameroon, Côte d'Ivoire, Democratic Republic of the Congo, Ethiopia, Kenya, Liberia, Rwanda, Senegal, Tanzania and Uganda*. AFROHUN is formerly OHCEA.

AFROHUN is working to transform the training environment and approaches in universities and allied institutions in Africa, to develop a One Health workforce: a workforce with no disciplinary boundaries. AFROHUN is building a workforce with competency to predict, detect and respond to the kind of complex health challenges we are witnessing today. To achieve this transformation, we are reviewing curricula, designing new and exciting experiential learning multidisciplinary training programs, re-tooling teachers and trainers, educating communities on existence and transmission of zoonotic and infectious diseases, while engaging national and sub-national governments to integrate One Health into national policy and strategic planning.

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