

Turning Air Into Water: A Sustainable Solution for Drought in Turkana County, Kenya

A. Executive Summary

Drought in Turkana County has left many rural communities without reliable access to clean drinking water. Families often travel long distances to collect unsafe water, creating serious health and economic challenges. This proposal introduces solar-powered Atmospheric Water Harvesting Stations—systems that extract moisture from the air and convert it into clean drinking water. This sustainable solution reduces dependence on rainfall and provides a reliable water source. Funding this project will improve health, save time, and strengthen community resilience.

B. Introduction & Problem Context

Turkana County is one of the driest regions in Kenya, with limited rainfall and extreme temperatures. Rural communities near Lodwar face ongoing water shortages. The main problem is the lack of accessible, clean drinking water. Residents often walk miles to reach water sources that may be contaminated. This leads to dehydration, disease, and lost time for education and work. Existing solutions like wells or water delivery are often expensive or unreliable, highlighting the need for a more sustainable approach.

C. Audience & Impact

This proposal targets nonprofit organizations, government agencies, and international aid groups focused on water access and disaster response. The solution will benefit rural families, especially women and children responsible for collecting water. By providing a local, reliable water source, it improves health, reduces physical burden, and allows more time for education and economic activity.

D. Proposed Solution

This project proposes solar-powered Atmospheric Water Harvesting Stations installed in rural communities. Each unit works by pulling in air, cooling it to condense moisture, and filtering the collected water into safe drinking water. The system is powered by solar panels, allowing it to operate without electricity. This approach is effective because it does not depend on rainfall or groundwater. Instead, it uses moisture already present in the air, creating a consistent and renewable water source.

E. Feasibility and Implementation

The project can be implemented in three phases:

- **Design & Planning (1–2 months):** Finalize system and select locations
- **Production (2–3 months):** Build units using existing technology
- **Deployment (1–2 months):** Install units and train local users

Required materials include solar panels, condensation systems, filters, and storage tanks. While output depends on humidity, the technology has been proven to work in similar environments.

F. Budget Overview (Revised)

Each Atmospheric Water Harvesting Station is estimated to cost between \$2,000 and \$4,000, including solar panels, water generation systems, filtration, and installation. A pilot program of 10 units would cost approximately \$20,000 to \$40,000.

Lack of clean water leads to preventable health issues, increasing pressure on limited healthcare resources. It also forces children to miss school to collect water, limiting future opportunities.

By providing a reliable, local water source, this solution reduces healthcare costs, improves education access, and supports long-term community development. With low maintenance costs due to solar power, it is a sustainable and cost-effective investment over time.

G. Qualifications & Credibility

Atmospheric water generation is an existing technology already used in remote and off-grid areas. Solar-powered systems are also widely used in similar environments. This proposal builds on proven methods and adapts them for community-level use, making it both realistic and achievable.

H. Conclusion

Water scarcity in Turkana County is a critical issue affecting health, education, and daily life. Atmospheric Water Harvesting Stations provide a sustainable and scalable solution by turning air into a reliable water source. With proper funding, this project can significantly improve living conditions and help communities become more resilient to drought.