

# THE ROLE OF GREENHOUSE SYSTEMS IN LOCAL PRODUCTION AND CLIMATE RESILIENCE

MOGADISHU  
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## Author

**Abdishakur Daaha** is a Somali multimedia storyteller, researcher, and sustainability educator, specializing in climate resilience and environmental advocacy. He holds a degree in Agriculture and Environmental Sciences from Somali National University and won the 2023 BBC Media Action Somalia Climate Storytelling Competition. Abdishakur is also the Head of Climate and Environmental Sustainability at RAAS Agribusiness Solutions, focusing on sustainable development and empowering marginalized communities.

[abdishakurdaaha@gmail.com](mailto:abdishakurdaaha@gmail.com), +252616968368

## 01. Introduction

Agricultural sustainability and climate resilience are increasingly critical priorities worldwide. Greenhouse technology emerges as a promising solution to mitigate the adverse effects of climate change and enhance agricultural resilience in subtropical areas (Power et al. 2024). Disruption or decline in global and local food supplies due to climate change can be avoided through more efficient irrigation and watershed management, improved crop varieties, improved land cultivation, farm and livestock management and the development of crop varieties and breeds that are adapted to changing climatic conditions (Anon 1947). The implementation of greenhouse technology is a possible avenue for increased agricultural productivity and higher climate resilience in Mogadishu, where environmental degradation and climate variability are becoming more severe. The many advantages of greenhouse systems in Mogadishu, Somalia, are examined in this paper, with a focus on how they might reduce climate risks, maximize resource efficiency, and improve local food security. It explores how greenhouse systems might improve Mogadishu's agricultural landscape and increase community resilience to climate change, using on current research and industry insights.

## 02. Mogadishu's Agricultural Constraints and Climate Vulnerabilities

Mogadishu, the capital and largest city of Somalia, with an estimated population of around 2 million, faces numerous challenges (Elmi and Ali 2024). Due to a variety of environmental stressors like drought, unpredictable rainfall, and rising temperatures, Mogadishu, like a large portion of Somalia, is particularly vulnerable to climate change. These climatic trends affect food security, reduce agricultural output, and raise the possibility of migration for disadvantaged groups (Bezabih 2022). Crop yields, water efficiency, and resilience to harsh weather events are all limited in agriculture, which is heavily dependent on old methods. There is an immediate need for novel agricultural practices due to the mounting strain on natural resources and the rising demand for food.

## 03. Greenhouse Systems: An Overview and Relevance to Mogadishu

The collapse of the central government in Somalia in the early 1990s affected farming adversely as extension services and export of produce came to a halt. (Anon n.d.-a). However, a new crop of young and ambitious farmers and agricultural entrepreneurs are driving an agricultural revolution by introducing modern agricultural practices. Simple greenhouses allow farmers to produce fruit and vegetables all year round, increasing food security for the residents of Mogadishu.

With over 250 greenhouses dotting the outskirts of Mogadishu, these farms are pivotal in ensuring a consistent food supply to Somalia's capital. The country has experienced extreme weather in recent years with prolonged drought and devastating floods. The emergence of greenhouse farming is seen as a way to allow farmers to grow fruit and vegetables for the local market (SAGIR and SAHAL 2022).

In order to establish ideal conditions for crop growth, greenhouse systems provide a controlled atmosphere that enables the adjustment of temperature, humidity, and light. Greenhouses assist stabilize production rates and lessen the adverse effects of climate fluctuation by protecting crops from outside environmental variables. This flexibility is especially helpful in places like Mogadishu, where erratic weather patterns can have a big influence on conventional farming practices. Additionally, greenhouses encourage resource-efficient behaviors, such as conserving water, which is essential in dry and semi-arid areas (Resh 2013).

## 04. Enhancing Agricultural Output through Greenhouse Cultivation

Greenhouse cultivation provides an artificially controlled environment for the off-season production of vegetables, and has played an increasingly important role in agriculture production systems in recent decades (Li et al. 2022). High-value crops may be grown year-round in greenhouses, which is particularly advantageous given Mogadishu's unpredictable environment. Due in large part to improved growth conditions, studies reveal that greenhouse agriculture can boost crop yields by up to 300% when compared to open-field farming (Chacha et al. 2023). Furthermore, greenhouse systems make it easier to employ contemporary agronomic techniques that increase water and nutrient efficiency, like hydroponics and drip irrigation. For example, hydroponic greenhouse systems can save up to 90% on water use, which is a significant benefit in areas with limited water supplies (KHAN 2018). Therefore, greenhouse farming has the potential to improve Mogadishu's agricultural businesses' sustainability and profitability in addition to increasing local production.

## 4. Climate Resilience and Community Adaptation

The greenhouse approach offers a strong foundation for climate variability adaptation and is in line with more general climate resilience objectives. Even during periods of drought or severe weather, greenhouses can stabilize food supplies by lowering reliance on rainfall and establishing safe growing conditions. In order for local populations to endure and adjust to the effects of climate change without turning to unsustainable habits, this stability is essential for community resilience.

Additionally, greenhouse systems facilitate crop diversification by enabling farmers to test high-value, drought-resistant crops that wouldn't normally flourish in Somalia's open fields. Food security in the area can be increased by diversifying crop types within these systems, which can increase nutritional diversity and lessen reliance on imported foods (姫野俵太 2007).

## 05. Socioeconomic Benefits: Employment and Capacity Building

There are also major social advantages to the installation of greenhouse systems, especially with regard to job creation and skill enhancement. Jobs in fields like agronomy, system maintenance, and the use of sustainable technologies are made possible by greenhouse farming. This could aid in addressing young unemployment, a recurring problem in Mogadishu. Additionally, because local farmers and technicians receive training in climate-smart technologies and current agricultural methods, the installation of greenhouse systems offers a platform for capacity building. Building a trained workforce that can sustain and scale these systems over time requires this knowledge transfer (GACSA 2016).

## 06. Policy and Institutional Support for Greenhouse Expansion

The successful expansion of greenhouse systems depends on institutional and policy support. By offering incentives like tax exemptions, grants, or subsidies for sustainable farming methods, policymakers can encourage the adoption of greenhouses. Furthermore, greenhouse projects can be financed and made more accessible to small-scale farmers through collaborations between international development organizations, private investors, and local governments. In recognition of the importance greenhouse technology plays in promoting food security and climate resilience, the Somali government, along with nongovernmental organizations, has lately made agricultural modernization a top priority in its national development program (Bezabih 2022). For greenhouse systems to be integrated into Mogadishu's agricultural sector in a sustainable manner, policymakers must remain committed.

## 07. Policy Recommendations

**1.Encourage the deployment of greenhouse technologies that are climate resilient:** Enact legislation to encourage the use of greenhouses, emphasizing drought-tolerant crops to ensure year-round food production and lessen dependency on erratic weather patterns.

**2.Enhance Capacity Building Initiatives:** Create and support training initiatives that give regional farmers the know-how to run greenhouse systems, emphasizing sustainable farming methods and water-efficient practices.

**3.Promote Water Efficiency Innovations:** To maximize water utilization in dry environments, offer incentives for the adoption of water-efficient technologies like hydroponics and drip irrigation.

**4.Encourage Public-Private Partnerships:** Work with private companies, non-governmental organizations, and international organizations to offer financial and technical assistance for small-scale greenhouse farming, which will help to improve local economies and create jobs.

**5.Support Crop Diversification and Local Food Security:** Implement laws that promote crop diversification in greenhouses, enhancing food security, nutritional diversity, and climatic shock resilience while lowering reliance on imports.

## 08.Conclusion

To sum up, greenhouse systems provide a comprehensive answer to Mogadishu's dual problems of climate resilience and agricultural productivity. Sustainable year-round production, less reliance on rainfall, and local food security are all made possible by greenhouses, which offer a controlled environment that minimizes climatic risks and maximizes resource use. In addition to their positive effects on the environment, greenhouse systems support socioeconomic growth by fostering employment and the development of sustainable agricultural skills. Greenhouses might become a key component of Mogadishu's climate-adaptive agriculture with strong policy backing and sustained investment, enabling local communities to prosper in the face of a changing environment.

## References

1. Anon. 1947. "Food and Agriculture Organization of the United Nations." International Organization 1(2):350–53. doi: 10.1017/S0020818300006160.
2. Anon. n.d.-a. "Somali Farmers Adopt Greenhouse Farming to Beat Hunger: Feature | Somali Observatory for Humanitarian Affairs." Retrieved November 17, 2024 (<https://sooha.org/en/2020/09/04/somali-farmers-adopt-greenhouse-farming-to-beat-hunger-feature/>).
3. Anon. n.d.-b. "Somalia: Greenhouse Farming to Combat Food Insecurity | Africanews." Retrieved November 17, 2024 (<https://www.africanews.com/2024/03/29/somalia-greenhouse-farming-to-combat-food-insecurity/>).
4. Bezabih, Mintewab. 2022. "Climate Change , Adaptation and Building Human Resilience in Somalia." 8–22.
5. Chacha, James, Murugan Thirumalai, Nafue Mathias, Obeid Idawa, Josephine Chilwea, Concheska Kilamba, Bertha Hussy, Kalidoss Rajendran, and Haaniya Ishaq. 2023. "Greenhouse and Open-Field Tomato Farming. A Comparison through Yield and Growth Parameters Investigated in Dar Es Salaam." Innovations in Agriculture (June):1–9. doi: 10.25081/ia.2023.02.1.
6. Elmi, Afyare A., and Faisal N. Ali. 2024. Mogadishu : City Report.
7. GACSA. 2016. "Compendium on Climate-Smart Agriculture & Extension." Supporting Agricultural Extension towards Climate-Smart Agriculture An Overview of Existing Tools 1–87.
8. KHAN, Fraz Ahmad. 2018. "A Review on Hydroponic Greenhouse Cultivation for Sustainable Agriculture." International Journal of Agriculture Environment and Food Sciences 2(2):59–66. doi: 10.31015/jaefs.18010.
9. Li, Xun, Xiaohui Hu, Shiwei Song, and Da Sun. 2022. "Greenhouse Management for Better Vegetable Quality, Higher Nutrient Use Efficiency, and Healthier Soil." Horticulturae 2022, Vol. 8, Page 1192 8(12):1192. doi: 10.3390/HORTICULTURAE8121192.
10. Power, Agricultural, Journal Apj, Timo Sonita, Lira Muhardi, and Eni Karningsih. 2024. "Implementation of Greenhouse Technology as an Adaptation Solution to Climate Change in Subtropical Regions." 1(1):1–8.
11. Resh, Howard. 2013. - Cultural Practices and Environment .
12. SAĞIR, Hayriye, and Muhudin Mohamed SAHAL. 2022. "Effects of Climate Change on Mogadishu And Applicable Policy Priorities." Kent Akademisi 15(3):997–1007. doi: 10.35674/kent.1151771.
13. 姫野倭太. 2007. "No Titleトランス・トランスレーションの分子メカニズム." 生化学 7(3):213–21.



## OUR CONTACTS



**Address:**  
Aaran Plaza, Taleeh  
Mogadishu-Somalia



**Email:**  
[Info@climategm.org](mailto:Info@climategm.org)



**Phone:**  
+252616968368



**Web:**  
[climategenerationmovement.org](http://climategenerationmovement.org)