

Sowing Seeds of Change: Vertical Farming Empowers Women in Urban Agriculture

Koneru Ramya¹ and Gadde Sri Harsha²

¹PhD research scholar, Department of Human Development and Family Studies, University of Agricultural Sciences Dharwad

²PhD research scholar, Department of Extension and Communication Management, University of Agricultural Sciences Dharwad
<https://doi.org/10.5281/zenodo.12594170>

Abstract

A growing number of concerns, including urbanization, food security, agricultural scarcity, and greenhouse gas emissions, underscore the need for vertical farming. It encompasses hydroponics, Aeroponics and aquaponics which utilizes less land, small amount of water as well as reduces CO₂ emissions and transportation expenses compared to traditional agricultural practices. On the other hand, it gives revolutionary solution by optimizing output, preserving resources and advances the gender equality. Acknowledging women's contributions to agriculture, removing obstacles in their path, and offering equitable chances for their active involvement are all critical. By doing this, we can encourage an agricultural industry that is more resilient and sustainable, which will benefit people, communities, and our planet.

Keywords: Vertical farming, women empowerment, hydroponics, aeroponics, aquaponics

Introduction

India boasts one of the world's fastest growing economies. It is the center of the cultivated plant kingdom. A large portion of India's population depends on farming for their living. Therefore, in light of the ever-increasing urbanization, it is imperative that new methodologies be developed, explored, and adapted. Furthermore, India is better suited to grow a greater variety of crops year-round due to its varied climate. India is presently the world's second-largest producer of vegetables, behind China. However, food scarcity still affects it despite being the second-largest producer (Sharma & Kaushal, 2022). It is necessary to find more sophisticated farming techniques that may be used either alone or in conjunction to the existing cultivation methods in order to sustain the market's demand-supply cycle. Hence, vertical farming frames out as a relatively modern idea, nevertheless the origins of vertical farming can be found in Mesopotamia's ancient civilization and the Babylonian Hanging Gardens.



Vertical farming

Most Common Vertical Farms

Hydroponics

This method involves growing plants without soil in nutrient-rich water. Within the grow tray, plant roots are immersed in nutrient-rich water. Through the use of a reservoir beneath the tray, a water pump, and a timer, those grow trays are filled with nutritious solution. The timer is adjusted based on variables such as temperature, watering needs, plant length, fertilizer requirements, and growth cycle of the plant. This is the method that vertical farming primarily uses.



Aeroponics

Aeroponics was developed in response to NASA's mission to discover a productive method of growing plants in space. It is a method of growing plants without the need of liquid or solid media and most sustainable soilless growing method since it requires no replacement of growing media and consumes up to 90 per cent less water than the most efficient conventional systems. Unlike horizontal systems, which usually require water pumps to handle extra solution, aeroponic systems have an upside-



down design that consumes less energy and automatically drains excess liquid but the use of aeroponic technologies in vertical farming has been quite limited.

Aquaponics

Hydroponics and aquaculture share the same habitat. The excrement produced by fish kept in tanks is fed to plants growing on a growth tray as fertilizer. It is cycled in the grow tray because the ammonia content of the water in the fish tank is high. Ammonia is converted by nitrifying bacteria in a growth tray to nitrites, nitrates, and ultimately



vermicompost—a biofertilizer. The fish tank is filled with water that has broken down into the nutrients that plants require. Aquaponics' primary benefit is that, after the first month, just the pH and ammonia levels need to be checked weekly. This eliminates the need for intensive supervision.

Benefits of vertical farming over traditional farming

Vertical farming yields higher yields per acre while utilizing less land. Reused water is also cycled in this farming technique, which reduces expenses and waste. When vertical farming is done right, it can completely remove the need for pesticides in food production. In a controlled vertical farming environment, these forces are neutralized, reducing the likelihood of disruptions to the supply chain process. One major benefit of vertical farming is the ability to grow food closer to the homes of customers. Both CO₂ emissions and transportation expenses are reduced. If you decide to go vertical, you can count on consistent crop yield all year long. Massive workforce would not be required for a continuous, yearly output (Sharma & Kaushal, 2022).

Vertical farming contributes to the protection of the environment as deforestation rises. Since no chemicals or heavy machinery are employed, there are much less occupational dangers associated with indoor farming than with outside farming. Since it doesn't alter the land surface and increases biodiversity, it is more sustainable than traditional farming.

Inclusion of women

Traditionally, women have been integral to many aspects of agriculture, including crop production and seed preservation. Nevertheless, their achievements have frequently gone unnoticed or unappreciated. A more sustainable and inclusive future depends on women being empowered in agriculture, as has become increasingly evident in recent years. Encouraging women to engage actively and fairly in the agricultural industry is known as women's empowerment in agriculture. Women are able to effectively contribute to food production,

biodiversity conservation, and sustainable development through this empowerment, which includes access to resources, expertise, and decision-making power.

Eliminating these barriers based on gender in agriculture could not only enable women to reach their full potential economically and reduce greenhouse gas emissions. Estimates predict a 30 per cent improvement in production for female smallholders if they had the same access to resources as their male counterparts. The majority of the 820 million or more undernourished people in the globe now reside in low-income nations, where women play a crucial role in food production. One hundred and fifty million people may be spared hunger if women had equal access to resources and knowledge as males and were able to increase food production thirty per cent. Furthermore, having additional income would allow women to invest more in their children's education, health care, and nutrition—investments that might benefit farm families and their neighbours in the future.

The Prospects for Vertical Farming

Vertical farming has made it possible to grow plants anywhere, even in small spaces with a regulated growth environment. As well as it boosts the plants' ability to produce continuously in a short amount of time and with less space. Growers often retort that because vertical farming is unaffected by weather or climate, it can enhance productivity and yields. Additionally, producers frequently assert that because vertical farming employs a highly controlled environment and makes more arable land possible, which accounts for 11 per cent of the total land area, the product produced there is of higher quality (Naskoori et al., 2022). Apart from soil degradation and climate change, water is an important resource.

Conclusion

Vertical farming a new era for modern agriculture offers significant economic advantages, with increased efficiency and productivity as well as less resource consumption, and improved sustainability. Its potential to address food security and economic challenges cannot be underestimated. It also paves way for gender equality by highlighting the women inclusion in vertical farming practices which requires limited resources, expertise and decision-making power. Hence it can revolutionize the way production and consumption of food, laying the path for a prosperous and sustainable future.

Reference

<https://www.lettusgrow.com/blog/women-equality-farming>
<https://green.org/2024/01/30/vertical-farms-and-the-role-of-women-in-agriculture/>
<https://green.org/2024/01/30/economic-advantages-of-vertical-farming/>

Sharma, R., & KAUSHAL, S. (2022). Vertical Farm: A Technologically Advanced Approach to Food Security. *Mysore Journal of Agricultural Sciences*, 56(4).