

Role of Entrepreneurship Development in Protected Cultivation of Agricultural Commodities

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Introduction

Entrepreneurship plays a crucial role in modern agriculture, particularly in the domain of protected cultivation, where crops are grown under controlled environmental conditions to maximize yield, quality, and efficiency. Protected cultivation includes methods like polyhouses, greenhouses, shade nets, and other structures that protect crops from adverse weather conditions and pests while allowing for optimal growing environments. As traditional farming faces numerous challenges, such as climate change, land degradation, and fluctuating market prices, protected cultivation offers a promising alternative for sustainable and profitable agriculture. This essay explores the role of entrepreneurship development in advancing the protected cultivation of crops, highlighting its significance, challenges, and potential benefits.

Protected cultivation has emerged as a major cultivation technique in modern agriculture, driven by the need to increase crop production, enhance crop quality, and ensure year-round availability of commodities (Fig. 1). The global population is expected to reach 9.7 billion by 2050, putting immense pressure on agricultural systems to produce more crop production with limited resources (Kaur & Chauhan, 2023). Traditional open-field farming is often subject to the

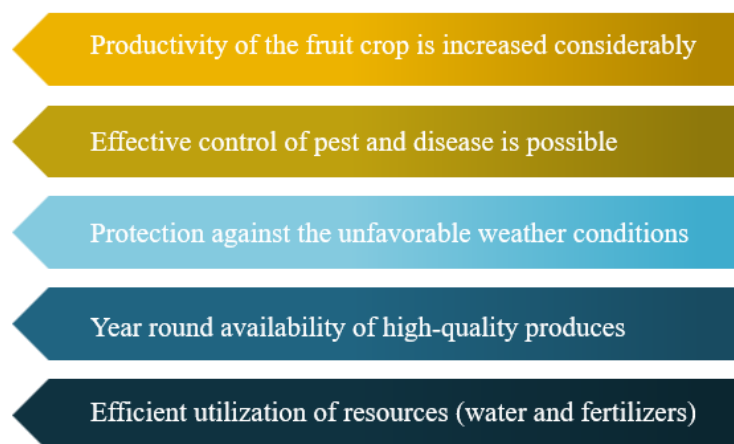


Fig. 1 Advantages of protected cultivation

vagaries of weather, pest attacks, and other uncontrollable factors, leading to inconsistent yields and quality. Protected cultivation, on the other hand, offers a controlled environment where temperature, humidity, light, and nutrients can be optimized to meet the specific needs of particular crop (McCartney & Lefsrud, 2018). On the other hand, protected cultivation may also indicate a comprehensive system of controlled environmental conditions for crop production in which all aspects of the natural environment are modified for maximum growth of commodities and economic return. The adoption of protected cultivation has been driven by several factors (Fig. 2), which is described as follows,

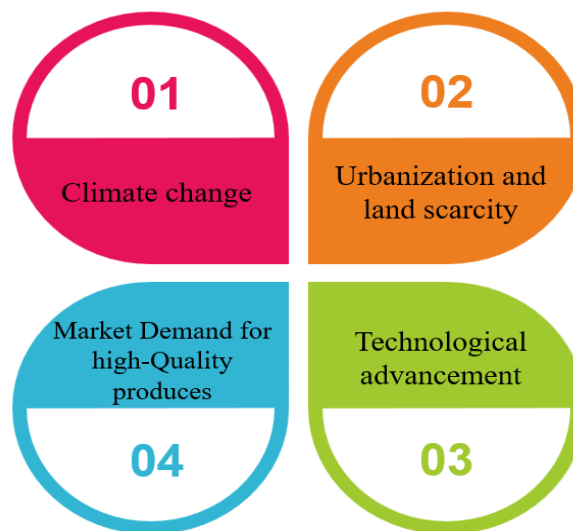


Fig. 2 Factors responsible for the adoption of protected cultivation

1. **Climate Change:** Increasingly erratic weather patterns have made open-field farming more unpredictable and riskier. Protected cultivation mitigates these risks by providing a stable environment for crop growth.
2. **Urbanization and Land Scarcity:** As urban areas expand; agricultural land is becoming scarcer and more expensive. Protected cultivation allows for intensive farming on smaller plots of land, making it a viable option for urban and peri-urban agriculture.
3. **Market Demand for High-Quality commodities:** Consumers are increasingly demanding high-quality, pesticide-free, and year-round availability of fresh produce. Protected cultivation enables farmers to meet these demands by producing crops under optimal conditions.
4. **Technological Advancements:** Advances in materials, sensors, automation, and data analytics have made protected cultivation more accessible and efficient. These technologies allow for precise control of growing conditions, leading to higher yields and better-quality crops.



Entrepreneurship in Protected Cultivation

Entrepreneurship in protected cultivation, involves the identification of opportunities, mobilization of resources, and implementation of innovative practices to create value in the agricultural sector (Gurrieri *et al.*, 2014). Entrepreneurs in this field play a pivotal role in driving the adoption and commercialization of protected cultivation techniques, contributing to the overall development of the sector. The key indicators for the role of entrepreneurship development in protected cultivation are,

1) Innovation and Technology Adoption

Entrepreneurs are at the forefront of adopting and promoting innovative technologies in protected cultivation. They are quick to recognize the potential of new tools, techniques, and practices that can enhance productivity and profitability. For instance, the use of automation in irrigation, climate control, and fertigation (the application of fertilizers through irrigation systems) has revolutionized protected cultivation. Entrepreneurs who invest in these technologies can optimize resource use, reduce labor costs, and improve crop yields.

2) Value Addition and Market Access

One of the significant contributions of entrepreneurship in protected cultivation is the emphasis on value addition. Entrepreneurs recognize that simply producing crops is not enough; there is a need to differentiate their products in the market to achieve higher returns. This can be achieved through various means, such as branding, packaging, processing, and certification etc. This direct marketing approach can lead to better price realization and increased profitability for entrepreneurs engaged in protected cultivation.

3) Risk Management and Sustainability

Entrepreneurs must navigate various risks, including those related to climate, pests, market fluctuations, and financial constraints. However, the controlled environment of protected cultivation inherently reduces many of these risks, making it an attractive option for entrepreneurs. The entrepreneurs adopt practices such as integrated pest management (IPM), water recycling, and the use of renewable energy sources to minimize the environmental impact of their operations (Rezaei *et al.*, 2019). By prioritizing sustainability, these entrepreneurs contribute to the resilience of the agricultural sector and help ensure that protected cultivation remains a viable option for future generations.

4) Employment Generation and Rural Development

Entrepreneurship in protected cultivation has a significant impact on employment generation and rural development. The establishment of polyhouses, greenhouses, and other protected cultivation structures creates direct employment opportunities in construction, maintenance, and



operation. Additionally, the increased demand for inputs such as seeds, fertilizers, and growing media generates employment in related sectors.

Challenges Faced by Entrepreneurs in Protected Cultivation

The entrepreneurship in protected cultivation offers numerous opportunities, it is not without its challenges. Some of the key challenges are,

1. **High Initial Investment:** The cost of setting up protected cultivation structures such as greenhouses and polyhouses can be prohibitively high for many small and medium-sized farmers.
2. **Technical Complexity:** Protected cultivation requires a high level of technical expertise, including knowledge of climate control, pest management, and nutrient management.
3. **Market Access:** While protected cultivation allows for the production of high-quality crops, accessing markets that can offer premium prices can be challenging.
4. **Regulatory Hurdles:** Entrepreneurs in protected cultivation may face regulatory challenges related to land use, water rights, and environmental regulations.
5. **Risk of Crop Failure:** Despite the controlled environment, protected cultivation is not immune to risks such as equipment failure, pest outbreaks, and extreme weather events.
6. **Access to Skilled Labor:** The operation of protected cultivation systems requires skilled labor, particularly in areas such as climate control, irrigation management, and crop monitoring.

In general, the entrepreneurship development plays a vital role in the advancement and success of protected cultivation for better crop production. Entrepreneurs are the driving force behind the adoption of innovative technologies, the creation of value-added products, and the establishment of sustainable and profitable agricultural practices. Through their efforts, they contribute to increased food production, improved crop quality, and enhanced market access, all while addressing the challenges posed by climate change, urbanization, and resource scarcity (Fonta *et al.*, 2011). While the path to success in protected cultivation is fraught with challenges, the opportunities for growth and impact are substantial. With the support of governments, financial institutions, and research organizations, entrepreneurs in this field can continue to innovate, expand, and contribute to the transformation of agriculture. As the world seeks to ensure food security and sustainability in the face of growing populations and environmental challenges, entrepreneurship in protected cultivation will undoubtedly play a crucial role in shaping the future of agriculture.

Conclusion

The role of entrepreneurship development in the protected cultivation of agricultural commodities is increasingly significant as the global agricultural sector faces numerous challenges.



Protected cultivation, which involves growing crops in controlled environments such as greenhouses, polyhouses, or other protective structures, offers a sustainable and innovative solution to problems like unpredictable climate, pest infestations, and declining agricultural productivity. Entrepreneurship development is the driving force that can transform this potential into a profitable and scalable venture, promoting economic growth, rural development, and food security. Entrepreneurs, especially those with a background in agriculture, bring novel ideas and technologies to enhance production efficiency and quality. Through the adoption of climate control systems, automation, and modern irrigation techniques, they ensure optimal growth conditions, leading to higher yields and superior-quality crops. These innovations not only improve production but also address critical challenges like water scarcity and land degradation, making agriculture more sustainable in the long term. Entrepreneurs play a critical role in connecting farmers with markets, ensuring that agricultural commodities grown under protected environments reach consumers efficiently. They develop supply chains, establish distribution networks, and explore market opportunities both domestically and internationally. By understanding market demand, entrepreneurs help farmers diversify their crops, focusing on high-value commodities such as fruits, vegetables, and flowers that fetch better prices. This approach boosts income levels for farmers, encouraging more individuals to adopt protected cultivation methods.

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