



Cloud Farming: A Potential Innovative Model for Rural E-commerce

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Abstract

Cloud farming, a novel e-commerce model enabled by technologies such as the Internet of Things and big data, is reshaping the landscape of rural agricultural development. By allowing urban consumers to remotely participate in livestock farming through digital platforms, cloud farming establishes a direct connection between producers and consumers, enhances land and labor value in rural areas, and stimulates financial investment. This editorial explores the technical foundations, advantages, and potential risks of cloud farming, including concerns over market uncertainty, financial misconduct, environmental impact, and data security. It concludes that while cloud farming presents considerable promise for rural revitalization and urban-rural integration, its sustainable development requires robust risk management, institutional support, and further academic exploration.

Keywords: cloud farming, rural e-commerce, digital agriculture.



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1 Introduction

During the rapid development of global information and communication technologies, many rural e-commerce models have emerged. For instance, China's "Taobao Villages" provide information, logistical, and technical support for the downward flow of industrial and consumer goods and the upward flow of agricultural products [1, 2]. In Kenya, "Twiga Foods" directly purchases fresh agricultural products from farmers, alleviating logistical challenges faced by farmers in transporting their produce to buyers and reducing opportunities for post-harvest losses [3]. The formation of rural e-commerce models in different countries or regions, tailored to local conditions, has provided commercial support for narrowing the urban-rural income gap [4], offering employment and entrepreneurial opportunities [5, 6], and enhancing the economic resilience of family farms [7].

In recent years, amid the transformative surge of digitalization, novel e-commerce models, represented by "cloud farming," have emerged, leveraging technologies such as the Internet of Things, big data, and internet platforms for livestock management [8]. These models have not only broken down the production and sales barriers of traditional livestock farming but also opened up a new pathway connecting urban and rural areas, thereby activating the rural economy.

This editorial discusses and reflects on various aspects

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of the "cloud farming" model, including its technical support, operational mode, advantages, risks, and countermeasures.

2 Technical Support

Traditional livestock farming has long been constrained by empirical and extensive management practices, with farmers often facing issues such as uncontrollable environments and high disease risks. It lags in information technology and market information [9, 10]. In contrast, "cloud farming" utilizes Internet of Things devices to collect real-time data on temperature, humidity, feed consumption, and other factors in livestock farms, combined with artificial intelligence algorithms to provide early warnings on animal health status, thereby upgrading "farming by intuition" to "farming with data" [11].

The core value of "cloud farming" lies in establishing a direct connection between producers and consumers [12]. Urban consumers can adopt a sheep or a cow through a mobile phone application, witnessing its growth in the cloud and obtaining traceable agricultural products [12]. This "subscription + witnessing + harvest" chain addresses the persistent issue of information asymmetry between production and sales in traditional agriculture. Specifically:

On the demand side, customers (typically urban dwellers) derive emotional value from participating in farming, transitioning from "passive buyers" to "co-producers," thereby promoting the adoption of green consumption concepts. On the supply side, farmers secure orders in advance and utilize platform resources to achieve intensive farming, thereby overcoming the dilemma of high yields but low profits.

Therefore, this e-commerce model facilitates a bidirectional flow of value, with "traffic flowing to the countryside and products entering the city."

3 Advantages of "Cloud Farming"

Compared to traditional e-commerce, which facilitates the online movement of agricultural products, "cloud farming" engages rural production factors on a deeper level. Firstly, it contributes to upgrading rural land value by converting idle resources, such as barren mountains and grasslands, into "digital pastures," thereby enhancing land utilization. Secondly, rural human capital is appreciated. Young "new farmers" can obtain technical premiums by operating cloud platforms, attracting talent to return to the countryside. Furthermore, it can attract financial capital infusion.

The prepaid adoption fees from consumers form production start-up funds, helping to alleviate farmers' financing difficulties.

4 Possible Risks and Countermeasures

Despite the immense potential demonstrated by "cloud farming," there are also risks that warrant vigilance. Firstly, there is the risk of capital investment. The emerging e-commerce model has not yet gained widespread market recognition, and farmers who hastily invest funds may face the risk of unsatisfactory output. Secondly, there is the risk of financial alienation. For example, individual platforms conduct securitization-like operations under the guise of "cloud farming," posing hidden dangers of illegal fund-raising and the risk of consumers defrauding their funds [12, 13]. Thirdly, there is the risk of pollution in the rural ecological environment, as large-scale livestock farming may contaminate land, water sources, and air. Lastly, there are data privacy and security risks associated with cloud farming, as it involves extensive data collection and processing, necessitating the prevention of data breaches and unauthorized applications [8].

In response to these risks, this editorial proposes establishing a risk response mechanism that combines "government regulation, platform self-discipline, and farmer collaboration." Specifically, measures such as promoting the use of blockchain technology for product traceability, mandating platforms to establish fund deposit accounts, strengthening supervision and management of the ecological environment and data protection of "cloud farming" operators, and cultivating new agricultural business entities to enhance their risk awareness should be implemented.

5 Conclusion

"Cloud farming" is an innovation in business models and an exploration of reconstructing urban-rural relations in the digital era. It uses technology to bridge the temporal and spatial distance between farmland and urban dining tables, awakening dormant rural resources through the sharing economy mindset. However, it must be acknowledged that at this stage, whether in terms of digital infrastructure, software capabilities, farmers' digital literacy, market recognition, or market size, most rural areas still face significant challenges in implementing "cloud farming." With the further development of technologies such as artificial intelligence, the Internet of Things, and cloud computing, this new e-commerce

model may give rise to more sophisticated business forms, better meet customer consumption experiences, and provide new impetus for rural revitalization.

Because this new e-commerce model faces numerous controversies, risks, and challenges while possessing potential economic and social value, it is hoped that more scholars will pay attention to this research topic and conduct more extensive research using qualitative and quantitative methods.

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Conflicts of Interest

The authors declare no conflicts of interest.

Ethical Approval and Consent to Participate

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