



# Millennial Farmers' Digital Communication Experiences in Smart Agriculture: An Interpretative Exploration

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## ABSTRACT

**Background:** Digital development communication has become a vital focus within agricultural modernization, particularly through smart farming programs targeting young farmers. Despite increasing attention to technology adoption, little is known about how millennial farmers subjectively experience and interpret their engagement with digital agricultural platforms. **Objective:** This study addresses the gap by asking: How do millennial farmers make sense of their participation in digital development communication within smart agriculture programs? **Methods:** Using an interpretative phenomenological approach, the study explores the lived experiences of ten young farmers to uncover how they construct meaning around digital interaction. Data were collected through in-depth semi-structured interviews and analyzed using Interpretative Phenomenological Analysis (IPA), which identified four central themes: digital identity formation, informational confusion, peer-based collective learning, and digital exclusion. **Results:** The findings reveal that digital tools serve not only functional roles but also as spaces for identity, emotion, and social connection, where farmers engage with development messages through interpretative and relational processes. These experiences highlight a mix of emotional responses—including feelings of empowerment, frustration, and distrust—reflecting the complex nature of digital communication, especially in resource-constrained rural settings. **Conclusion:** The study deepens understanding of communication as a lived phenomenon rather than a purely technical process and emphasizes the need for culturally sensitive and experience-based communication strategies in development programs. These insights provide a foundation for future studies to examine digital engagement as a socially embedded experience, with potential to guide more inclusive and reflective communication design in agricultural innovation.



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## INTRODUCTION

In the era of rapid technological transformation, agriculture has emerged as a key sector undergoing digitalization, particularly through smart farming initiatives that integrate data-driven tools and communication technologies. Digital development communication is increasingly promoted globally as a solution to longstanding challenges in rural agriculture, including limited access to market information, agronomic advice, and sustainable farming practices. In this context, young farmers—often referred to as “millennial farmers”—have become central actors in adopting and adapting to these innovations.

The rise of smart agriculture platforms, mobile applications, and social media-based knowledge exchange has redefined how development communication is produced, shared, and experienced within agricultural communities. Development messages now circulate in interactive, networked digital environments where farmers act not only as recipients but also as co-creators of content. While technological uptake and programmatic impact have been well documented, less attention has been given to the subjective experiences of these farmers—how they internalize, respond to, and assign meaning to their engagement with digital communication systems.

Therefore, this study seeks to answer the following research question: How do millennial farmers perceive and interpret their participation in digital development communication within smart

agriculture programs? This experiential dimension is particularly important in settings where communication is not merely functional, but deeply embedded in social relationships, cultural expectations, and identity formation. Among millennial farmers—many of whom are navigating dual roles as both traditional agriculturists and digital natives—the intersection of technology and rural livelihood carries implications that extend beyond productivity. It encompasses feelings of empowerment, confusion, aspiration, and exclusion, depending on the context and quality of communication.

Therefore, a deeper exploration is needed to uncover how these individuals experience digital development communication—not just in terms of access or effectiveness, but through the lens of meaning, interpretation, and lived reality. Such understanding calls for a phenomenological approach that prioritizes first-person narratives and the richness of human experience over abstract generalizations. Recognizing the complexity of these experiences is essential to designing development communication strategies that are inclusive, responsive, and culturally grounded.

In recent years, scholarly attention has increasingly turned toward understanding the lived experiences of individuals as they engage with digital systems and development interventions. Within the field of development communication, this focus on subjective experience is particularly crucial, as communication is not only a medium for information transfer but also a space for negotiation of identity, agency, and social positioning. For millennial farmers operating in digitalized agricultural environments, their personal encounters with communication platforms—ranging from mobile apps to social media—are deeply embedded in both their socio-economic realities and generational expectations.

Despite the growing recognition of experience-centered research, much of the existing literature has been dominated by quantitative assessments that prioritize metrics such as user engagement, adoption rates, or program outputs. While valuable, these approaches often fail to illuminate the internal meanings, emotional responses, and interpretive processes that define how individuals relate to communication technologies. As a result, studies tend to overlook the nuanced realities of how digital development messages are understood, negotiated, or even resisted by their intended recipients.

Moreover, methodological challenges persist in capturing the depth of such experiences. Structured surveys and standardized tools may inadvertently flatten complex phenomena, especially in diverse cultural and geographic settings. These methods often lack the flexibility to accommodate the fluid, evolving, and context-dependent nature of digital interactions in the lives of rural youth. Consequently, the essence of the phenomenon—how millennial farmers live through and make sense of digital communication—remains underexplored in contemporary scholarship.

Addressing this gap requires a methodological shift toward approaches that can honor the richness of human experience and the interpretive frameworks individuals use to navigate technological change. Phenomenology, particularly in its interpretive form, offers such a lens by emphasizing personal narratives and the construction of meaning as central to understanding any lived phenomenon.

To date, efforts to integrate digital communication technologies into agricultural development have largely been informed by practical and instrumental approaches. These initiatives often emphasize increasing access, improving infrastructure, and enhancing digital literacy through standardized programs and policy frameworks. While such efforts are undeniably important, they are typically evaluated using pre-defined success indicators—such as user reach, platform usage frequency, or crop yield improvements—that reflect surface-level engagement rather than deeper cognitive or emotional responses.

These existing approaches tend to reduce communication to a functional process, thereby overlooking the subjective meanings that individuals assign to their digital interactions. As highlighted by Simiyu et al. (2021) and Mujiburrahman et al. (2020), much of the current research remains bounded by positivist paradigms that do not account for the complex social and psychological dimensions of how digital technologies are experienced, particularly by marginalized or transitional groups such as millennial farmers.

What remains insufficiently explored is how these individuals make sense of their participation in digital communication networks: how they interpret messages, navigate conflicting information, construct identities, and express agency within their socio-technical environments. Without such understanding, development interventions risk becoming dislocated from the realities of their intended beneficiaries, leading to disengagement, misuse, or even rejection of technology-based solutions.

This gap calls for a paradigmatic shift—from asking what digital tools are used and how often, to asking how these tools are experienced, what meanings they carry, and why they resonate (or fail to resonate) with users. A phenomenological approach, particularly one rooted in interpretative analysis, offers a promising alternative. By foregrounding lived experience as the central unit of inquiry, phenomenology allows for a deeper, more holistic understanding of digital development communication in the everyday lives of millennial farmers.

Previous research on digital development in agriculture has emphasized technology adoption, behavioral change, and program implementation. However, only a few studies have examined how young farmers interpret and internalize their digital experiences. Studies by Smith et al. (2021) and Ningsih (2024) have begun exploring personal narratives in development contexts but have not focused specifically on millennial farmers in digital agriculture. Most available literature remains centered on outcomes and efficiency, leaving the inner world of the user largely unexplored. This study builds on these gaps by focusing on the personal meaning behind digital communication in smart farming.

To address this, the study applies an interpretative phenomenological approach, which seeks to understand how individuals make sense of their lived experiences. This method is suitable for exploring how millennial farmers experience digital communication—not just what they do, but how they feel, think, and interpret their engagement. The method allows space for complexity, contradictions, and context-specific meanings to emerge from the data. In doing so, the study responds to the central knowledge gap: the absence of experiential understanding in the current literature on digital development communication. The goal is not to generalize, but to uncover the depth of meaning in farmers' voices.

This article is structured into several key sections. It begins with an introduction outlining the research context and knowledge gap. The following sections describe the methodological approach, including participant selection, data collection, and the interpretative analysis process. The Results section presents the core experiential themes derived from participant narratives. Finally, the discussion interprets these findings in light of existing theories and concludes with implications for future development communication practices.

## **RESEARCH METHODS**

### **Study Design**

This study employed an interpretative phenomenological approach to explore the lived experiences of millennial farmers within the context of digital development communication in smart agriculture programs. Interpretative Phenomenological Analysis (IPA) was selected due to its focus on understanding how individuals make sense of their personal and socio-cultural experiences. Phenomenology, in this context, prioritizes subjective meaning and lived realities over generalized patterns, making it particularly appropriate for capturing the nuances and depth of individual interactions with digital agricultural communication platforms.

The interpretative aspect of IPA acknowledges the co-construction of meaning between participant narratives and researcher interpretation, enabling the study to uncover complex and layered understandings of communication experiences in the evolving digital farming environment. This design facilitates a deep engagement with participants' perceptions, emotions, and sense-making processes surrounding their involvement in digitally mediated agricultural development efforts.

### **Participants**

Participants consisted of millennial farmers aged between 22 and 35 years old who were actively involved in smart agriculture programs utilizing digital platforms such as mobile applications,

online forums, or social media for agricultural learning and community engagement. Participants were selected using purposive sampling based on their relevance and experiential knowledge of the phenomenon under study.

Inclusion criteria required participants to be engaged in farming as their primary livelihood, to have used digital agricultural communication tools consistently for at least six months, and to reside in rural or peri-urban areas undergoing development interventions. Exclusion criteria included individuals whose digital engagement was limited to non-agricultural purposes or who were involved only in managerial or non-farming roles.

A total of 10 participants (7 males and 3 females) were included. The average age was 28.4 years. Participants came from diverse agricultural sub-sectors, including rice farming, horticulture, and aquaponics, and were based in regions with varying degrees of digital infrastructure availability, offering a comprehensive view of the phenomenon.

### **Data Collection**

Data were collected through in-depth, semi-structured interviews designed to elicit detailed descriptions of participants' experiences with digital development communication. An interview guide was used to maintain consistency while allowing flexibility for participants to elaborate on their experiences. Interviews were conducted in participants' preferred settings to ensure comfort and openness, with durations ranging from 45 to 90 minutes.

All interviews were audio-recorded with participant consent and transcribed verbatim for analysis. Field notes and reflective memos were also documented to capture contextual information and preliminary interpretive insights. The data collection process spanned over eight weeks and adhered to protocols that ensured a non-intrusive and respectful engagement with participants' lived realities.

### **Data Analysis**

Data were analyzed using Interpretative Phenomenological Analysis (IPA), following a systematic and iterative procedure. Initially, transcripts were read repeatedly to achieve immersion in the data. Meaning units were identified and coded, followed by the development of emergent themes grounded in participants' narratives. These themes were then clustered based on conceptual similarities and reviewed to ensure alignment with the original data.

The analytical process emphasized idiographic engagement with each case before identifying cross-case patterns. NVivo software was used to support the coding process and data organization. The analysis sought to uncover the essence of participants' experiences by integrating both descriptive accounts and interpretative depth, thus capturing the nuanced dynamics of digital communication in agricultural development.

### **Ethics**

Ethical approval was obtained from the relevant institutional review board prior to the commencement of the study. Written informed consent was secured from all participants after they were provided with detailed information regarding the study's aims, procedures, and their rights, including the right to withdraw at any time without consequence.

Anonymity and confidentiality were ensured throughout the research process. All data were stored securely and pseudonyms were used in the reporting of findings to protect participant identities. The study adhered to the ethical guidelines outlined in the Declaration of Helsinki and complied with national research ethics regulations.

## **RESULTS**

This section presents the lived experiences of millennial farmers in engaging with digital development communication within smart agriculture programs. Through a rigorous process of Interpretative Phenomenological Analysis (IPA), four major themes emerged that encapsulate how

these individuals interpret and internalize their interactions with digital platforms, messages, and agents of agricultural development.

### **Digital Communication as a Gateway to Modern Farming Identity**

For many millennial farmers, digital platforms are not merely channels for receiving agricultural knowledge but serve as critical spaces for self-identification and reinvention. The ability to access tutorials, real-time weather updates, and market price analytics through smartphones has transformed how they perceive their role in the agricultural landscape.

“When I first watched a YouTube video on hydroponics and tried it, I realized I wasn’t just a farmer—I became a modern innovator. It made me proud to share my results on Instagram.”

(Participant 4)

This shift in identity is deeply embedded in their interaction with social media, which allows them to broadcast their innovations and engage with broader farming communities, both regionally and internationally. Digital communication enables not just information dissemination, but self-affirmation and status-building.

### **Navigating Informational Overload and Digital Mistrust**

Despite the benefits, participants frequently described feelings of confusion and skepticism in dealing with the vast amount of online agricultural content. The absence of content moderation or certification in digital agricultural messaging was a recurrent concern.

“Sometimes I get five different answers from five different videos. One says use organic fertilizer, another says go chemical. Who should I trust?”

(Participant 7)

Such experiences reflect a gap in digital literacy and critical evaluation, leading to hesitation in applying digital advice. Participants expressed the need for “verified” digital communicators—preferably linked to local government or university-backed initiatives—to bridge the gap between information and practical implementation.

### **Peer Networks and Collective Learning in Digital Spaces**

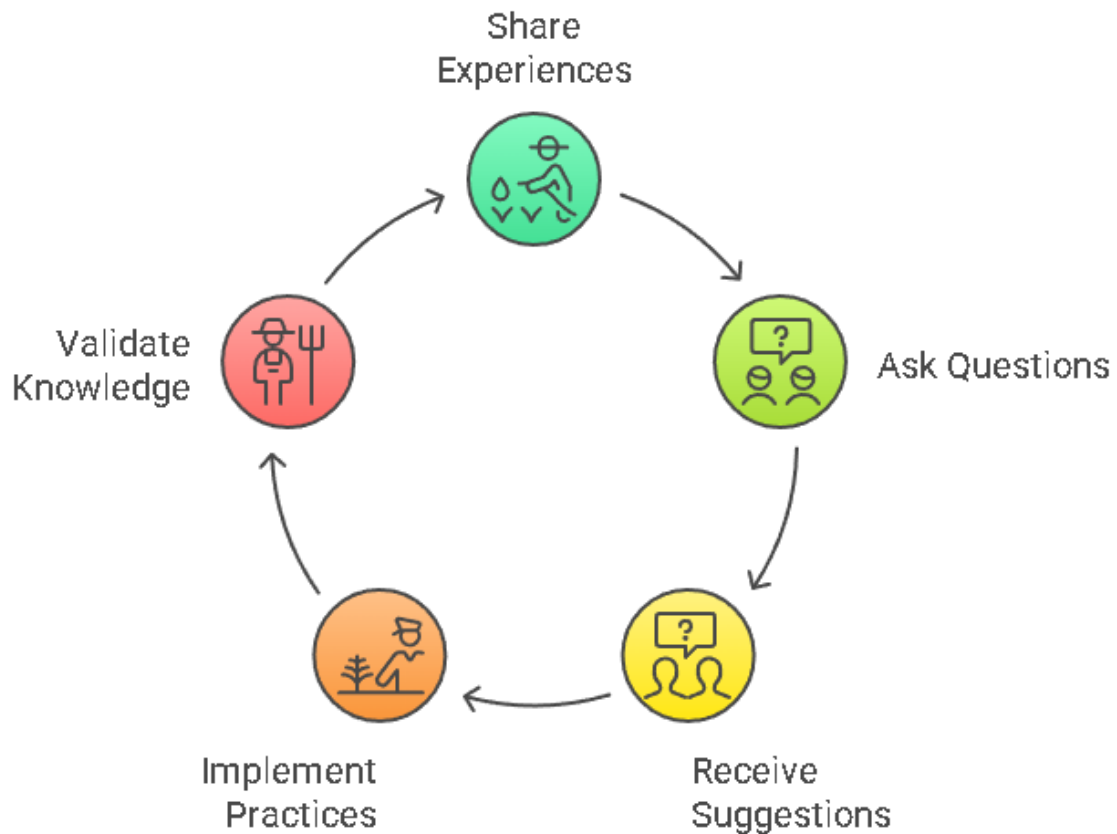
A powerful subtheme emerged around the role of WhatsApp groups, Telegram channels, and local Facebook communities in sustaining peer-based agricultural learning. These platforms functioned as digital “warungs”—informal forums where experiences, doubts, and best practices are shared.

“In our Telegram group, I asked about pest control, and within two minutes, three other farmers gave suggestions. It’s like having a support group at your fingertips.”

(Participant 2)

This peer-driven dynamic illustrates how communication in digital spaces is not unidirectional. Rather, it is dialogic and experiential, where knowledge is co-created and validated through everyday farming practice.

### **Peer-Driven Agricultural Learning Cycle**



### The Uneven Terrain of Digital Inclusion

Access to reliable internet, digital devices, and supportive infrastructure remains a central challenge for participants in more remote rural regions. While some participants described digital technology as “empowering,” others felt excluded due to inconsistent signals, expensive data plans, or lack of technical assistance.

“I want to join online training, but my area has poor signal. Sometimes I download videos in town and watch them later at home.”

(Participant 5)

This digital divide not only limits access to critical agricultural updates but also reproduces social inequalities in access to development benefits. Participants recommended hybrid approaches that combine face-to-face support with digital reinforcement.

The findings demonstrate that millennial farmers perceive digital development communication as a double-edged experience—one that offers empowerment, innovation, and community but also presents barriers of mistrust, exclusion, and overload. Their narratives reveal a strong desire for communication that is credible, inclusive, and context-sensitive, and which acknowledges their role not just as receivers but as co-creators of agricultural development knowledge.

## DISCUSSION

### Summary of Key Findings

This study reveals that millennial farmers experience digital development communication as a dynamic interplay between empowerment, uncertainty, and social belonging. These experiences illuminate how digital platforms are not merely tools for information exchange but are integral to how young farmers construct identity, build community, and navigate agricultural modernization.

### Contribution to the Research Question

The findings directly address the central research question concerning how millennial farmers make meaning of their participation in digital development communication. Rather than perceiving digital tools as passive instruments, participants describe them as gateways to personal transformation, relational learning, and status negotiation within their social environments. This study contributes a phenomenological insight that digital communication in agriculture is not simply a matter of access or literacy—it is an embodied, interpretative experience shaped by aspiration, doubt, and collective agency. The research offers a textured understanding of how technological engagement is lived and understood, presenting a human-centered counterbalance to the predominantly instrumental discourse in smart agriculture.

### **Relationship to Previous Literature and Theory**

These findings resonate with earlier work by Smith et al. (2021), who explored identity negotiation in community health contexts, and extend their insights to the domain of rural development. The theme of peer-supported digital learning aligns with Fatima & Rahman (2020), who underscored the role of interpersonal networks in shaping empowerment. However, unlike many previous studies that focused on outcome-driven metrics, this research uncovers the subjective complexities of digital communication—experiences that range from inspiration to exclusion. It challenges the linear adoption models often found in agricultural innovation literature by highlighting the emotional and interpretative dimensions of digital engagement. Moreover, the results substantiate Heideggerian phenomenological theory, suggesting that technology is always experienced within a contextual world of meaning, not in isolation from it. This connection reinforces the value of interpretative phenomenology in understanding communication as lived experience rather than mere transaction.

### **Explanation of the Implications of Findings**

The findings from this study have several important implications for both scholarly inquiry and practical development efforts. On a social level, they reveal that digital platforms are not neutral spaces but arenas where identity, legitimacy, and social belonging are actively negotiated. For policy-makers and development practitioners, this suggests that success in digital agriculture cannot be measured solely by technology access or usage statistics, but must account for how individuals experience and interpret digital engagement within their cultural and relational contexts. The emotional ambivalence expressed by participants—between empowerment and mistrust—indicates that inclusive design of digital communication must prioritize credibility, local relevance, and participatory feedback mechanisms. Culturally sensitive strategies that integrate peer-led forums and hybrid models of learning may thus be more effective in supporting meaningful engagement across diverse agricultural populations.

### **Study Limitations**

As with all qualitative and phenomenological inquiries, this study does not aim for statistical generalization but for in-depth contextual understanding. The findings are derived from a purposive sample of millennial farmers who are actively engaged in smart agriculture programs, and thus may not reflect the experiences of other demographic groups or regions with different infrastructural realities. Additionally, the reliance on self-reported narratives introduces potential biases related to memory or social desirability. While efforts were made to enhance credibility through member checking and triangulation, the study remains bounded by its interpretative nature and the specificity of its socio-cultural context. These limitations, however, do not diminish the richness of insight but instead underscore the importance of contextuality in interpreting human experience.

### **Future Research Directions**

The interpretative insights generated by this study open avenues for further research into the relational and affective dimensions of digital development communication. Future studies could expand the demographic scope by including women, older farmers, or agricultural extension agents to explore intergenerational and gendered perspectives on digital engagement. Additionally, longitudinal designs may help trace how meanings and experiences evolve over time as farmers' digital literacies and technologies themselves develop. There is also potential to integrate phenomenology with participatory action research to co-create interventions that are not only informed by lived experience but shaped

through it. Such approaches could significantly deepen our understanding of how communication technologies are embedded in, and transformative of, the lived realities of rural populations.

## CONCLUSION

This study explored the lived experiences of millennial farmers engaging with digital development communication in the context of smart agriculture programs. The findings reveal that digital platforms function not only as tools for agricultural knowledge but also as spaces for identity construction, peer interaction, and emotional negotiation. These experiences highlight the need for more nuanced, human-centered development communication strategies that reflect users' realities rather than assuming uniform technological adoption. By applying an interpretative phenomenological approach, this research fills a gap in understanding the subjective meanings behind digital engagement, which prior studies have often overlooked. The study emphasizes that successful communication interventions must consider the cultural, emotional, and relational dimensions of digital use. Future research may benefit from expanding participant diversity and employing longitudinal designs to trace the evolution of these experiences over time.

## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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