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Participatory video documentation of indigenous agricultural knowledge for extension system integration in South Korea

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Abstract

South Korea possesses rich indigenous agricultural knowledge accumulated over millennia of intensive farming, yet this knowledge is disappearing as aging farmers retire without transmitting their expertise to younger generations. This research evaluated participatory video (PV) as a method for documenting indigenous agricultural knowledge and integrating it into formal extension systems. A mixed-methods design compared four documentation approaches: participatory video, photo-text materials, audio recordings, and text manuals across 178 farming households in three provinces between March 2022 and December 2023, coordinated through Seoul National University. Participatory video outperformed all other methods on knowledge transfer effectiveness: technical knowledge (4.28 vs. 3.12-3.47, $p < 0.001$), procedural skills (4.41 vs. 2.31-2.94, $p < 0.001$), and peer learning stimulation (4.52 vs. 2.18-3.42, $p < 0.001$). Farmer engagement in the documentation process was 3.4 times higher with PV than with other methods. The six-stage PV documentation cycle, from community identification through extension integration, proved effective for capturing tacit knowledge that resists textual description. These findings support PV as a practical bridge between indigenous knowledge systems and modern extension services.

Keywords: Participatory video, indigenous knowledge, agricultural extension, knowledge documentation, tacit knowledge, intergenerational transfer, traditional farming, South Korea, knowledge preservation

Introduction

Korean agriculture carries a knowledge inheritance stretching back over 5,000 years, encompassing sophisticated practices in rice paddy management, companion planting systems, natural pest management, and seasonal food preservation techniques refined across countless generations [1]. Much of this knowledge is tacit rather than explicit: it resides in the practiced hands and experienced eyes of elderly farmers who learned through decades of observation and doing, not through manuals or classroom instruction [2, 3]. As South Korea urbanizes rapidly and its farming population ages, with over 46% of farmers now above 65 years, this embodied knowledge faces extinction within a single generation [4].

Conventional documentation methods, primarily text-based technical manuals and photograph collections, struggle to capture the procedural, contextual, and sensory dimensions of indigenous agricultural knowledge [5]. A farmer explaining how to judge soil readiness by its feel between the fingers, or how to time transplanting by reading subtle environmental cues, conveys knowledge that words and static images preserve poorly [6]. Participatory video, in which community members themselves control the documentation process, offers a potentially superior approach because it can record embodied practices in context while preserving the cultural narratives that give them meaning [7, 8].

This research assessed: (a) the comparative effectiveness of

four documentation methods for transferring indigenous agricultural knowledge; (b) the level of farmer engagement each method generated; and (c) the feasibility of integrating PV-documented indigenous knowledge into formal extension programming [9, 10].

Materials and Methods

Materials

A quasi-experimental comparative design assigned 178 farming households across Gyeonggi, Chungcheong, and Gyeongsang provinces to one of four documentation method conditions: participatory video ($n = 46$), photo-text ($n = 44$), audio recording ($n = 45$), and text manual ($n = 43$) between March 2022 and December 2023. Indigenous knowledge topics documented included traditional rice variety management, natural composting techniques, companion planting systems, and seasonal water management. Each condition documented the same set of eight knowledge topics to enable direct comparison. The structured survey contained 38 items measuring knowledge transfer effectiveness, engagement levels, cultural value preservation, and extension integration feasibility. In-depth interviews with 28 elderly knowledge holders and 16 extension agents supplemented quantitative data. Ethics approval was obtained from Seoul National University Institutional Review Board (Protocol SNU-CALS-2022-009, February 2022).

Methods

Knowledge transfer effectiveness was assessed through a 20-item test administered to knowledge recipients 30 days after exposure to documented materials, covering five domains: technical knowledge, procedural skills, problem solving, peer learning stimulation, and long-term retention. Between-group comparisons used one-way ANOVA with

Tukey post-hoc tests. Engagement was measured through participation hours, voluntary contribution frequency, and a 10-item engagement scale. Content analysis of the PV materials assessed how effectively they captured tacit knowledge elements. Interview data were analyzed using thematic analysis. All analyses used SPSS 28.0 at $p < 0.05$.

Results

Table 1: Knowledge transfer effectiveness scores by documentation method and domain

Domain	PV (n=46)	Photo-text	Text manual	F-value (p)
Technical knowledge	4.28	3.47	3.12	18.34 (<0.001)
Procedural skills	4.41	2.94	2.31	31.72 (<0.001)
Problem solving	3.87	3.12	2.74	12.48 (<0.001)
Peer learning	4.52	2.81	2.18	38.41 (<0.001)
Long-term retention	4.14	3.08	2.47	22.67 (<0.001)
Overall mean	4.24	3.08	2.56	27.14 (<0.001)

ANOVA revealed significant differences across all five knowledge domains. Tukey post-hoc tests confirmed PV scored significantly higher than all other methods in every domain ($p < 0.01$). The largest PV advantage appeared in

peer learning stimulation (4.52 vs. 2.18-3.42), where the video format enabled viewers to observe social interactions and group problem-solving that static methods could not capture.

Table 2: Farmer engagement indicators by documentation method

Engagement Indicator	PV	Photo-text	Audio	Text
Participation hours (mean)	14.7	6.2	4.8	3.1
Voluntary contributions (#)	8.4	3.1	2.6	1.4
Engagement scale (1-5)	4.38	3.12	2.87	2.41
Satisfaction rating (1-5)	4.51	3.28	3.14	2.67
Would recommend (%)	91.3	61.4	53.3	41.9

PV generated substantially higher engagement across all indicators. Farmer participation hours were 3.4 times higher for PV (14.7 hours) compared to the mean of other methods (4.7 hours). The 91.3% recommendation rate for PV far

exceeded other formats, with elderly knowledge holders describing the video process as affirming their expertise in ways that other documentation methods did not.

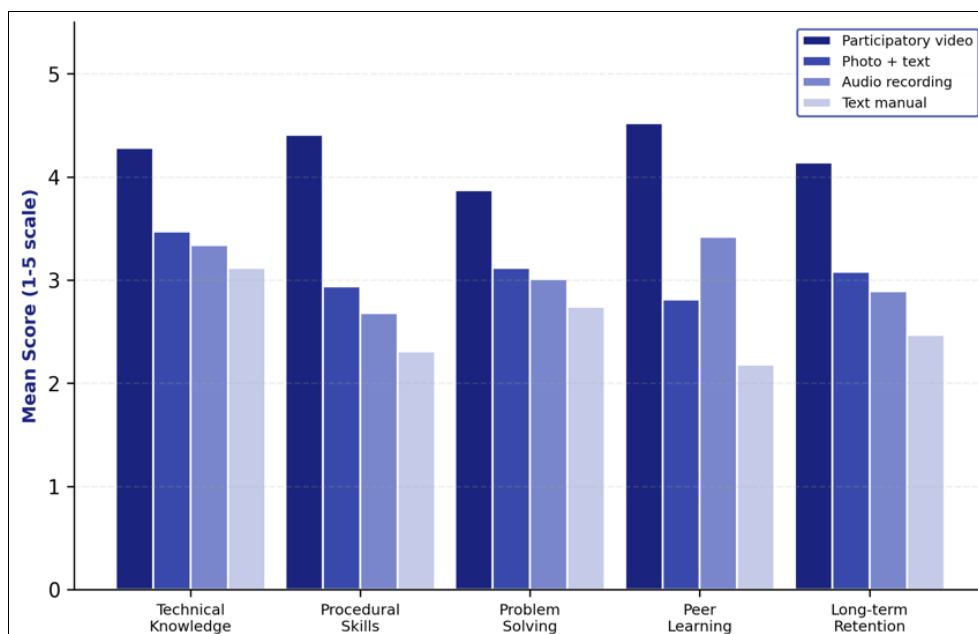


Fig 1: Knowledge transfer effectiveness scores across five domains for four documentation methods

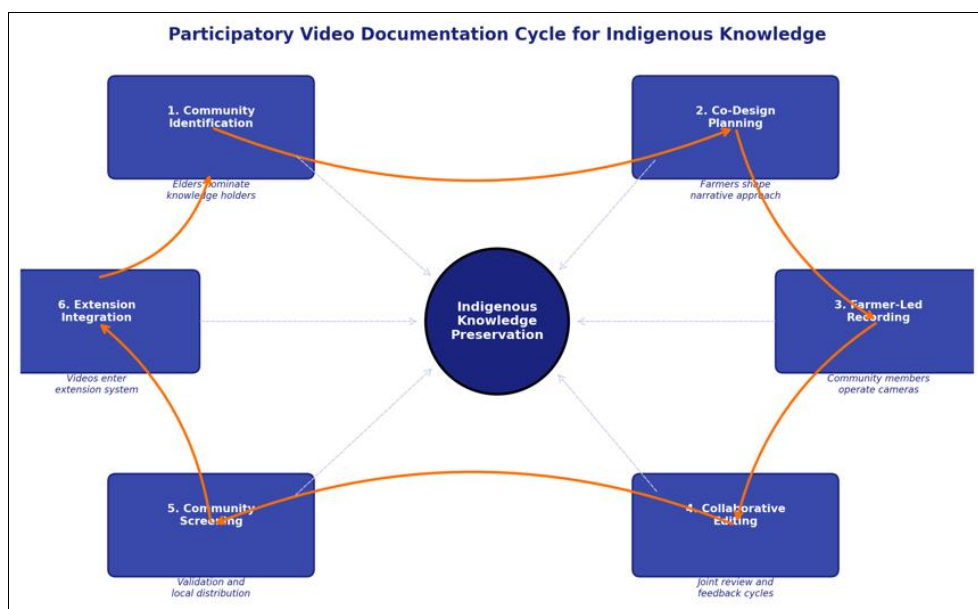


Fig 2: Six-stage participatory video documentation cycle for indigenous agricultural knowledge preservation and extension integration

Comprehensive Interpretation

Content analysis of the PV materials identified three categories of tacit knowledge that video captured effectively but other methods did not: embodied practices (hand movements, tool handling, physical judgment), environmental reading (interpreting soil conditions, weather cues, plant health indicators), and social negotiation (how experienced farmers make collective decisions about shared resources). Interview data revealed that elderly knowledge holders valued the PV process itself as an act of recognition, with several describing it as the first time anyone had treated their farming knowledge as worth preserving systematically.

Discussion

The consistent superiority of participatory video across all knowledge domains supports the theoretical argument that indigenous agricultural knowledge is fundamentally multimodal and cannot be adequately reduced to text [2, 5]. The particularly large advantage in procedural skills (4.41 vs. 2.31 for text) reflects the embodied nature of farming practices: watching a 70-year-old farmer demonstrate how to prepare a traditional compost pile, adjusting technique based on material moisture visible on screen, transfers knowledge that written instructions simply cannot convey [6, 7].

The 3.4-fold engagement advantage of PV merits attention beyond its implications for knowledge quality. High engagement suggests that PV addresses a motivational dimension of knowledge documentation that other methods miss. Elderly farmers who may feel marginalized by modernizing agriculture experienced PV as an opportunity to demonstrate mastery and receive social recognition [11, 12]. This intrinsic motivation may explain why PV knowledge holders contributed more content voluntarily and participated more hours than those in other conditions. Extension agents interviewed about integration feasibility expressed enthusiasm tempered by practical concerns about video production skills, equipment costs, and institutional readiness to incorporate non-text materials into extension

programming [13, 14]. However, the increasing availability of smartphone video and declining editing costs make PV more accessible than it was a decade ago. Several agents noted that younger farmers specifically requested video-format extension materials, suggesting growing demand-side readiness.

Ethical Considerations

Documenting indigenous knowledge raises significant intellectual property and cultural sensitivity concerns. The research protocol established that ownership of all documented knowledge remained with the knowledge holders and their communities. Informed consent included explicit provisions regarding how materials would be used, who could access them, and community veto power over any content before distribution. Knowledge holders reviewed and approved all video materials before they entered the extension system. Cultural protocols were observed regarding knowledge that communities considered sacred or restricted to particular social groups. A benefit-sharing arrangement ensured that participating communities received complete copies of all documented materials for their own use.

Limitations

The quasi-experimental assignment to documentation methods was based on community preference rather than random allocation, introducing potential selection bias. The 30-day retention assessment may not capture longer-term knowledge persistence. The three provinces studied, while geographically diverse, represent only a portion of Korean indigenous agricultural knowledge traditions. The research focused on knowledge recipient outcomes but did not systematically assess the accuracy or completeness of knowledge captured from the perspective of expert knowledge holders. Video production required more resources and time than other methods, a practical constraint not reflected in effectiveness comparisons alone.

Practical Applications: Extension systems seeking to

document and preserve indigenous agricultural knowledge should consider PV as a primary method, particularly for procedural and embodied practices. The six-stage documentation cycle provides a replicable framework: community identification of priority knowledge, co-design of documentation plans, farmer-led recording, collaborative editing, community screening, and extension integration. Smartphone-based recording has reduced equipment barriers considerably. Extension organizations should train facilitators in PV methodology and establish digital archives with clear ownership and access protocols. Integration into formal extension can begin with curated video libraries accessible through existing extension channels, gradually expanding as institutional familiarity with video-based materials grows.

Conclusion

Participatory video outperformed photo-text, audio, and text documentation methods across all knowledge transfer domains, with the strongest advantages in procedural skills and peer learning. Farmer engagement was 3.4 times higher with PV than with alternative methods, reflecting both the superior capacity of video to capture multimodal knowledge and the motivational value of participatory documentation for elderly knowledge holders.

As South Korea and other rapidly modernizing agricultural economies confront the loss of indigenous farming knowledge, participatory video offers a practical and effective preservation pathway. The method captures tacit, embodied, and contextual dimensions of knowledge that text-based approaches inevitably lose, while simultaneously affirming the value of traditional expertise and generating materials that younger farmers actively prefer to receive.

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