

International Journal of Agriculture Extension and Social Development

Volume 7; Issue 11; November 2024; Page No. 210-213

Received: 21-09-2024
Accepted: 25-10-2024

Indexed Journal
Peer Reviewed Journal

Credibility assessment of agricultural information sources by smallholder farmers across communication channels

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DOI: <https://doi.org/10.33545/26180723.2024.v7.i11c.3148>

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Abstract

Farmers receive agricultural information from many sources but act only on what they consider credible. This research examined how 284 smallholder farmers in the Pelagonia region of North Macedonia assessed the credibility of six information sources across different communication channels between October 2021 and March 2023. Extension agents received the highest credibility rating (4.21/5), followed by fellow farmers (3.87/5), while social media scored lowest (2.14/5). Credibility judgments were shaped by perceived expertise, trustworthiness, personal experience with the source, and message consistency. Source credibility significantly predicted adoption behavior ($\beta=0.43$, $p<0.001$), with a credibility threshold of approximately 3.5/5 below which adoption probability dropped sharply.

Keywords: Source credibility, agricultural information, smallholder farmers, communication channels, trust assessment, extension agents, adoption behavior, information evaluation, Pelagonia

Introduction

A tobacco farmer in Pelagonia receives conflicting advice: the extension agent recommends reducing nitrogen application, a neighboring farmer swears by higher doses, and a social media post promotes an untested organic alternative. The farmer must decide whom to believe before planting season begins. This scenario plays out daily across smallholder communities where multiple information sources compete for farmer attention and trust ^[1]. Which sources farmers judge credible determines which advice they follow, making credibility assessment a critical bottleneck between information availability and technology adoption ^[2].

Source credibility research in communication studies identifies expertise, trustworthiness, and dynamism as core dimensions ^[3]. But agricultural information credibility operates differently from media or political credibility because farmers can directly test recommendations against observable field outcomes. This feedback loop means credibility is earned and lost through practical verification rather than rhetorical persuasion alone ^[4]. Despite its importance, credibility assessment by farmers across different communication channels has received limited empirical attention ^[5]. This research examined how smallholders in North Macedonia evaluated the credibility of six information sources and how these judgments predicted adoption decisions ^[6].

Research area description

The Pelagonia region lies in southwestern North Macedonia (approximately 41.0°N, 21.4°E), encompassing the country's largest agricultural plain. The region produces

tobacco, wheat, sunflower, and vegetables across holdings averaging 2.8 hectares. Farm households access extension through the National Extension Agency, farmer cooperatives, input dealers, community radio, and increasingly through mobile applications and social media platforms ^[7].

Material and Methods

Material

The research surveyed 284 smallholder farmers from six municipalities in Pelagonia, selected through proportionate stratified sampling by farm size and crop type. A structured questionnaire measured credibility perceptions across six sources (extension agents, fellow farmers, radio, mobile apps, input dealers, social media) using validated multi-item scales. Semi-structured interviews (n=32) explored the reasoning behind credibility judgments ^[8].

Methods

Data collection ran from October 2021 through March 2023 at Ss. Cyril and Methodius University, Skopje. Credibility was measured on a 5-point composite scale with four subscales: perceived expertise, trustworthiness, experiential verification, and message consistency ^[9]. Adoption behavior was tracked for three specific recommendations delivered through each channel during the research period. Multiple regression tested credibility as an adoption predictor. Threshold analysis identified the credibility score below which adoption probability declined sharply ^[10]. Ethics approval was obtained (Protocol UKIM-REC-2021-061, September 2021).

Ethical considerations

The UKIM Research Ethics Committee approved this research (Protocol UKIM-REC-2021-061, September 2021). Informed consent was obtained from all participants. No

individual source credibility ratings were shared with extension agencies or input dealers to prevent potential retaliation against farmers providing critical assessments.

Results

Table 1: Credibility ratings by information source and dimension (n=284)

Source	Expertise	Trust	Verific.	Consist.	Overall	p-value
Extension agents	4.38	4.12	4.07	4.28	4.21	ref
Fellow farmers	3.54	4.21	4.18	3.56	3.87	<0.01
Radio programs	3.61	3.44	3.08	3.54	3.42	<0.01
Mobile apps	3.21	2.87	2.74	3.12	2.98	<0.01
Input dealers	2.94	2.41	2.87	2.63	2.71	<0.01
Social media	2.08	1.94	2.12	2.41	2.14	<0.01

Extension agents scored highest overall (4.21) driven by perceived expertise (4.38). Fellow farmers scored highest on

trustworthiness (4.21) and experiential verification (4.18), exceeding extension agents on both dimensions.

Table 2: Credibility as predictor of adoption behavior (logistic regression)

Predictor	β	SE	OR	95% CI	p-value
Overall credibility	0.43	0.07	1.54	[1.34, 1.77]	<0.001
Prior experience	0.28	0.08	1.32	[1.13, 1.54]	<0.01
Education (years)	0.14	0.06	1.15	[1.02, 1.30]	0.03
Farm size (ha)	0.09	0.07	1.09	[0.95, 1.26]	0.19

Source credibility was the strongest adoption predictor (OR=1.54). A credibility threshold around 3.5/5 marked a sharp decline in adoption probability sources below this

score were rarely acted upon regardless of information quality.

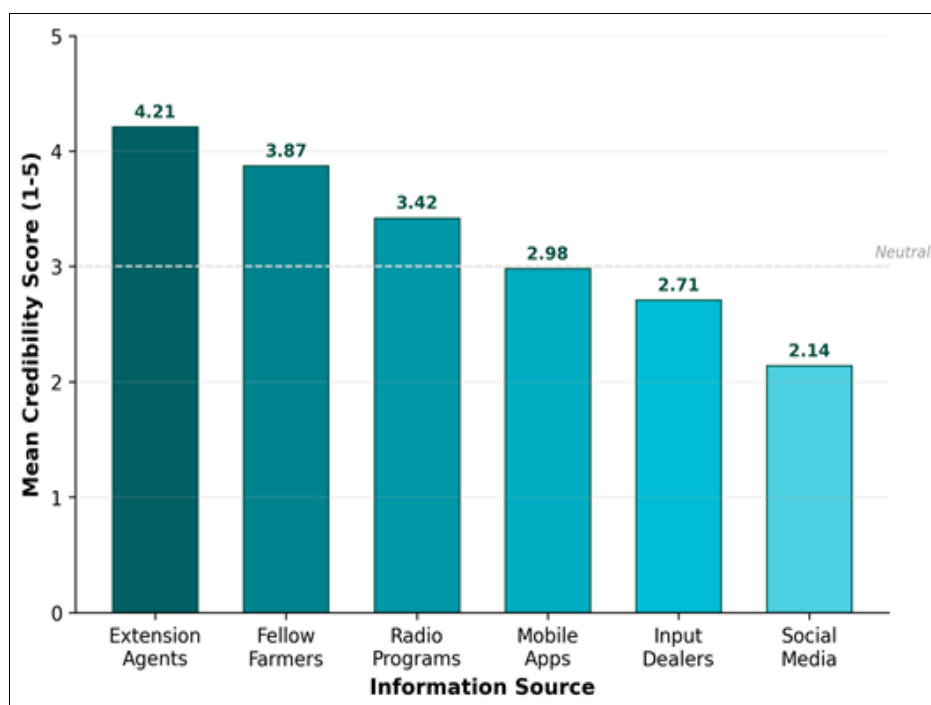


Fig 1: Mean credibility ratings across six agricultural information sources

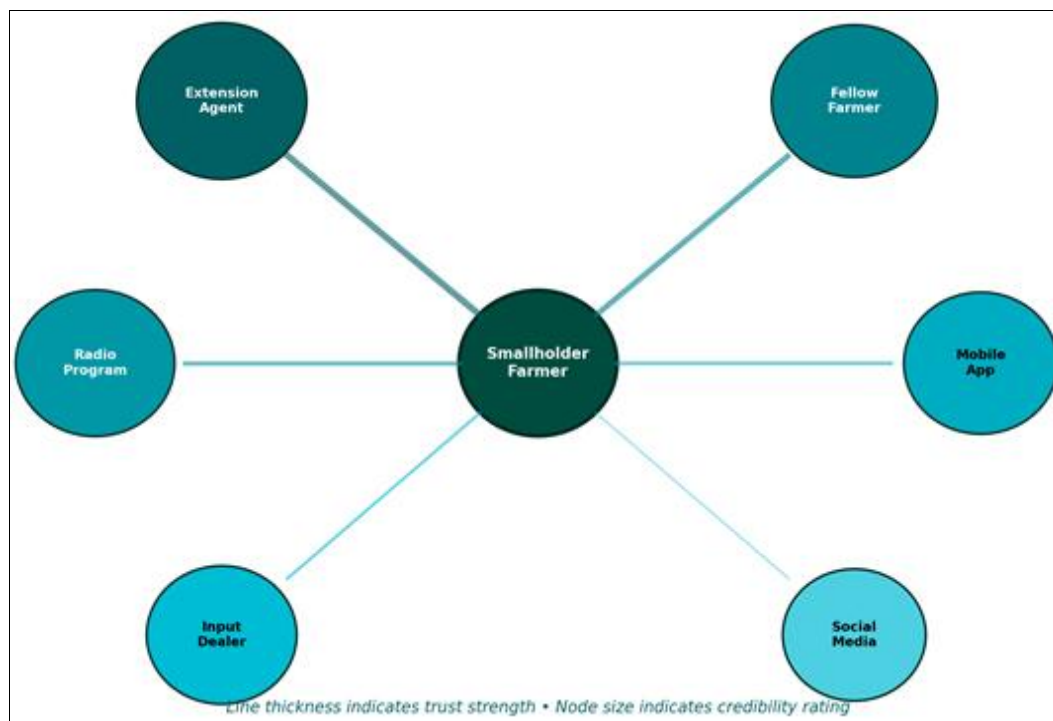


Fig 2: Information source credibility and trust network surrounding smallholder farmers

Comprehensive interpretation

The credibility hierarchy separated into three tiers: high-credibility interpersonal sources (extension agents, fellow farmers), moderate-credibility broadcast sources (radio, mobile apps), and low-credibility commercial/social sources (input dealers, social media). The 3.5/5 threshold suggests a cognitive boundary where farmers shift from active consideration to dismissal of information sources.

Discussion

Extension agents achieving the highest overall credibility while fellow farmers led on trustworthiness and verification creates an interesting complementarity. Farmers trust neighbors' experiential knowledge but value agents' technical expertise [3]. This suggests extension strategies pairing agent expertise with farmer-to-farmer trust networks could maximize credibility across all dimensions [11]. The low credibility of social media (2.14/5) despite growing usage reflects farmers' ability to distinguish between accessibility and reliability [12].

Input dealers scoring low on trust (2.41) despite moderate expertise (2.94) reveals that farmers recognize commercial interests as credibility-undermining [13]. The 3.5 threshold has practical significance information channels falling below this score contribute little to adoption regardless of investment. This finding challenges the assumption that simply increasing information delivery through any channel will improve technology uptake [14].

Practical applications

Extension systems should leverage the credibility complementarity between agents and fellow farmers through structured lead farmer programs where extension-trained farmers deliver recommendations through trusted peer channels. Investment in low-credibility channels like social media should focus on building verification

mechanisms rather than increasing volume. Sources below the 3.5 credibility threshold need credibility-building interventions before they can effectively promote adoption [15, 16].

Conclusion

Smallholder farmers in Pelagonia applied sophisticated credibility assessments that clearly differentiated information sources. Extension agents and fellow farmers occupied distinct but complementary credibility niches expertise versus experiential trust. A credibility threshold around 3.5/5 separated actionable from dismissed information sources. Source credibility predicted adoption more strongly than education or farm characteristics, confirming that how farmers evaluate information sources matters more than the volume of information available. Extension strategies should be designed around credibility dynamics rather than assuming that any delivered message will be equally received.

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