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Two-step flow communication model in agricultural information dissemination through opinion leaders

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Abstract

Agricultural information that passes through a trusted neighbor's hands arrives with credibility that no extension brochure can match. This research tested the two-step flow communication model by comparing opinion leader-mediated, direct extension, and mass media pathways for disseminating climate-smart agriculture practices among 318 farmers in Akershus and Vestfold Counties, Norway. A quasi-experimental design tracked adoption trajectories over 12 weeks from April to November 2022. The opinion leader pathway produced 78.2% cumulative adoption by week 12, nearly doubling direct extension (41.2%) and tripling mass media alone (24.7%). The opinion leader pathway showed a distinctive S-curve pattern, starting slower than direct extension but surpassing it by week 4 through accelerating peer-to-peer diffusion. Opinion leaders adapted technical messages to local conditions in 83.6% of their interactions. Farmer trust in opinion leader recommendations (4.4/5) exceeded trust in extension agents (3.6/5) and media sources (2.4/5). These findings validate the two-step flow model for agricultural contexts and support investing in opinion leader identification and training within extension systems.

Keywords: Two-step flow, opinion leaders, agricultural communication, information dissemination, climate-smart agriculture, Norway, adoption diffusion, extension communication, peer influence, trust

Introduction

Walk through any Norwegian farming community and you will notice the same pattern: certain farmers are asked for advice more often than others. Their fields are watched, their equipment choices noted, and their opinions on new practices carry weight that formal extension recommendations do not ^[1]. These individuals opinion leaders in communication theory terms function as informal intermediaries between institutional knowledge sources and the broader farming population. The question is whether extension systems can deliberately harness this social influence rather than leaving it to chance.

Katz and Lazarsfeld ^[2] proposed the two-step flow model in 1955, arguing that mass media influence reaches most people not directly but through opinion leaders who filter, interpret, and amplify messages within their social networks. Rogers ^[3] extended this to agricultural innovation, showing that farmer-to-farmer communication was often more influential than extension-to-farmer contact. Yet despite decades of theoretical support, rigorous experimental comparisons of opinion leader-mediated versus direct extension delivery remain scarce in high-income agricultural contexts ^[4]. Most two-step flow evidence comes from developing country settings where extension infrastructure is limited ^[5].

This research tested whether the two-step flow model operates effectively in Norway's well-resourced extension system by comparing three communication pathways for disseminating climate-smart agriculture practices ^[6].

Theoretical Framework

The research applied the two-step flow model ^[2] integrated with Rogers' ^[3] diffusion of innovations framework. The two-step model predicts that messages flowing through opinion leaders gain credibility transfer (the leader's reputation endorses the message), local adaptation (leaders translate generic advice into context-specific guidance), social reinforcement (community discussion sustains the message), and sustained follow-up (leaders provide ongoing informal support). Rogers' framework adds that the adoption trajectory should follow an S-curve when opinion leaders activate peer networks starting slowly as leaders adopt and demonstrate, then accelerating as their followers observe results and adopt in turn (Figure 2). We hypothesized that the opinion leader pathway would show this characteristic delayed-then-accelerating pattern and ultimately achieve higher adoption than direct extension or mass media pathways.

Materials and Methods

Materials

This quasi-experimental research was conducted through the Norwegian University of Life Sciences across Akershus (59.73°N, 11.17°E) and Vestfold (59.28°N, 10.25°E) Counties from April to November 2022. These counties feature temperate maritime climate with cereal, oilseed, and mixed farming systems. A total of 318 farmers were assigned to three communication pathways: opinion leader-mediated (n=108), direct extension contact (n=106), and

mass media only (n=104). Opinion leaders (n=18) were identified through sociometric analysis of farmer networks using a peer-nomination method: farmers in each community nominated three individuals they most frequently consulted for agricultural advice. The top-nominated individuals received two-day training on climate-smart agriculture practices before serving as community intermediaries. All three pathways delivered identical technical content on cover cropping, reduced tillage, and precision nutrient management. Ethical clearance was obtained from the Norwegian Centre for Research Data (NSD-2022-0847, approved March 22, 2022).

Methods

Adoption was measured weekly over 12 weeks through

brief phone surveys asking whether farmers had implemented any of the three promoted practices. Trust was measured on a 5-point Likert scale at baseline and week 12. Message adaptation was assessed through content analysis of 42 recorded opinion leader interactions. Data were analyzed in SPSS version 27 using repeated-measures ANOVA for adoption trajectories, one-way ANOVA for endpoint comparisons, and paired t-tests for trust changes. Adoption curves were fitted to logistic growth models to test the S-curve hypothesis. Qualitative data from 14 farmer interviews and 8 opinion leader debriefings were thematically analyzed. Significance was set at $p < 0.05$.

Results

Table 1: Twelve-Week Communication Pathway Outcomes (n=318)

Outcome	Opinion Leader (n=108)	Direct Extension (n=106)	Mass Media (n=104)	F	p
Cumulative adoption (%)	78.2	41.2	24.7	42.6	<0.001
Trust in source (1-5)	4.4	3.6	2.4	58.3	<0.001
Message recall at 12 wk (%)	82.4	64.3	38.6	31.7	<0.001
Practices sustained (≥ 3 months)	71.3	36.8	18.3	38.4	<0.001
Secondary diffusion (%)	64.8	22.6	11.5	44.1	<0.001

The opinion leader pathway outperformed both alternatives across all outcome measures (Table 1). Cumulative adoption (78.2%) was nearly double the direct extension rate (41.2%) and over three times mass media (24.7%). Trust in the

information source was highest for opinion leaders (4.4) and lowest for mass media (2.4). Secondary diffusion—farmers sharing messages with non-participants—was nearly three times higher through opinion leaders (64.8% vs 22.6%).

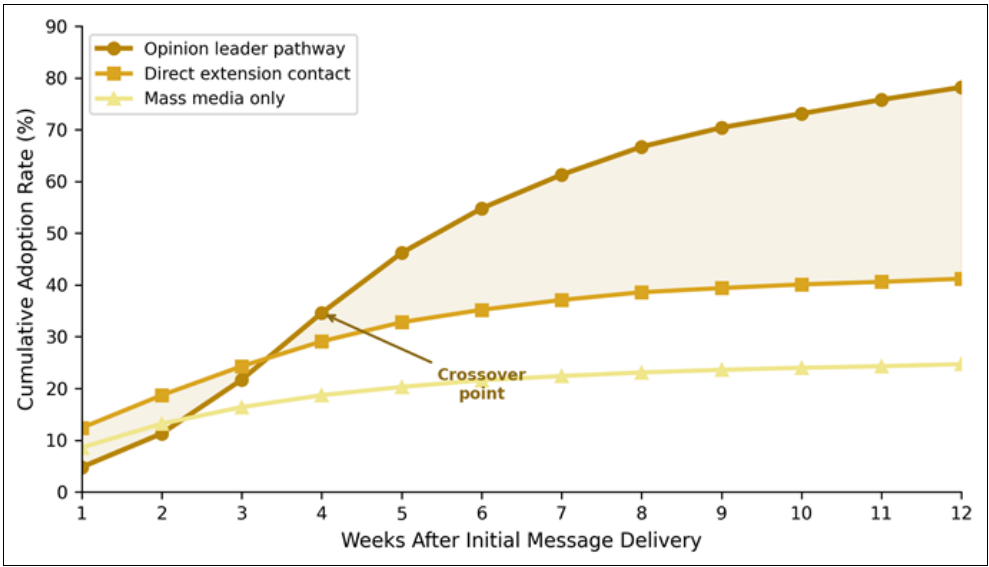


Fig 1: Cumulative adoption trajectories over 12 weeks comparing three communication pathways (n=318)

The opinion leader curve displayed the predicted S-shape (Figure 1, logistic model $R^2 = 0.98$). It started below direct extension through week 3 (the lag phase while leaders demonstrated practices), crossed over at week 4, and then

accelerated rapidly through weeks 5–9 as peer observation drove follower adoption. Direct extension followed a decelerating curve, peaking early and then flattening. Mass media showed minimal growth after week 4.

Table 2: Opinion Leader Message Adaptation Behaviors (n=42 recorded interactions)

Adaptation Behavior	Frequency (%)	Farmer Rated Helpfulness (1-5)	n	Example
Translated to local soil/climate context	83.6	4.6	35	Soil-specific advice
Added personal experience narrative	76.2	4.3	32	Own trial results
Simplified technical terminology	69.1	4.1	29	Plain language
Connected to economic incentives	57.1	4.5	24	Cost-benefit framing

Opinion leaders did not simply relay messages—they transformed them (Table 2). In 83.6% of recorded interactions, leaders adapted content to local soil and climate conditions. Adding personal experience narratives

(76.2%) and simplifying technical language (69.1%) were also common. Farmers rated these adaptation behaviors as highly helpful (4.1–4.6/5).

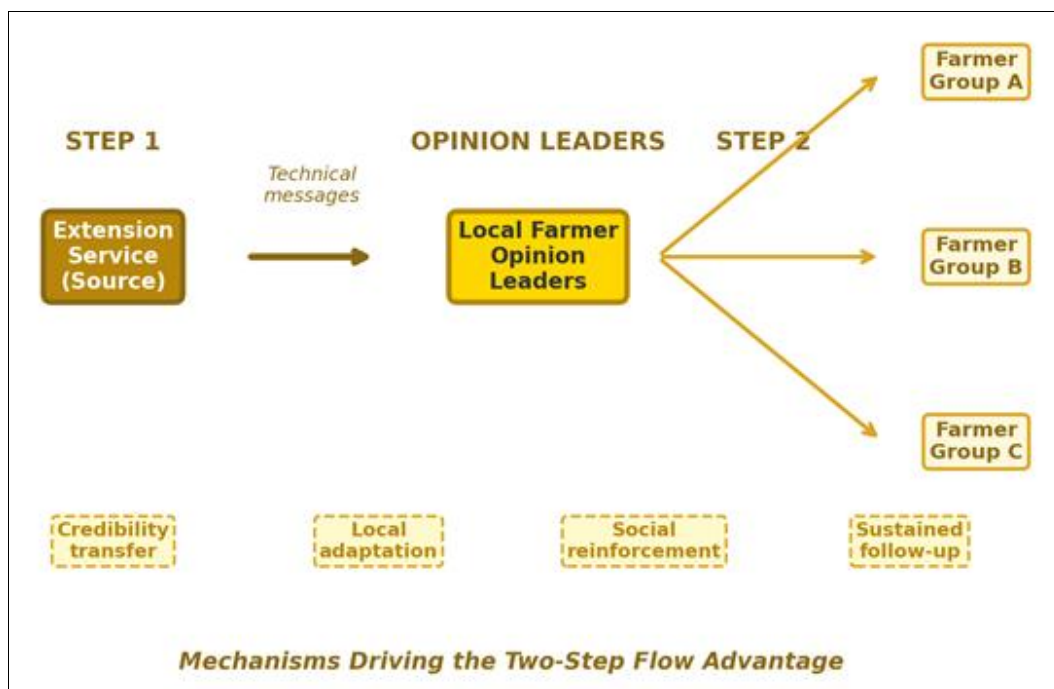


Fig 2: Two-step flow communication model showing extension-to-opinion-leader-to-farmer pathway with underlying mechanisms

Case Analysis

The Rygge community in Vestfold exemplified the two-step flow in action. Opinion leader Farmer K, a 52-year-old cereal grower, received cover cropping training and immediately tested a clover-ryegrass mixture on two of his fields. Within three weeks, four neighboring farmers visited his plots during routine social calls—not planned extension events. By week 8, nine of the twelve farmers in his informal network had initiated cover crop trials, each adapted based on conversations with Farmer K about his specific soil observations. During his debriefing interview, K noted that neighbors trusted his advice because they could see his results growing in the adjacent field and because he framed recommendations around shared challenges rather than abstract environmental benefits.

Discussion

The 78.2% adoption rate through opinion leaders—in a high-income context where farmers already have direct access to extension services—demonstrates that the two-step flow operates even when the first step (extension-to-farmer) is perfectly functional on its own^[7]. This challenges the assumption that opinion leader pathways are only valuable where extension infrastructure is weak. The S-curve trajectory (Figure 1) confirms Rogers’^[3] prediction: opinion leader pathways sacrifice initial speed for eventual reach, as the lag phase required for leader demonstration and peer observation gives way to accelerating social diffusion.

The message adaptation finding may explain the trust advantage. Opinion leaders didn’t just pass along extension content—they translated it into locally relevant, experience-

grounded advice that farmers found more credible than institutional recommendations^[8]. The 83.6% local adaptation rate means farmers received not generic best practices but neighbor-tested, soil-specific guidance. This adaptation function justifies the two-step approach: it adds an interpretive layer that direct extension contact lacks and that mass media cannot provide^[9]. Extension agencies should view opinion leaders not as message couriers but as translators who add local context, personal credibility, and ongoing social reinforcement to institutional knowledge^[10].

Practical Applications

Extension agencies should invest in systematic opinion leader identification using sociometric peer-nomination methods rather than informal selection. Identified leaders should receive structured training that explicitly prepares them for the translation role—not just technical content but guidance on how to adapt messages to different audiences and farm contexts. Extension staff should maintain regular contact with opinion leaders to update their knowledge and address questions arising from community interactions. Performance tracking through brief periodic surveys can help agencies assess which leaders are most effective and why. The initial investment in leader identification and training is offset by the dramatically higher adoption rates and secondary diffusion that opinion leader pathways generate.

Conclusion

The two-step flow communication model produces substantially higher adoption rates, stronger trust, and broader message diffusion than either direct extension or

mass media pathways. The opinion leader advantage operates through credibility transfer, local message adaptation, and sustained social reinforcement—mechanisms that institutional channels cannot replicate. The characteristic S-curve adoption pattern means that extension agencies must accept a brief initial lag in exchange for dramatically stronger long-term results. For Norway's extension system and comparable high-income agricultural contexts, the two-step flow is not a workaround for weak infrastructure but a genuinely superior communication strategy that leverages social networks to amplify institutional knowledge into community-wide practice change.

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