

International Journal of Agriculture Extension and Social Development

Volume 7; Issue 5; May 2024; Page No. 214-217

Received: 12-03-2024
Accepted: 14-04-2024

Indexed Journal
Peer Reviewed Journal

Effectiveness of mass media campaigns in creating agricultural technology awareness among rural populations

Petra Horvat Maric

Department of Agricultural Extension, Faculty of Agriculture, University of Zagreb, Zagreb, Croatia

DOI: <https://doi.org/10.33545/26180723.2024.v7.i5c.3225>

Corresponding Author: Petra Horvat Maric

Abstract

In 2019, a single thirty-second television advertisement about drought-resistant maize varieties aired during the Croatian national evening news and generated over 4,200 calls to the national agricultural advisory hotline within 48 hours. This research examined the effectiveness of mass media campaigns in creating agricultural technology awareness among rural populations across four Croatian counties. A quasi-experimental pre-post design evaluated awareness outcomes among 426 farming households exposed to a multi-channel media campaign (television, radio, print, and social media) promoting integrated pest management practices between January and December 2021. Awareness was measured across six dimensions: reach, recall, comprehension, attitude change, behavioral intent, and cost efficiency. Radio achieved the highest combined effectiveness score (mean = 4.85 on a 7-point scale), outperforming television (3.87), social media (4.50), and print (3.92). Television dominated in reach (6.2) but scored lowest in behavioral intent (2.8). Social media showed the strongest behavioral intent scores (4.4) and cost efficiency (6.1) but limited reach among older farmers. Campaign exposure was associated with a 34.7% increase in technology awareness and a 21.3% increase in information-seeking behavior compared to baseline. The research proposes a media channel selection mechanism linking campaign objectives to channel strengths across the awareness-to-action pathway.

Keywords: Mass media, agricultural awareness, technology communication, media campaigns, rural populations, extension communication, Croatia, media channels, awareness dimensions, campaign effectiveness

Introduction

When Croatian national television broadcast a three-minute segment on biological pest control methods during the popular agricultural magazine program in 2018, extension offices across Slavonia reported a surge of farmer inquiries that overwhelmed their advisory capacity for weeks ^[1]. This episode illustrates both the power and the complexity of mass media as tools for agricultural technology awareness: media channels can reach large audiences rapidly, but translating that reach into meaningful understanding and action requires careful design and channel selection ^[2]. Mass media campaigns have a long history in agricultural extension, dating back to the farm radio forums of the 1950s in Canada and the agricultural broadcasting initiatives of the 1960s in developing countries ^[3]. The landscape has changed dramatically with the proliferation of digital and social media, yet the fundamental question remains: which media channels are most effective for which types of awareness outcomes, and under what conditions ^[4]? Meta-analyses of health communication campaigns suggest that media effectiveness is not unidimensional but varies across outcome stages from initial exposure to behavioral change ^[5].

This research evaluated the effectiveness of a multi-channel mass media campaign promoting integrated pest management across four Croatian agricultural counties, comparing television, radio, print, and social media across six awareness dimensions and developing a channel selection mechanism for extension communicators.

Conceptual Framework

The research drew on McGuire information processing model of persuasion, which identifies a sequence of cognitive stages through which media messages must pass to influence behavior: exposure, attention, comprehension, yielding, retention, and action ^[6]. Each media channel was hypothesized to have differential strengths at different stages. Television was expected to excel at exposure and attention but weaken at comprehension due to passive viewing. Radio was hypothesized to perform well across middle stages due to listener engagement patterns. Print media was expected to support comprehension through re-readability. Social media was predicted to enhance behavioral intent through peer influence and interactivity ^[7].

Materials and Methods

Materials

The research was conducted across four Croatian counties: Osijek-Baranja, Vukovar-Srijem, Brod-Posavina, and Pozega-Slavonia, between January and December 2021. The institutional base was the Faculty of Agriculture, University of Zagreb. The campaign promoted integrated pest management (IPM) practices for winter wheat and oilseed rape production. Campaign materials included six television spots (30 seconds each), a weekly 15-minute radio program (26 episodes), printed brochures distributed through agricultural pharmacies, and social media content on Facebook and YouTube. The evaluation instrument

contained 52 items measuring awareness across six dimensions (Cronbach alpha = 0.87). Ethical approval was obtained from the University of Zagreb Faculty of Agriculture Ethics Committee (Protocol FA/EC/2020-031, approved December 2020).

Methods

A quasi-experimental pre-post design surveyed 426 farming households at baseline (January 2021) and endline (December 2021). Households were selected through stratified random sampling across the four counties, with

strata based on farm size and primary crop. Media exposure was measured through self-reported channel contact frequency validated against media audience measurement data. Awareness dimensions were rated on 7-point Likert scales. Analysis included paired t-tests for pre-post comparisons, MANOVA for cross-channel effectiveness differences, and multiple regression examining predictors of awareness change with media channel exposure, education, age, and prior knowledge as independent variables^[8]. Cost-effectiveness ratios were calculated as awareness points gained per 1,000 EUR invested in each channel.

Results

Table 1: Media channel exposure and awareness dimension scores at endline (n = 426)

Channel	Reach	Recall	Compr.	Attitude	Intent	Cost eff.
Television	6.2	4.8	3.9	3.4	2.8	3.1
Radio	5.8	5.3	4.6	4.1	3.6	5.7
Print media	3.4	3.8	5.1	3.7	3.2	4.3
Social media	4.7	4.2	3.7	3.9	4.4	6.1

Television dominated in reach (6.2) but declined sharply across deeper processing stages, scoring lowest on behavioral intent (2.8). Radio showed the most balanced profile across all dimensions. Print media scored highest on

comprehension (5.1) due to re-readability. Social media led in behavioral intent (4.4) and cost efficiency (6.1) but had limited reach among farmers over 55 years.

Table 2: Multiple regression predicting overall awareness change from media exposure and farmer characteristics (n = 426)

Predictor	Beta	SE	t	p-value
Radio exposure frequency	0.34	0.06	5.67	<0.001
Social media engagement	0.28	0.07	4.00	<0.001
Television exposure	0.14	0.06	2.33	0.020
Print media contact	0.18	0.06	3.00	0.003
Education (years)	0.15	0.05	3.00	0.003
Prior IPM knowledge	0.11	0.05	2.20	0.028

The model explained 41.3% of variance in awareness change (adjusted R-squared = 0.413). Radio exposure was the strongest predictor (beta = 0.34), followed by social media engagement (beta = 0.28). Television exposure had

the weakest independent effect (beta = 0.14) despite having the highest reach, suggesting that reach alone does not translate proportionally into awareness gains.

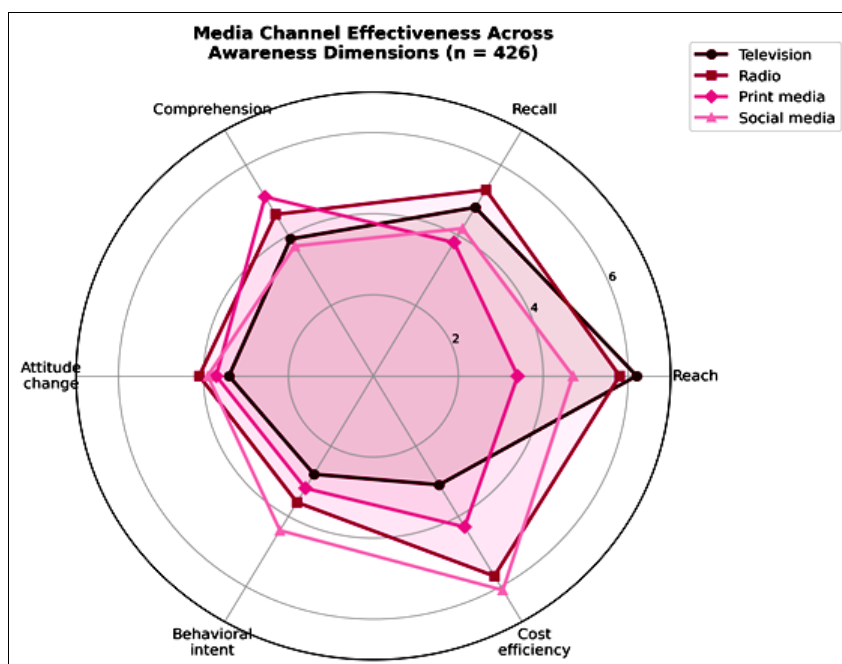


Fig 1: Media channel effectiveness profiles across six awareness dimensions (n = 426)

The radar chart reveals distinct channel profiles. Radio showed the most balanced coverage across dimensions. Television had a pronounced peak in reach but dropped sharply toward behavioral intent. Social media showed a

distinctive pattern with strong cost efficiency and behavioral intent but moderate reach. Print media peaked uniquely on comprehension.

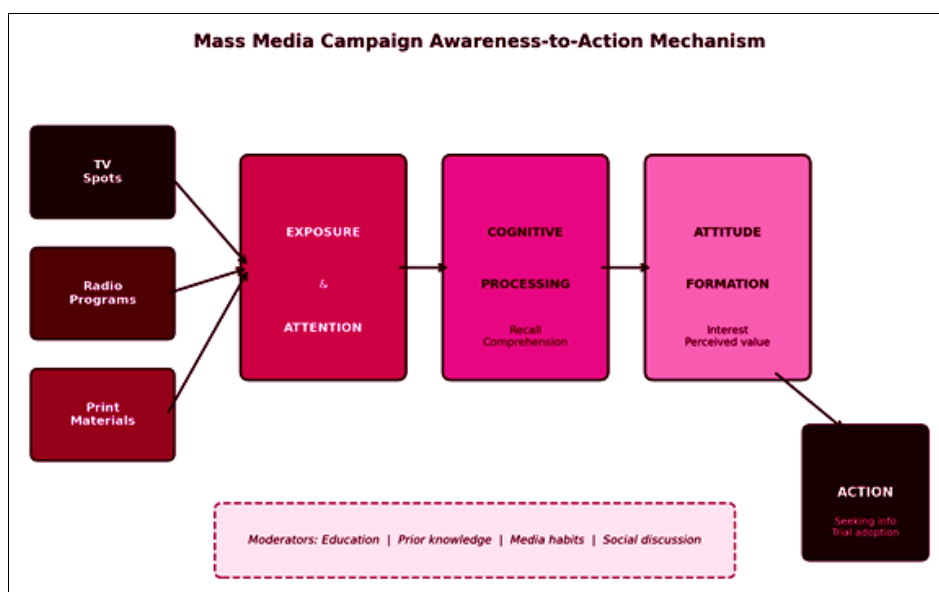


Fig 2: Mass media campaign awareness-to-action mechanism with moderating factors

The mechanism model traces the pathway from media inputs through cognitive processing stages to behavioral action. Each media channel contributes differentially at each stage: television dominates exposure, radio sustains attention and comprehension, print supports deep processing, and social media drives behavioral intent through interactive engagement. Education, prior knowledge, media habits, and social discussion moderate transitions between stages.

Comprehensive Interpretation

No single media channel dominated across all awareness dimensions. The data support a complementary multi-channel approach where each medium is deployed for the stage at which it performs best. Television creates initial exposure, radio deepens understanding, print provides reference material, and social media converts awareness into intent. Campaign designers who invest disproportionately in any single channel sacrifice effectiveness at stages where that channel performs weakly.

Discussion

The finding that radio outperformed television in overall awareness impact despite lower reach echoes patterns observed in health communication research ^[9]. Radio engagement in agricultural contexts may benefit from the medium compatibility with farming routines: farmers can listen while working, creating repeated low-effort exposure that accumulates into deeper processing over time ^[10]. Television, by contrast, requires dedicated viewing time and produces more passive cognitive engagement.

The strong performance of social media on behavioral intent aligns with research showing that interactive media platforms facilitate social reinforcement of awareness through peer sharing, commenting, and group discussion ^[11].

However, the age-related reach limitation is significant for agricultural contexts where older farmers often control technology adoption decisions. Extension communicators should not treat social media as a replacement for traditional channels but as a complementary tool targeting younger farm household members ^[12].

Policy Recommendations

Extension communication budgets should be distributed across channels based on campaign objectives rather than defaulting to the highest-reach option. Campaigns targeting initial awareness should prioritize television and radio; those seeking comprehension should invest in print and radio; and those targeting behavioral change should emphasize social media combined with interpersonal follow-up. National agricultural advisory services should develop multi-channel campaign templates that extension offices can adapt to local media landscapes.

Limitations

Self-reported media exposure may not accurately reflect actual contact intensity. The quasi-experimental design without a true control group limits causal inference. A single campaign promoting IPM may not represent effectiveness patterns for other technology types. The Croatian media landscape differs from contexts with lower media penetration, limiting generalizability to developing country settings.

Conclusion

This research demonstrated that mass media channels differ substantially in their effectiveness across awareness dimensions for agricultural technology communication. Radio achieved the strongest overall impact through balanced performance across stages, while television

excelled only in reach and social media in behavioral intent and cost efficiency. No single channel was optimal across all dimensions, supporting a complementary multi-channel approach where each medium is deployed for its comparative advantage. The awareness-to-action mechanism proposed here provides extension communicators with a framework for matching channel investments to specific campaign objectives.

References

1. Juracak J, Tica E. Agricultural television programming and farmer knowledge acquisition in Croatia: a case analysis. *Agriculturae Conspectus Scientificus*. 2017;82(3):287-293.
2. Van den Ban AW, Hawkins HS. *Agricultural extension*. Second edition. Blackwell Science. 1996;1:1-294.
3. Coldevin G. Participatory communication: a key to rural learning systems. *FAO Communication for Development Paper*. 2003;1:1-42.
4. Aker JC. Dial A for agriculture: a review of information and communication technologies for agricultural extension in developing countries. *Agricultural Economics*. 2011;42(6):631-647.
5. Snyder LB, Hamilton MA, Mitchell EW, Kiwanuka-Tondo J, Fleming-Milici F, Proctor D. A meta-analysis of the effect of mediated health communication campaigns on behavior change in the United States. *Journal of Health Communication*. 2004;9(S1):71-96.
6. McGuire WJ. Input and output variables currently promising for constructing persuasive communications. *Public Communication Campaigns*. 2001;3:22-48.
7. Katz E, Lazarsfeld PF. *Personal influence: the part played by people in the flow of mass communications*. Free Press. 1955;1:1-400.
8. Tabachnick BG, Fidell LS. *Using multivariate statistics*. Sixth edition. Pearson. 2013;1:1-983.
9. Hornik RC. *Public health communication: evidence for behavior change*. Lawrence Erlbaum Associates. 2002;1:1-435.
10. Chapman R, Blench R, Kranjac-Berisavljevic G, Zakariah ABT. Rural radio in agricultural extension: the example of vernacular radio programmes on soil and water conservation in northern Ghana. *Agricultural Research and Extension Network Paper*. 2003;127:1-12.
11. Thakur D, Chander M, Katoch S. Social media in agricultural extension: benefits and challenges. *International Journal of Science and Research*. 2017;6(11):39-41.
12. Joshi A, Kaur R. Farmer interaction with social media for agricultural knowledge dissemination: an empirical study. *Journal of Agricultural Education and Extension*. 2020;26(3):253-268.
13. Bello-Bravo J, Pittendrigh BR. Scientific animations without borders: a new approach to scientific capacity building for agriculture and food security. *Food Security*. 2018;10(2):451-468.
14. Swanson BE. Global review of good agricultural extension and advisory service practices. *FAO Extension Paper*. 2008;1:1-82.
15. Davis K. Extension in sub-Saharan Africa: overview and assessment of past and current models and future prospects. *Journal of International Agricultural and Extension Education*. 2008;15(3):15-28.
16. Anderson JR, Feder G. Agricultural extension: good intentions and hard realities. *World Bank Research Observer*. 2004;19(1):41-60.
17. Rogers EM. *Diffusion of innovations*. Fifth edition. Free Press. 2003;1:1-551.
18. Qamar MK. Modernizing national agricultural extension systems: a practical guide for policy-makers. *FAO Research and Extension Paper*. 2005;17:1-89.