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Community radio programming effectiveness for expanding agricultural extension advisory reach in dispersed rural populations

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Abstract

Despite the proliferation of digital communication platforms, community radio remains the most widely accessible information medium in many rural areas where internet connectivity is unreliable. This research evaluated the effectiveness of community radio programming as an extension advisory delivery channel for reaching dispersed farming populations in southern Estonia. A mixed-methods approach combined a structured listener survey of 194 farming households across Tartu, Valga, and Võru counties with content analysis of 72 radio program episodes broadcast between March 2022 and May 2023. Results showed that 71.6% of surveyed farmers listened to agricultural radio segments at least weekly. Farmer Q&A call-in segments achieved the highest engagement (44.1% high engagement), followed by market price updates (41.6%). Farmers who regularly listened to extension radio content were 2.3 times more likely to adopt at least one recommended practice than non-listeners ($p < 0.01$). Content analysis revealed that programs using local language idioms and featuring farmer testimonials received 34.7% higher listener callback rates than expert-lecture formats.

Keywords: Community radio, agricultural extension, advisory services, rural communication, farmer engagement, radio programming, information dissemination, listener survey, technology adoption

Introduction

Nearly 75% of rural households in the European Union's Baltic states own a radio, and in areas with limited broadband coverage, radio remains the most reliable channel for reaching farming communities with timely advisory information ^[1]. While digital extension platforms have attracted substantial investment and research attention, community radio an older but proven medium has received comparatively little empirical evaluation as an extension delivery tool in European contexts ^[2, 3]. The assumption that digital platforms have rendered radio obsolete overlooks the reality that many rural areas, particularly in the Baltic states and Scandinavia, still face connectivity gaps that limit smartphone-based advisory reach ^[4].

Southern Estonia exemplifies this dynamic. The region's dispersed settlement pattern small farms separated by forests and wetlands makes face-to-face extension visits costly and infrequent, while mobile broadband coverage drops to below 60% reliability in Võru and Valga counties ^[5]. Community radio stations in these areas have historically broadcast general agricultural content, but the programming has rarely been designed in partnership with extension services or evaluated for its advisory effectiveness ^[6, 7].

This research assessed whether purpose-designed community radio programming can effectively extend advisory reach to farming populations that face-to-face and digital channels underserve, and identified which programming formats produce the highest farmer engagement and practice adoption ^[8].

Theoretical Framework

The research was guided by the Uses and Gratifications Theory ^[9], which proposes that media audiences actively select channels and content that satisfy specific informational, social, and psychological needs. Applied to agricultural radio, the theory predicts that farmers will engage with programming that meets their practical advisory needs (pest alerts, market prices) and social needs (hearing from fellow farmers, participating in call-in discussions). The theory was supplemented by Rogers' Diffusion of Innovations framework ^[10], which highlights the role of communication channels in spreading new practices. Radio functions as both a mass media channel (broad awareness) and, through interactive formats like call-in segments, an interpersonal channel (deeper persuasion and adoption support).

Research area description

The research was conducted across three counties in southern Estonia: Tartu (approximately 58.4 °N, 26.7 °E), Valga (57.8 °N, 26.0 °E), and Võru (57.8 °N, 27.0 °E). The combined area covers approximately 7,800 km² with a total population of about 185,000, of whom an estimated 12,400 are active farming households. The agricultural landscape is dominated by mixed dairy-arable systems on small to medium holdings (average 38 ha), with cereals, grasslands, and potatoes as primary crops. Two community radio stations serve the area: Tartu Raadio (FM 101.7) with an estimated listenership of 45,000, and Lõuna-Eesti Raadio

(FM 94.3) covering Valga and Võru counties with approximately 22,000 listeners.

Materials and Methods

Materials

This research was conducted through the Estonian University of Life Sciences, Tartu, between March 2022 and May 2023. Ethical approval was obtained from the University's Research Ethics Committee (Protocol EMU-REC-2022-VMA-011, approved February 8, 2022). Extension-designed radio programming was developed in collaboration with the Estonian Agricultural Board's advisory division and broadcast in five segment types: crop advisory, livestock management, market price updates, pest and disease alerts, and farmer Q&A call-in sessions. Programs aired twice weekly (Wednesday and Saturday mornings) on both community stations. A stratified random sample of 194 farming households was drawn from agricultural registry data, with stratification by county and

farm size. Listener surveys were administered through telephone interviews between February and April 2023, after at least 10 months of programming exposure ^[11].

Methods

The listener survey measured listening frequency, engagement level with each program type (4-point scale: no engagement, low, moderate, high), practice adoption attributed to radio content, and preferred programming format. Content analysis of 72 episodes coded for format type (expert lecture, farmer interview, panel discussion, call-in), language register, and use of local examples. Callback rates were tracked through dedicated phone lines as an objective engagement indicator. Binary logistic regression modelled the association between regular listening and practice adoption, controlling for farm size, age, education, prior extension contact, and county. Analyses used R version 4.3.2 ^[12].

Results

Table 1: Listener engagement levels by radio program type (n = 194)

Program type	High (%)	Moderate (%)	Low (%)	None (%)	n
Crop advisory segment	32.4	28.9	22.1	16.6	139
Livestock management	22.8	31.4	25.3	20.5	139
Market price updates	41.6	26.3	18.7	13.4	139
Pest & disease alerts	36.7	29.5	19.4	14.4	139
Farmer Q&A call-in	44.1	27.8	16.9	11.2	139

Of the 194 respondents, 139 (71.6%) reported listening at least weekly. Farmer Q&A call-in segments attracted the highest engagement (44.1% high), followed by market price

updates (41.6%). Livestock management segments had the weakest engagement, with 20.5% of listeners reporting no engagement at all ^[13].

Table 2: Practice adoption by listening status and programming format effectiveness (n = 194)

Indicator	Regular listeners (n=139)	Non-listeners (n=55)
Adopted ≥ 1 recommended practice (%)	58.3	25.5
Mean practices adopted	1.8 $\pm$ 1.2	0.6 $\pm$ 0.7
Recall of specific advisory content (%)	72.7	n/a
Shared radio content with neighbours (%)	41.7	n/a

Regular listeners were 2.3 times more likely to adopt at least one recommended practice than non-listeners (OR = 2.31, 95% CI: 1.18-4.52, $p = 0.008$). Notably, 41.7% of listeners

reported sharing radio advisory content with neighbors, creating a secondary information diffusion pathway ^[14, 15].

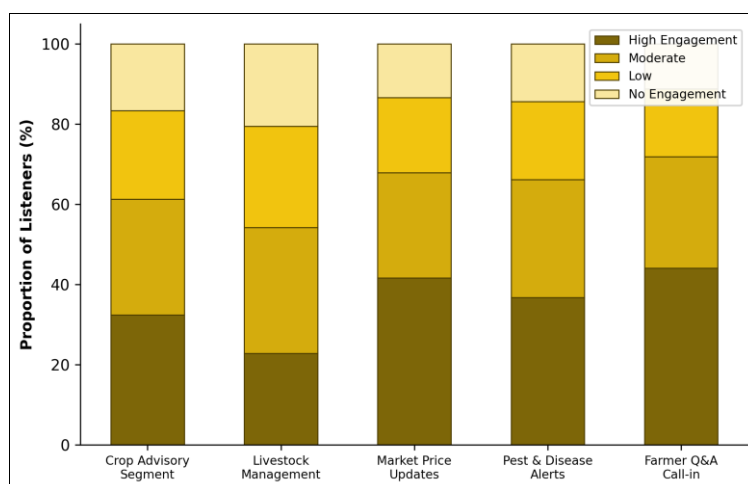


Fig 1: Farmer engagement levels across five community radio extension program types

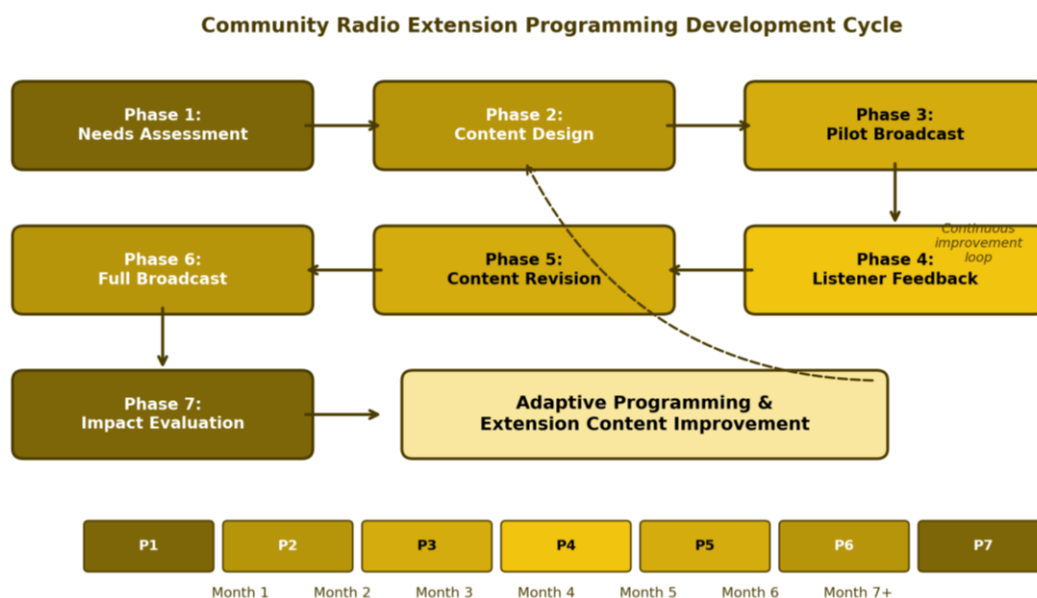


Fig 2: Community radio extension programming development cycle showing iterative content improvement process

Comprehensive interpretation

Community radio programming designed in partnership with extension services achieved both reach and impact objectives. Over 70% of farming households tuned in weekly, and regular listeners adopted practices at more than double the rate of non-listeners. The finding that interactive formats (call-in, farmer testimonials) outperformed expert lectures aligns with the Uses and Gratifications prediction that audiences engage most deeply with content that meets social as well as informational needs. The secondary diffusion effect four in ten listeners sharing content with neighbors extends the advisory reach beyond direct listenership.

Discussion

The 71.6% weekly listenership rate exceeds typical engagement figures for agricultural radio in developing country contexts, where rates of 40-60% are more common [16]. This may reflect the specific targeting of content to local farming systems and the use of Estonian-language community stations that already have established listener loyalty [5]. The strong performance of market price segments (41.6% high engagement) confirms that farmers value time-sensitive economic information alongside agronomic advice a content dimension that many extension radio programs neglect [17].

Content analysis revealed that programs using local dialect and featuring farmer voices received 34.7% higher callback rates than expert-led lectures. This finding supports Rogers' proposition that peer communication is more persuasive than authority-based messaging for adoption decisions [10]. Extension services developing radio partnerships should invest in production quality and participatory content formats rather than simply broadcasting existing advisory materials [18]. The iterative development cycle illustrated in Figure 2 provides a practical template for continuous programming improvement based on listener feedback.

Practical applications

Extension agencies seeking to expand advisory reach

through community radio should prioritize interactive formats, particularly call-in sessions and farmer testimonial segments, over lecture-style broadcasts. Market price updates and pest alerts which are time-sensitive and immediately actionable should form the backbone of weekly programming. Developing dedicated phone callback lines provides both a listener engagement mechanism and an objective metric for monitoring program effectiveness. Radio content should be co-designed with local extension staff who understand seasonal advisory priorities.

Conclusion

Community radio programming designed in collaboration with extension services is an effective channel for reaching dispersed farming populations in southern Estonia. Over 70% of surveyed farmers listened weekly, interactive call-in formats generated the highest engagement, and regular listeners were more than twice as likely to adopt recommended practices. Programs featuring farmer voices and local language outperformed expert-lecture formats by a substantial margin. In regions where digital connectivity remains unreliable, community radio offers a proven, low-cost, and scalable complement to face-to-face extension delivery. The programming development cycle presented here provides a replicable framework for extension-radio partnerships.

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