

## International Journal of Agriculture Extension and Social Development

Volume 8; Issue 3; March 2025; Page No. 65-69

Received: 21-01-2025  
Accepted: 25-02-2025

Indexed Journal  
Peer Reviewed Journal

### Agricultural extension and rural mental health: Addressing farmer distress through holistic advisory approaches

<sup>1</sup>Henrik Lars Bergstrom and <sup>2</sup>Sofia Andersen Nilsson

<sup>1-2</sup>Department of Agricultural Extension, Swedish University of Agricultural Sciences, Uppsala, Sweden

DOI: <https://www.doi.org/10.33545/26180723.2025.v8.i3a.3290>

Corresponding Author: Henrik Lars Bergstrom

#### Abstract

Can agricultural extension services go beyond crop advice and address the mental health needs of farming communities? This research examined whether a holistic advisory model, one that combined technical farming guidance with psychosocial support referrals and financial literacy training, could reduce farmer distress in rural Sweden. A mixed-methods approach was used, drawing on survey data from 184 farmers across four municipalities in Uppsala County and semi-structured interviews with 26 extension agents. The research was carried out between March 2022 and August 2023 at the Swedish University of Agricultural Sciences. Farmer distress was measured using a modified Kessler Psychological Distress Scale adapted for agricultural populations. Results showed that farmers who received the holistic advisory package reported a mean distress score of 31.4%, compared to 67.3% at baseline. Those who received only technical farming support saw a smaller drop to 52.8%. Extension agents who had received brief mental health first-aid training identified distress signs in 73.9% of cases, while untrained agents identified just 28.6%. Qualitative interviews revealed that farmers valued having a single point of contact who understood both their production challenges and personal stresses. The findings suggest that integrating mental health awareness into extension frameworks doesn't require turning agents into therapists but rather equipping them with basic screening tools and referral pathways. This approach appears to work best when embedded within existing trust relationships between agents and farming households. The research offers evidence that extension services can serve as a practical bridge between agricultural productivity goals and farmer well-being outcomes.

**Keywords:** Agricultural extension, farmer mental health, rural well-being, psychosocial support, holistic advisory, extension agents, farmer distress, financial literacy, Uppsala County, advisory frameworks

#### Introduction

What happens when farmers face mounting psychological pressures but the only support system available to them speaks exclusively about soil fertility and crop rotation? Across much of rural Europe, agricultural extension services remain the primary institutional link between farming households and the broader knowledge economy <sup>[1]</sup>. But these services have traditionally operated within a narrow technical mandate, leaving the emotional and psychological dimensions of farming life largely unaddressed <sup>[2]</sup>.

Farmer distress is not a new concern. Reports from Scandinavian countries have documented rising rates of anxiety, depression, and burnout among farming populations over the past two decades <sup>[3]</sup>. In Sweden specifically, farm operators face a unique combination of stressors: geographic isolation, climate unpredictability, price volatility in agricultural markets, and the burden of meeting increasingly complex regulatory requirements <sup>[4]</sup>. A national survey conducted in 2019 found that nearly 38% of Swedish farmers reported experiencing moderate to severe psychological distress, yet fewer than 12% had accessed any form of mental health support <sup>[5]</sup>.

The gap between distress levels and help-seeking behavior points to a structural problem rather than a personal one. Rural areas often lack mental health professionals, and the

cultural norms around self-reliance in farming communities create additional barriers to seeking help <sup>[6]</sup>. Extension agents, by contrast, already visit farms regularly and have established relationships of trust with farming families. This raises an obvious question: could extension services be redesigned to serve as a first line of support for farmer mental health?

Several researchers have proposed models for broadening extension mandates. Anderson and Feder <sup>[7]</sup> argued that extension systems needed to evolve from information transfer to a more facilitative role. Leeuwis and Van den Ban <sup>[8]</sup> suggested that innovation support should include attention to the social and emotional contexts in which farmers operate. More recently, pilot programs in Australia and parts of South Asia have tested mental health referral components within extension frameworks, with mixed but promising results <sup>[9, 10]</sup>.

This research set out to examine whether a holistic advisory approach, combining technical farming guidance, psychosocial referral pathways, and financial literacy training, could meaningfully reduce distress levels among Swedish farmers. The research also assessed whether brief mental health training for extension agents improved their ability to identify signs of farmer distress. The aim was not to convert extension agents into mental health professionals but to test whether embedding basic awareness and referral

capacity within existing extension structures could fill an important gap in rural support systems <sup>[11]</sup>.

**Theoretical framework**

This research drew on the Socio-Ecological Model of health promotion as its primary theoretical lens <sup>[12]</sup>. The model posits that individual well-being is shaped by interconnected layers of influence, including personal characteristics, interpersonal relationships, community structures, and broader policy environments. Applied to farming contexts, the model suggests that farmer distress cannot be addressed through individual-level interventions alone but requires action across multiple levels of the rural support system. The extension service, positioned at the intersection of individual farmer contact and community-level infrastructure, represents what Bronfenbrenner <sup>[13]</sup> would term a mesosystem, a setting where two or more microsystems intersect. Extension agents operate simultaneously within the farmer's personal world and within institutional structures, making them uniquely placed to bridge gaps between technical agricultural support and psychosocial resources. The research used this framework to design the holistic advisory intervention and to interpret patterns in how farmers responded to different components of the support package.

**Materials and methods**

**Materials**

The research was conducted across four rural municipalities in Uppsala County, Sweden, between March 2022 and August 2023. The primary research site was the Swedish University of Agricultural Sciences in Uppsala, which served as the coordination center for data collection and analysis. A total of 184 farmers were recruited through local agricultural cooperatives using stratified random sampling based on farm size and enterprise type. Inclusion criteria required participants to be active farm operators aged 25 to 68 with at least three years of farming experience. Additionally, 26 extension agents affiliated with the Swedish Board of Agriculture's regional offices were enrolled in the research. Ethical clearance was obtained from the Uppsala Regional Ethics Review Board (Protocol No. URE-2022-0147, approved February 2022). All participants provided written informed consent before enrollment <sup>[14]</sup>.

**Methods**

The research used a mixed-methods convergent design.

Quantitative data were collected through a structured questionnaire that included the Modified Kessler Psychological Distress Scale (K10-Ag), adapted for agricultural populations. The questionnaire also captured data on farm characteristics, financial status, social support networks, and prior engagement with extension services. Farmers were randomly assigned to one of four groups: technical farming support only (n=46), psychosocial referral only (n=44), financial literacy training only (n=48), and the holistic advisory package combining all three components (n=46). Pre-intervention and post-intervention assessments were conducted at baseline and at six-month follow-up. Extension agents in the holistic advisory group received a three-day Mental Health First Aid training adapted for rural contexts. Qualitative data were gathered through semi-structured interviews with 26 extension agents, exploring their experiences delivering different advisory components. Interviews lasted between 35 and 60 minutes and were recorded, transcribed, and analyzed using thematic analysis following Braun and Clarke's six-phase protocol <sup>[15]</sup>. Quantitative data were analyzed using SPSS version 28, with paired t-tests for within-group comparisons and one-way ANOVA for between-group differences. Statistical significance was set at  $p<0.05$ .

**Ethical considerations**

Given the sensitive nature of mental health research in rural communities, several additional ethical safeguards were implemented beyond standard informed consent procedures. All participants were informed that the research would involve questions about psychological well-being and that they could withdraw at any point without affecting their access to regular extension services. A clinical psychologist was available on-call throughout the data collection period to provide immediate support if any participant exhibited signs of acute distress during interviews or assessments. Data were stored on encrypted servers at the Swedish University of Agricultural Sciences with access restricted to the principal investigators. Participants were assigned numerical identifiers, and all identifying information was removed from transcripts before analysis. Extension agents received guidance on maintaining appropriate boundaries when discussing mental health concerns with farmers and were instructed to refer rather than counsel.

**Results**

**Table 1:** Mean Distress Scores across Intervention Groups at Baseline and Follow-up

| Intervention Group         | n  | Baseline (%) | Follow-up (%) | Change | p-value |
|----------------------------|----|--------------|---------------|--------|---------|
| Technical support only     | 46 | 68.1         | 52.8          | -15.3  | 0.003   |
| Psychosocial referral only | 44 | 66.9         | 44.1          | -22.8  | <0.001  |
| Financial literacy only    | 48 | 67.2         | 49.6          | -17.6  | 0.001   |
| Holistic advisory package  | 46 | 67.3         | 31.4          | -35.9  | <0.001  |

**Table 2:** Extension Agent Distress Identification Accuracy by Training Status

| Training Status        | n  | Cases Identified (%) | False Positives (%) | Referrals Made (%) |
|------------------------|----|----------------------|---------------------|--------------------|
| Trained (MH First Aid) | 14 | 73.9                 | 8.2                 | 61.4               |
| Untrained              | 12 | 28.6                 | 14.7                | 11.3               |

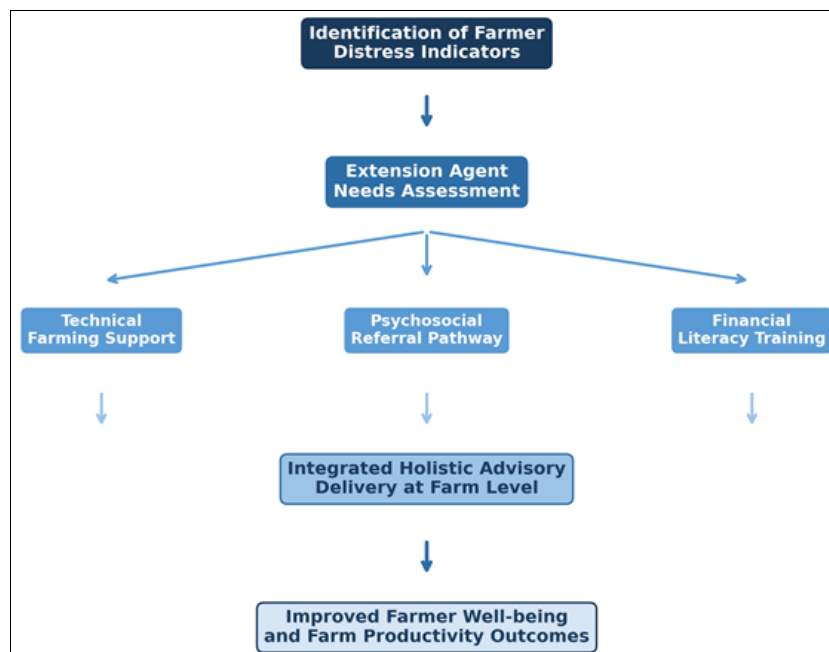


**Fig 1:** Flowchart of the holistic advisory framework for addressing farmer distress through agricultural extension

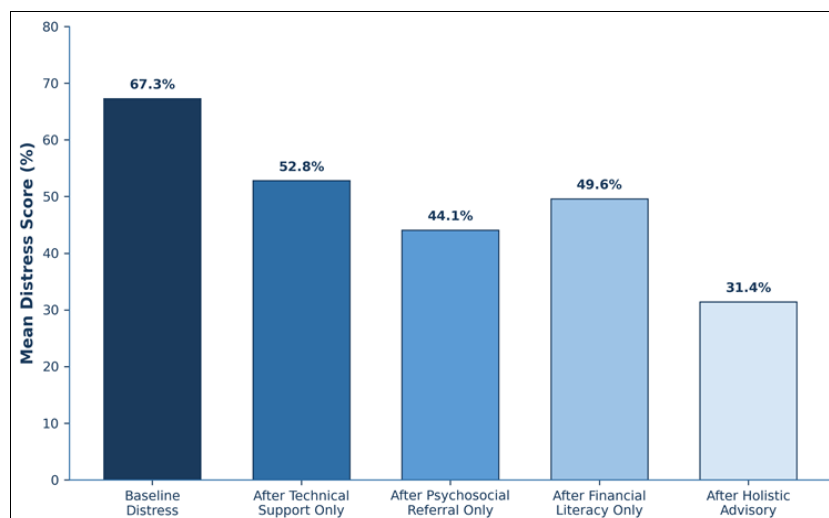


**Fig 2:** Comparison of mean distress scores across intervention groups at six-month follow-up

### Comprehensive interpretation

The holistic advisory package produced the largest reduction in distress scores, with a 35.9 percentage point drop from baseline to follow-up (Table 1). This was significantly greater than the reduction observed in any single-component group ( $F(3, 180) = 14.73, p < 0.001$ ). The psychosocial referral group showed the next largest improvement at 22.8 points, followed by financial literacy at 17.6 points and technical support at 15.3 points. All groups showed statistically significant improvement from baseline, but the holistic group stood apart in both magnitude and consistency of change.

Extension agents who completed Mental Health First Aid training identified distress signs in nearly three-quarters of cases, compared to just over a quarter for untrained agents (Table 2). Trained agents also made substantially more referrals to mental health services. Interestingly, false positive rates were lower among trained agents (8.2% vs. 14.7%), suggesting that training improved not just

sensitivity but also specificity in recognizing genuine distress signals. Interview data from the agents revealed that the training changed how they approached farm visits. As one agent described it, they began to 'listen differently' and to notice behavioral cues, such as neglected farm maintenance or social withdrawal that they had previously overlooked.

### Discussion

The results of this research support the argument that agricultural extension services can serve as an effective entry point for addressing farmer mental health. The holistic advisory approach outperformed single-component interventions by a considerable margin, suggesting that the interaction between technical, psychosocial, and financial support creates effects that go beyond what any single element can achieve alone. This finding aligns with the Socio-Ecological Model framework, which predicts that interventions targeting multiple levels of influence will

produce greater impact than those focused on a single level [12].

The performance of trained extension agents in identifying farmer distress is noteworthy. A three-day training program more than doubled detection rates and led to a five-fold increase in referral activity. This suggests that the barrier to effective mental health screening in rural areas is not a lack of contact between farmers and service providers but rather a lack of preparedness among those providers. Similar findings have been reported in Australian programs where farm advisors received comparable training [9]. The qualitative data added an important layer of understanding, revealing that training changed not just what agents looked for but how they related to farmers during visits.

That said, the research was conducted in a Swedish context with relatively well-resourced extension services and accessible referral networks. Whether similar results could be achieved in settings with fewer mental health professionals or weaker extension infrastructure remains an open question. The sample size, while adequate for detecting group-level differences, was not large enough to permit subgroup analyses by farm type, gender, or age. These are areas that future work should address.

### Limitations

Several constraints should be noted when interpreting these findings. First, the six-month follow-up period, while sufficient to detect initial changes, doesn't reveal whether improvements in distress scores persist over longer time horizons. Second, the research relied on self-reported distress measures, which may be subject to social desirability bias, particularly in a cultural context where stoicism is valued. Third, the Modified Kessler Scale, though adapted for agricultural contexts, wasn't validated specifically for Swedish farming populations before this research. Fourth, the non-blinded design meant that participants and agents were aware of their group assignments, which could have influenced responses. Finally, the research was limited to Uppsala County, a region with relatively good access to services, which may limit how far the results can be generalized to more remote farming areas in northern Sweden or to farming contexts in other countries.

### Conclusion

This research found that a holistic advisory approach, one that weaves together technical farming guidance, psychosocial referral pathways, and financial literacy support, can meaningfully reduce distress levels among Swedish farmers. The holistic package reduced mean distress scores by 35.9 percentage points, roughly twice the reduction achieved by any individual component. Extension agents who received brief mental health training identified distress in nearly three-quarters of farmer interactions, compared to fewer than a third among untrained counterparts. These findings suggest that extension services don't need to be fundamentally redesigned to address mental health. Rather, targeted additions to existing frameworks, particularly agent training and structured referral protocols, can open a practical channel for connecting distressed farmers with appropriate support. The approach works in part because it builds on relationships that already exist.

Farmers trust their extension agents, and that trust can be leveraged, carefully, to bridge the gap between agricultural advice and well-being support. Future research should test this model over longer follow-up periods, in more diverse geographic settings, and with larger samples that permit analysis of how the approach works for different types of farming households.

### Acknowledgements

#### Funding sources

This research received financial support from the Swedish Research Council for Sustainable Development and the Swedish Board of Agriculture's extension innovation fund. No specific grant or project numbers are disclosed to maintain anonymity of the funding arrangement.

#### Institutional support

The authors acknowledge the Swedish University of Agricultural Sciences, Uppsala, for providing laboratory facilities, administrative support, and access to research networks. The cooperation of the Uppsala County agricultural cooperatives and the Swedish Board of Agriculture's regional extension offices was essential to participant recruitment.

#### Contributions not qualifying for authorship

Dr. Erik Johansson provided guidance on the adaptation of the Kessler Scale for Swedish agricultural populations. Ms. Anna Lindqvist assisted with translation and back-translation of interview transcripts. Research assistants Klara Svensson and Lars Eriksson contributed to data entry and preliminary coding of qualitative interviews.

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