Book of Abstracts

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Content

Country reports

Country Report Denmark, Nordic Meeting NMAOH2025

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Introduction:

In Denmark, serious accidents still occur in agriculture. There is therefore a corresponding focus on safety and occupational health in agriculture, both from the side of consultants, employers/takers and the authorities. There is good cooperation among the players in the industry, in particular work is being done to improve the safety culture. In addition, there is an increased focus on mental health - mental health can be crucial for remaining a farmer and having the energy to run healthy and safe farms.

Selected new and major initiatives in Denmark are the following

- Social conditionality
- ESG reporting
- The Danish Working Environment Authority's holistic efforts
- Expert committee appointed by the Minister of Employment
- BFA focus on machine safety
- Focus on mental health (SEGES, Necto)

Status Statistics

Table 1. *Reported accidents divided into fatal accidents, serious accidents and other accidents.*

Type of accident	year of registration								I alt
	2017	2018	2019	2020	2021	2022	2023	2024	
Fatal accidents	5	3	4	7	6	3	5	3	36
Serious accidents (=> 3 uger)	247	240	223	297	320	308	325	338	2298
Other accidents (< 3 uger)	298	337	334	400	450	363	402	427	3011
Expected absense unknown	70	86	99	94	82	68	27	38	564
In total	**620**	**666**	**660**	**798**	**858**	**742**	**759**	**806**	**5909**

Table 2. Accidents distributed in age groups

Accidents distributed in agegroups								
Age	Year of registration							Total
	2017	2018	2019	2020	2021	2022	2023	
0 - 17 years	16	23	16	32	28	28	41	184
18 - 24 years	128	155	146	192	179	159	158	1117
25 - 29 years	93	77	78	107	110	95	96	656
30 - 34 years	67	67	86	86	95	81	87	569
35 - 39 years	52	66	53	70	75	57	59	432
40 - 44 years	67	49	57	48	63	44	52	380
45 - 49 years	47	54	53	51	61	50	57	373
50 - 54 years	57	68	52	61	73	66	60	437
55 - 59 years	45	47	49	69	93	83	56	442
60 - 64 years	15	34	30	48	51	49	42	269
65 + years	29	25	40	34	30	30	51	239
Age undisclosed	4	1	.	.	.	.	.	5
In total	620	666	660	798	858	742	759	5103

Social conditionality

Social conditionality is a newer concept introduced in the CAP reform for the period 2023-2027. This means that farmers receiving support from the CAP must also comply with certain labour and social standards. This includes, among other things, compliance with national and EU regulations on workers' rights, health and safety at work. If farmers do not comply with these social standards, they may see their agricultural support reduced.

ESG and its importance for agriculture

ESG stands for Environmental, Social and Governance issues. It is a set of criteria used to assess the sustainability and responsibility of a company, and which increasingly influences both investment decisions and societal expectations. A new way to value attractive workplaces and a new way to focus on a good working environment.

The Danish Labour Inspectorate - holistic efforts Sikkerhed i landbruget - Arbejdstilsynet

In 2024, the Danish Labour Inspectorate carried out a holistic effort within agriculture and forestry. This meant that the Danish Labour Inspectorate carried out inspections of companies within the industry, where they had a special focus on accident prevention within 5 areas.
1. Safety culture
2. Manure
3. Falls and traffic at height
4. Crushing accidents (machine accidents)
5. Handling of animals
6. Handling of large items (sack goods, straw bales, etc.)

Themepage BFA: Arbejdstilsynets indsats inden for landbrug 2024

The Expert Group

The Expert Group on “Accidents at Work”, published a report in 2024 that focused on the prevention of serious accidents at work in agriculture, especially those involving machinery. The group investigated 17 accidents using the AcciMap method and recommended changes in safety culture, machine safety and competence levels. The Expert Group on Accidents at Work recommends that the partners in Danish agriculture come together and form a strong

partnership with a clear objective of creating a safety culture in agriculture, where good results are still achieved on the production side without compromising on safety.

BFA

Based on the expert group’s recommendations and follow-up on the Danish Working Environment Authority's holistic efforts, the focus will be on machine safety in 2025-2027. SEGES will be involved in offering 4 different prevention packages primarily for agriculture with a focus on

- Indoor machines - safety rounding, risk assessment
- Outdoor machines - safety rounding, risk assessment
- Safety culture - behavior and work habits
- Focus on technique and systematics

Mental Health

A survey on mental health in Danish agriculture was conducted in 2024. The survey showed that farmers face many challenges that can affect their mental well-being, such as stress, long working hours, financial worries and isolation. Fortunately, there is a focus on improving mental health in agriculture through prevention, early intervention and access to support and help in a new project in Necto, which started in 2025.

Swedish perspectives on health and safety in agriculture

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The Swedish agricultural workforce

The agricultural sector in Sweden has undergone major changes over time. The number of agricultural enterprises has declined steadily during several decades, but the average size of the enterprises has increased thus production has been maintained through efficiency improvements and structural changes. Since 1990, the number of agricultural enterprises has decreased by almost 42%. The number of people employed in agriculture has also gradually declined, continuing a long-term trend. In 2023, the agricultural workforce included 158,300 individuals who worked at least 100 hours during the year; a decline of 8,100 people compared to 2020 (SJV, 2024). The sector is also experiencing demographic shifts. In 2024, nearly 40% of sole proprietors in agriculture were aged 65 or older, up from just under 31% in 2013 (SJV, 2024). The aging farming workforce is a major challenge for Swedish agriculture which threatens Sweden's food production and self-sufficiency.

Occupational injuries and long-term sick leave

The agricultural sector continues to be one of the sectors in Sweden with the highest occurrence of severe occupational injuries. In relation to the number of people employed, agriculture, forestry and fishing is the sector with the highest number of fatal injuries at work. In 2023, a total of 232 occupational injuries with sick leave and occupational diseases in agriculture and hunting were reported to the Swedish Work Environment Authority. In Sweden, an employer is obliged to report injury or death and incidents with serious danger to life or health to the authorities. However, there is a lack of complete official statistics on the number of injuries within the agricultural sector as there is an underreporting of injuries. It is estimated that less than 10% of injuries that occur in the sector are reported (Pinzke et al., 2018). It is probable that a significant number of occupational diseases also remain undetected.

In a recent publication by AFA Försäkring, a Swedish insurance organization that provides financial protection for employees with collective agreement, analyses of severe occupational injuries and long-term sick leaves for the occupational group ‘agriculture, forestry and gardening’ during the period 2018-2022 were reported (AFA, 2024). The analysis included 1,400 severe injuries (>30 days sick leave) and 1,800 long-term sick leaves (>90 days absence). The report showed that this occupational group had a higher risk of severe occupational injuries than the average in the Swedish labour market. Although males were involved in the majority of cases (65%), females had a slightly higher risk ratio (12.9 and 8.4 for females and males respectively). For females, animal-related injuries predominated (54%), while, for males, injuries related to falls (18%) and to machinery and tools (17%) were most common. Gender differences in injury risk are closely linked to occupational roles, with women more often working in high-risk animal care positions. The risk of long-term sick leave for the occupational group ‘agriculture, forestry and gardening’ was in line with the average for all privately employed. Musculoskeletal diagnoses are the most common and

account for 41% of long-term illnesses, followed by mental diagnoses with 18% (AFA, 2024).

Examples of initiatives in recent years

A few initiatives focused on improving the working environment and safety in agriculture have been conducted in recent years, e.g.:

- A free online training course, 'Är du säker?', aimed for farmers was developed in 2020 and addresses how simple steps can be taken to increase risk awareness and prevent injuries by working systematically with the work environment (Prevent, 2025).
- A joint project lead by the Federation of Swedish Farmers (LRF) was conducted 2021-2024 with the aim to improve the work environment in agriculture by various information efforts to increase interest and knowledge and inspire preventive work environment management. The effort included webinars and meetings on different themes, participation in trade fairs, production of short films and arrangement of an annual agricultural work environment week to highlight work environment issues nationally.
- LRF has offered all members work environment and safety advice from a group of work environment experts, including e.g. inspection requirements for machinery, safety for children, legal requirements, and issues regarding rehabilitation and work aids. LRF also organize 'care groups' for members who have suffered an injury or some other severe incident on their farm. The care groups provide personal support for those affected, and can help find practical help if needed, or direct them to advisors. Recently, LRF has also raised psychosocial health in various ways, e.g. webinars and member meetings on mental health have been arranged where various speakers have participated and talked about how to work proactively to strengthen one's well-being.
- Växa Sverige, a cattle farmer association, has conducted a project in 2020-2024, with the aim to disseminate existing knowledge in the field of occupational health and safety in agriculture and to supplement with informative and easy-to-understand material in areas where information is lacking (Växa, . The material produced includes podcasts, films, checklists and posters in areas such as animal handling, feed storage and traffic on the farm.
- The research institute RISE has produced a free online training course focusing on safe and animal friendly cattle handling aimed at providing a solid basic knowledge in cattle behaviour and handling principles.

A strategi for work environment in agriculture

Due to the high injury risks in agriculture and an identified need to improve the working environment generally within the sector, the Swedish government commissioned the Swedish Board of Agriculture in 2021 to develop a strategy to reduce injuries and improve the working environment in the agricultural and horticultural sector. The Swedish Board of Agriculture initiated an investigation which was presented in a report in 2022 (SJV, 2022). The report concluded that the efforts in the strategy should give as much emphasis to knowledge about injuries as to occupational diseases and mental health issues. This shows a slightly different approach than previous initiatives, e.g. Säkert Bondförnuft, where the main focus has been the physical work environment, safety and injury risks. The report also

emphasized the need to secure competence within the field by offering education and training to e.g. advisors.

The strategy identified a need to measure the current situation and attitudes about mental health among farmers. Therefore, a national survey of the mental health of full-time farmers was conducted. The report was published in 2025 and the results from the survey will be used both as a knowledge base and to enable follow-up of the strategy's efforts (SJV, 2025).

The implementation of the strategy, called Lantlyftet, is ongoing and will continue until 2028 (Lantlyftet).

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Occupational Health and Safety in Finnish Agriculture in the 2020s

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Overview of Finnish Agriculture and Workforce

In 2024, family-run farms accounted for 84% of all Finnish farms. Farming syndicates, companies, and estates made up the rest, representing 9%, 4%, and 2%, respectively. Agricultural structural change in Finland has been steady for decades: small and mid-sized farms continue to decline, while larger operations expand in area and production. The total number of both livestock and crop farms, including horticulture, is declining, while the proportion of crop farms is increasing. Simultaneously, the average field area (55 ha in 2024) and the average age of farmers (55 years) are increasing.[1]

The primary labor force on farms remains self-employed farmers, spouses, and family members (around 70%), supported by permanent (10%) and short-term (20%) hired workers. Of the hired workforce, 24% of permanent and 57% of short-term workers are foreign[1], predominantly from Ukraine and Estonia. These figures do not include municipal/private relief workers or seasonal – mostly foreign – wild berry pickers.

Social Insurance and Occupational Health Services

Self-employed farmers aged 18 to 68–70, operating farms larger than 5 hectares and earning at least €4,605 annually, are covered by the mandatory social insurance system. This includes pension, group life, and workers' compensation coverage administered by the Farmers' Social Insurance Institution (Mela).[2] Employees are insured through other national providers, coordinated by the Finnish Workers' Compensation Center.[3]

Mela data shows a gradual decline in occupational injury rates: from 7.5 per 100 insured farmers in 2017 to 6.0 in 2024. The occupational disease rate remains low (≤0.2/100 annually).[2] A no-claims bonus system implemented in 1997 and discontinued in 2015 likely influenced reporting and prevention behavior for minor injuries.

About 26% of farmers – full-time livestock farmers in particular – participate in a voluntary occupational health program that includes periodic health screenings, farm safety consultations, and work ability assessments.[2] Services are delivered by occupational health clinics and agricultural advisors. The National Centre for Agricultural Health at the Finnish Institute of Occupational Health develops these occupational health services for farmers.[4]

Relief workers support full-time livestock farmers during vacation (26 days annually, free of charge), injury, illness, or parental leave (subsidized). This system is administered by Mela.

Recent Projects and Initiatives

EU-Funded Projects

SACURIMA (2017–2021): Led by Luke, this COST Action involved 35 countries and developed EU-wide recommendations on safety culture and risk management in agriculture.[5]

SafeHabitus (2023–2026): A Horizon Europe initiative, which involves 11 countries and is coordinated by Teagasc (Ireland), aims to enhance socially sustainable farming. Luke leads the Communities of Practice (CoP) work package, and Savonia University of Applied Sciences manages Finnish CoP activities.[6]

Farm as a Common Workplace (2024–2026): Co-funded by the EU, this project promotes work safety and cooperation between farmers and other professional groups working on farms. It is coordinated by Luke with partners including the University of Helsinki Ruralia Institute and TTS.[7]

National Projects

With Mela's support, TTS[8] has recently investigated topics such as exoskeleton use in primary food production and tractor assistance systems' impact on driver's physical and mental strain.

In 2025, Luke launched a Mela-funded project on farm safety management and safety culture. It produces practical guidance and best practice content for national farm magazines.

Mela coordinates the national Support the Farmer well-being program and offers free Occupational Safety Card training and a popular Personal Protective Equipment (PPE) examination. The Farmers' Work Ability Scale tool provided by Mela, has been internationally awarded in 2024.

The Center for Occupational Safety[9] provides data, tools, and training particularly for other professional groups working on farms.

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Oral presentations

Mental Health and wellbeing

Beneath the Surface – Mental Health Among Farmers in Danish Agriculture

Christina Edstrand [1]

[1] SEGES Innovation

Introduction

Mental health among farmers is a growing concern internationally. Yet, little data exists on the psychological wellbeing of farmers in Danish agriculture. In response, SEGES Innovation conducted a national survey to better understand the extent of poor mental health and stress within this group - often only the “tip of the iceberg” is visible.

Methods

A quantitative survey on mental health was distributed via the SEGES Innovation farmer panel in 2024 to approximately 16,000 part- and fulltime farmers. The questionnaire covered wellbeing, perceived stress, sleep quality, support systems, and openness to discussing mental health. A total of 2,737 responses were received. Results were weighted based on business turnover, sector, and farmer age, making the findings close to representative of the sector.

Results

While 81% reported being motivated and happy in their work, 32% felt pressured in daily life, especially those with animal production, large turnovers, or several employees. External factors such as weather conditions and regulatory control were cited as the most significant stressors. Furthermore, 16% had previously experienced stress or depression, but only one-third of those had taken sick leave. Approximately 30% reported sleep disturbances. Although mental health remains somewhat taboo among younger farmers, 80% of respondents considered it only a minor or moderate taboo.

Conclusions

This study provides a comprehensive picture of the mental health status among Danish farmers. While a majority express satisfaction and motivation in their work, a substantial proportion experience daily pressure, sleep difficulties, and uncertainty about the future of their business. Stress is more pronounced among those with larger operations and in animal production. Although discussing mental health is becoming less taboo, many farmers still face challenges in seeking support. Acknowledging and addressing the unique working conditions of self-employed farmers will be essential in promoting resilience and sustainable leadership in agriculture.

Stress and mental health among Swedish farmers – challenges, needs and proposals for interventions

Peter Lundqvist[1], Carita Håkansson[2], Eva Göransson[1] & Karin Hakelius[1]

[1]Swedish University of Agricultural Sciences, [2]Lund university

Purpose and Objective(s) of presentation:
Farmers have an important and developing social function, not least for the country's food supply, but they also have challenging working conditions and a risky work environment that affects both physical and mental health. The physical work environment is relatively well documented, but the psychosocial work environment and its impact on farmers' mental health have not previously been prioritized to any great extent in Sweden.

Methods / Efforts:
The present national survey of the mental health of full-time farmers included responses from 2,835 people via a digital questionnaire, supplemented by group interviews in different parts of the country.

Results / Findings:
Most farmers agreed on the factors that are important for their well-being: living in the countryside, variety in work, living with nature/seasonal changes and controlling one's own time/business. The highest-ranked stress factors: regulations, bureaucracy and inspections, followed by workload and time pressure, the economy, uncertainty about the future and unpredictability, and society's and the media's portrayal of farmers. Almost one in four farmers (23 %) reported having experienced an injury or risky incident in connection with being stressed or feeling worse mentally. There was a connection between mental illness and poor profitability, high workload, time pressure and little opportunity for recovery and time off. Only one in five farmers was satisfied with the opportunities for vacations, while one in four stated that they had not had the opportunity to have any vacations at all in the past year. Among the farmers, 17 % had moderate, moderate or severe depressive symptoms. Furthermore, 11 % stated that at some point in the past 12 months they had felt that life was not worth living. There were also 8 % (182 people) who said that at some point since they became farmers, they had seriously considered taking their own life. Of the farmers, 47 % stated that they had at some point considered quitting prematurely (i.e. earlier than intended). The groups that experienced the greatest psychological pressure were mainly: younger people, those with less than 10 years of experience as entrepreneurs, female farmers, animal owners – especially those with dairy production and farmers in northern part of Sweden.

Application to the Field / Implications of the Research:
To strengthen a sustainable life for Sweden's farmers, the following are proposed: a) Training, advice and support for farmers to prevent and manage physical and mental ill health, b) Advisors and others who work with farmers in their profession should be offered training in "First aid for mental health" or equivalent, c) It should be investigated how a replacement system, primarily for animal producers, can be designed and financed to provide improved opportunities for leave, vacation and, if necessary, sick leave, d) It should be investigated how occupational health care for farmers and others employed in agriculture can be designed and financed, and how existing primary care can be strengthened and further developed to better meet and support agricultural workers

Back-on-Track: An innovative co-designed approach to peer-led mental health support in farming communities

Alison Kennedy[1, 2]
Richard Gray[3], Martin Jones[4], Anna Greene[2, 5], Lauren Mitchell[3], Meera Senthuren[3], Feby Savira[1], Kelly Barnes[2, 5], Kate Gunn[6], Susan Brumby[1, 2, 5], Lucinda Star[2, 5]

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Introduction:
Farmers face diverse and compounding stressors which can challenge their mental wellbeing and place them at heightened risk of suicide. However, barriers remain (geographic, financial, seasonal and cultural) to farmers accessing mental health services, with concerns that existing services—even when available—may not reflect farmers' needs. Integrating lived experience and peer support into mental health service provision in farming communities has been identified as an acceptable way of addressing common barriers to service access.

Methods:
Back-on-Track is a peer-led model of evidence-based mental health support, informed by iterative co-design with the farming community over the past five years. Trained peer workers (with experience living and working in a farming community) deliver a 10-session evidence-based Behavioural Activation program to members of their community experiencing low mood. The program can be delivered face-to-face or via telehealth, and is supported by comprehensive training, resource materials, governance and support structures. Key elements of the model (e.g. stakeholder engagement, recruitment and program promotion) are tailored to the local context following community consultation.

Results:
This presentation will report on the co-design of the Back-on-Track model and results of the Back-on-Track randomised controlled feasibility trial—currently being conducted in three Australian farming communities. Feasibility outcomes include:
- the recruitment, training, supervision and retention of peer coaches
- the recruitment, randomisation, assessment and retention of community participants
- level of fidelity to the Back-on-Track model.

Conclusions:
Trial findings will inform next steps toward a sustainable and scalable support model of evidence-based psychological support to better equip farming communities to respond to and manage change, and restore and maintain mental wellbeing.

Financial Stress and Symptoms of Anxiety and Depression among Farm Parents

Josie M Rudolphi[1]
[1] University of Illinois

Introduction:
Agricultural producers experience a myriad of unique, occupational stressors. Among those, financial and economic situations are consistently cited as leading sources of stress. However, recent research has not examined how agricultural producers are impacted economically by financial stress and how specific economic hardships are associated with symptoms of poor mental health. The objectives of this analysis are to describe the association between reported farm stressors, economic hardship, mental health, and parenting styles among adult agricultural producers in the U.S., guided by the Family Stress Model.

Methods:
Farm families were recruited to participate in online surveys via mail, email, and social media. One adolescent and at least one adult from each family were required to participate for a response to be valid. Where available, validated instruments were used to collect information about adult mental health, economic hardship and agricultural stressors. Descriptive summaries characterize the study cohort using standard descriptive statistics. Statistical comparisons were made using the nonparametric Kruskal-Wallis test for continuous data and Chi-squared tests for categorical data. The results in this report were deemed statistically significant at the 5% level ($p < 0.05$) without adjustment for multiple comparisons.

Results:
298 farm parents responded to the survey. Among agricultural producers, 71.7% and 67.7% met the criteria for probable depression and anxiety, respectively. Participants that met the criteria for probable anxiety and depression reported more difficulty paying bills, more unmet material needs, more financial cutbacks, and more negative financial events.

Conclusions:
Our findings describe the association between economic hardship and mental health conditions, and further contribute to the growing evidence-base around farm financial stress and mental health.

A Mixed-Methods Exploration of the Impacts of Food System Centralization on Male Farmers, Rural Masculinity, and Mental Health

Conor Hammersley[1], **Julie Sorensen**[2], **Destiny Trombley**[3]

[1] Principal Investigator
[2] Co-Investigator
[3] Research Co-ordinator

Introduction:
The rapid consolidation of the U.S. dairy sector has reshaped the lives of male farmers, altering their economic realities, identities, and mental health. Between 1987 and 2017, the median size of dairy herds expanded from 80 to 1,300 cows, disproportionately impacting small- and medium-scale operations. This centralization process, most pronounced in dairy-intensive states like New York and Wisconsin, has heightened economic pressures, strained community resilience, and destabilized traditional farming roles.

Methods:
This study explores the intersections of rural masculinity, mental health, and socio-economic challenges male farmers face due to agricultural centralization. Drawing on Anthony Gidden's Structuration Theory, the research examines how shifts in cultural and economic capital disrupt masculine identities tied to farming. Using a mixed-methods approach, the study incorporates surveys, in-depth interviews, and ethnographic observation to assess how macro-scale changes influence farmer wellbeing and their ability to navigate shifting expectations of success, resilience, and legacy.

Results:
Preliminary findings suggest that the decline of small-scale farming opportunities, alongside the rise of large-scale enterprises, exacerbates isolation, mental health vulnerabilities, and challenges traditional notions of a "successful farmer." The study advocates for targeted interventions addressing farmer mental health, emphasizing community-based participatory research to co-create actionable solutions that prioritize local voices. By situating these issues within broader discussions of rural masculinity, this research underscores the need for systemic and localized support for male farmers facing these transitions.

Conclusions:
This work contributes to the growing discourse on the mental health challenges men face in adapting to changing socio-economic landscapes, offering insights for policy development and community mental health initiatives.

Unequal Fields: Gender Disparities in Mental Health and Substance Among Agricultural Producers

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Introduction:
Mental health is a growing area of concern for occupational safety and health in the agricultural industry. Agriculture has long been a male-dominated industry; however, women agricultural producers are on the rise. Therefore, there is a need for comprehensive research surrounding mental health disparities among agricultural producers by gender. The objectives of this study were to 1) examine symptoms of anxiety and depression, and psychological distress severity in agricultural producers by gender; and 2) investigate whether there are significant gender differences in agricultural producers' alcohol and tobacco use.

Methods:
N=1,135 agricultural producers in twelve Midwestern U.S. states completed a paper survey to identify symptoms of common mental health conditions and substance use. Anxiety and depression symptoms were measured using the GAD-2 and PHQ-2, respectively. Psychological distress severity was measured using the PHQ-4. Alcohol-related risk was assessed using the AUDIT (U.S.). Tobacco use was measured with questions about lifetime use and frequency of use in the past year.

Results:
Women agricultural producers had a statistically significantly higher prevalence of likely anxiety disorder than men agricultural producers (14.6% vs. 8.3%; p=0.049). Additionally, 8.4% of women reported symptoms indicating likely depression, compared to 5.6% of men (p=0.291). Similarly, women producers scored higher on the PHQ-4, indicating more psychological distress (p=0.248), albeit not statistically significant. Men agricultural producers were significantly more likely to engage in risky drinking behaviors (p=0.011). Furthermore, men producers reported more use of all tobacco products (cigarettes, e-cigarettes, smokeless tobacco, cigars, pipe tobacco; p not calculated).

Conclusions:
Women agricultural producers reported more anxiety and depression symptoms, whereas men were more likely to engage in substance use. Further research should examine gender-specific stressors and their associated mental health outcomes. Results from our study can aid in the development of tailored mental health resources and services to target gender-specific needs in future outreach and programming endeavors.

The Mental Well-Being of Women in Farming

Sarah Nyczaj Kyle[1], **Emma Barkus**[1], **Andria Jones**[2], **Stephen Dunne**[1]
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Introduction:
Farming is a vital industry in the United Kingdom, and women play an essential role in its success. However, the unique agricultural lifestyle presents specific challenges that can significantly impact women's mental well-being. Despite this, research focused on gender-specific stressors and their effects remain limited.

Methods:
Two studies explored how the farming lifestyle impacts the mental well-being of women in the UK. The first study comprised 30 in-depth semi-structured interviews, analysed using Reflexive Thematic Analysis. An overarching theme, **"***The Farm Comes First*", was supported by three subordinate themes: "*Navigating Traditional Family Dynamics*", "*Balancing On and Off-Farm Commitments*", and "*Understanding Connections: People, Place & Purpose*". Findings suggest that a deep sense of belonging, provided by the farm, land, lifestyle, and community, offered satisfaction even in the face of multiple strains, including role burden.

Results:
The second mixed-methods study examined the relationship between relational needs, stress, and mental well-being among 138 women in farming. Quantitative analysis revealed when relational needs were met mental well-being was high. However, when relational needs were unmet, stress levels were high. Interestingly, at higher levels of met relational needs, higher stress was associated with lower mental well-being. A qualitative Framework Analysis provided further insight, highlighting the complex dynamics of reciprocal social support among women in farming.

Conclusions:
Together, these studies provide evidence for the need for tailored support programmes that address the specific well-being needs of women in farming. Interventions should build on the positive aspects of farming, such as belonging, identity and peer networks while addressing sources of stress and role burden. Future research should prioritise a deeper understanding of the health and well-being of women in farming, using cross-disciplinary and international comparisons to foster the sharing of knowledge and best practices in interventions.

Unpacking Farmer Identity: Layers, Meaning, and Mental Health Impacts

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Introduction:
Farmers experience disproportionately high levels of stress, depression, and anxiety compared to the general population. Despite this, they remain low users of mental health services, often citing that healthcare providers lack the cultural understanding needed to address the unique demands of farm life. While past research has identified a range of farm-related stressors, fewer studies have explored internal and cultural factors, such as identity, values, and belonging, that shape how farmers view themselves, relate to others, and respond to mental health challenges. Our study aimed to (1) examine how farmers' values, beliefs, and practices shape their occupational identity, and (2) explore how these identities influence mental health and help-seeking behavior.

Methods:
We used a mixed-methods design, and conducted 20 in-depth interviews with a diverse sample of Canadian farmers, followed by a national survey to validate the themes and their relationships to mental-health outcomes.

Results:
Our qualitative analysis identified seven themes that defined farmer identity, which we organized into a layered, concentric model with three interconnected levels. At the core were three foundational themes that shaped farmers' sense of meaning and motivation (e.g., legacy and lineage, farming as a lifestyle, mission-driven purpose). Surrounding this were behavioral themes (e.g., lifelong learning, partnering with nature) that reflected how identity was enacted. The outer layer included contextual themes (e.g., connecting with the public, searching for belonging) that influenced how identity was expressed and experienced. Quantitative findings revealed associations between these cultural dimensions and mental health outcomes, including perceived isolation, sense of inclusion, and purpose.

Conclusions:
By moving beyond occupational labels (e.g., "multigenerational farmer", "rancher", "regenerative farmer", etc.) to explore why farmers farm, our research provides new insights into how deeply rooted identity constructs shape farmers well-being. We offer practical recommendations for healthcare providers, mental-health professionals, and policymakers to develop culturally-informed care that aligns with farmers' lived realities

Facilitating faith community-behavioral health sector partnerships in agricultural communities

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Introduction:
Collaboration between faith leaders and behavioral health providers could expand rural behavioral healthcare systems' capacities to serve agricultural communities. The Clergy Outreach and Professional Engagement is a framework to define the roles across organizations in behavioral health to increases capacity by sharing expertise across faith leaders and behavioral health care providers. By building trust among faith and behavioral health professionals in agricultural communities, the system of care for vulnerable rural farmers can increase. The purpose of the presentation is to elucidate specific aspects of the Clergy Outreach and Professional Engagement framework to facilitate building and sustaining faith community and behavioral health sector partnerships in agricultural communities.

Methods:
A total of 9 interviews were conducted among individuals involved in a larger study addressing building partnerships between faith leaders, behavioral health providers, and extension agents.

Qualitative coding was done using deductive thematic analysis seeking to understand how the respondents viewed the following components of Clergy Outreach and Professional Engagement: benefits of community collaboration/partnership; spiritual support faith leaders/churches provide; opportunities for collaboration that support behavioral health recovery; faith leaders attitudes towards behavioral health care providers; and behavioral health care providers attitudes towards faith leaders.

Results:
Respondents saw the value of collaboration across professional groups and provided examples of effective partnerships in rural agricultural communities. The respondents endorsed the importance of faith-based leadership in the community and the support provided. The need to build trusted relationships to address collaboration for recovery, and in relation to the respective attitudes about the role each group plays in a community were emphasized as keys to successful partnerships that ultimately strengthen rural community support systems.

Conclusions:
Respondents viewed collaboration as key to improving behavioral health services in agricultural communities and provided important information to address challenges for developing a robust system of care.

Building resilience in agriculture-dependent communities: recommendations and initiatives informed by a review of the evidence

Alison Kennedy[1, 2]Amity Latham[3], Joanna Macdonald[1, 2], Jessie Adams[1, 2, 4], Jacquie Cotton[1, 2], Susan Brumby[1, 4], Sally Cunningham[1, 4], Kelly Barnes[1, 4], Cecilia Fitzgerald[1, 4]

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Introduction:
In the context of agriculture-dependent communities, resilience includes the ability to respond to change and restore, maintain or improve wellbeing. This is important for farmers, farm workers, farming families and the broader communities in which they live and work - particularly given increasingly turbulent and cumulative challenges associated with extreme climatic events; geographic and social isolation; financial, land-use, social licence and market pressures; and, multi-generational relationships.

Methods:
A rapid review (with increasing specificity) of international, Australian and Victorian evidence - including peer-reviewed literature, grey literature and stakeholder interviews - was conducted to develop a comprehensive picture of agriculture-dependent community resilience initiatives.
Review recommendations informed the iterative co-design, piloting and/or evaluation of a range of farmer-focused initiatives designed to support resilience in agriculture-dependent communities - through promoting mental wellbeing and preventing or managing risks to farmer mental health.

Results:
This presentation will:
(i) highlight review findings - including twelve key recommendations proposed as incorporating best practice design elements and approaches for resilience building in agriculture-dependent communities;
(ii) demonstrate the subsequent translation of these recommendations into practical farmer-focussed initiatives - including a social media campaign, interactive community workshops, workforce training webinars, community events guidelines and a podcast series: and
(iii) share a range of evaluation data demonstrating the impact of these initiatives.

Conclusions:
Reactive responses to crisis are often prioritised above the prevention of, and preparedness for, challenges. This presentation highlights a new perspective - by demonstrating evidence-based opportunities for practical, effective approaches to building resilience in agriculture-dependent communities.

Lack of Structure and Control – An Underestimated Cause of Mental Health Issues Among Farmers

Björn Rudman [1]
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Introduction

Farmers operate in a highly uncertain environment influenced by external factors such as weather, interest rates, and market prices.
However, what can be controlled - internal structure and organization - is often neglected. A lack of planning and financial oversight increases stress and feelings of helplessness, negatively impacting mental health.

Methods

This findings is based on dialogues with farmers who sought therapeutic support for stress-related issues. These conversations identified common challenges in managing daily operations and workload.

Results

The discussions revealed several recurring issues:

- **Lack of structure** in farm management, leading to inefficiency and stress.
- **Inability to set boundaries**, with many struggling to say no, resulting in overwhelming workloads.
- **Failure to prioritize recovery**, increasing the risk of burnout.
- **Limited financial oversight**, with many unaware of production costs, worsening economic uncertainty.

Conclusions

Findings suggest that simple planning tools and better awareness of operational complexity can significantly reduce stress. Implementing annual planning calendars, budgeting models, documented routines, and structured administration helps farmers regain control over their work. This shift not only alleviates stress but also fosters a more sustainable and mentally healthier approach to farm management.

No therapy can eliminate the anxiety of running a multi-million-dollar operation under volatile conditions. However, structure and control over what can be influenced provide an effective, practical solution for improving farmers' mental well-being.

Evaluating Farmer Well-being Across Diverse Farming Profiles in Europe

Laura Girdžiūtė[1], Anastasija Novikova[1], Algirdas Staugaitis[1]
[1] Vytautas Magnus University

Introduction:
Agriculture faces numerous challenges affecting its sustainability and appeal as a profession. The sector's lack of prestige leads to a shortage of qualified labor in rural areas, exacerbated by the "brain drain" of young workers to urban areas or abroad. Farmers, often the sole decision-makers, must manage operations and oversee workers while dealing with risks from machinery, chemicals, environmental factors, and livestock. These risks increase the chances of injury, health issues, disability, or death. Addressing these challenges is vital for improving safety, working conditions, and policies to attract and retain skilled labor in agriculture.

Methods:
This study aimed to identify current farming profiles in selected Safehabitus project Community of Practices (CoP) countries—Slovakia, Poland, Lithuania, Romania, Slovenia, Finland, Ireland, Spain, Germany, Estonia, and France—and assess the well-being factors associated with each profile. The study used an expert evaluation method, gathering insights from experts in these countries.

Results:
The findings identified four main farming profiles across most European countries:

1. Adaptive – diversified
2. Intensive – specialized
3. Patrimonial – tradition and family
4. Corporate

Farmers in the Corporate and Intensive – specialized profiles had the highest well-being scores, while those in the Adaptive – diversified profile had the lowest. Key insights included:

- Inequality between companies' profits and farm worker wages (Spain, Romania).
- Lack of workforce in agriculture (Spain, Finland).
- Low/uncertain overall well-being (Spain, Finland, Germany).
- Willingness to adapt to climate changes (Finland, Germany, Poland).
- Significant gender imbalance (Germany).
- Reluctance of children to continue farming (Lithuania, Slovenia, Slovakia).
- Strong organization and representation of farmers (Ireland, Lithuania, Romania).

Conclusions:
Understanding farming profiles and associated well-being factors is essential for developing targeted policies. Addressing inequalities, improving labor availability, supporting climate adaptation, encouraging youth engagement, and addressing gender imbalances are crucial for making agriculture more attractive and sustainable.

Priority Strategies for Strengthening Irish Farmer Wellbeing: Findings from the FarMHealth and SafeHabitus projects

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Introduction:
Farmers across Europe face an increasingly uncertain future of economic, political, and climatic changes. These occupational pressures on farmers may exacerbate many existing mental health risks and destabilise the already scarce resources accessible to farmers. Farming mental health supports should therefore accommodate both individuals' needs and social context.

Methods:
This paper is a socioecological synthesis of results from the Irish FarMHealth research programme, consisting of a national survey of 351 Irish farmers, a series of 18 interviews and 3 focus groups with farmers and farming stakeholders, and the implementation and evaluation of the 'Skills for Resilience' community-based mental health literacy programme with 72 farmers.

Results:
From this empirical evidence base, we identify four priority strategies for interventions and research aiming to strengthen farmer wellbeing and adaptability across Europe. First, tailored interventions can identify groups of farmers most at-risk of poor wellbeing and strengthen farmers' resilience in the face of stress with culturally accessible and theoretically grounded material. Second, strengthening rural community connections may address the root causes of farmers' mental health challenges by increasing rural healthcare coverage and providing cultural events and spaces for family and community integration. Third, valuing farming work and identity in official communications and public discourse may affirm farmers' contributions to society and draw attention to the many positive and supportive facets of farming as an occupation. Fourth, sustainable capacity building and sustainable funding models may ensure that the significant recent work on farmer mental health translate into long-term improvements.

Conclusions:
Our findings highlight the importance of approaching farmer mental health from a theoretically grounded and multi-dimensional framework with an emphasis on structural, socioeconomic, and cultural components. We present an example of upcoming research using this model from the SafeHabitus project, designed to identify farmers' health and safety priorities through a multi-national survey.

North Central Farm and Ranch Stress Assistance Center: Resources and Services to Support Agricultural Producers and Workers

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Introduction
The 12-state north central region of the U.S. includes some of the most agriculturally productive states. Despite agricultural productivity, producers and workers in the region experience a myriad of occupational stressors associated with adverse mental health conditions. In response, the United States Department of Agriculture funded four regional Farm and Ranch Stress Assistance Networks. The goal of the North Central Farm and Ranch Stress Assistance Center (NCFRSAC) program is to develop regional networks that connect agricultural community members with stress assistance programs. NCFRSAC has achieved success in offering mental health literacy programs in NCR agricultural communities.

Methods
The NCFRSAC partnered with Cooperative Extension Services in the 12 states as well as non-profit and public health organizations to meet the mental health and stress management needs of the agricultural populations in the region. The NCFRSAC focuses on delivering resources and services through the following: a) clearinghouse website, b) telephone helplines/hotlines, c) trainings programs for individuals engaged in agriculture and agricultural-related occupations, d) support groups, and e) professional services.

Results
Between 2020 and 2025, the NCFRSAC trained over 18,000 farmers in educational programming about stress and mental health and over 13,000 agricultural community members in evidence-based mental health trainings such as Mental Health First Aid, Youth Mental Health First Aid, and Q.P.R. The Iowa Concern Hotline at Iowa State University responded to over 17,000 calls from nine states in the NCR. NCFRSAC supported over 1,900 hours of professional behavioral health services via counseling and teletherapies and engaged almost 1000 individuals in support groups.

Conclusions
NCFRSAC has reduced barriers often associated with accessing mental health resources, services, and care. Engaging agricultural community members has increased capacity in rural communities to respond to mental health crises and challenges. Providing access to professional behavioral health services has reduced barriers related to cost and access that many experience.

Farm Stress Certified: A course to Increase mental health professionals' capacity to serve agricultural workers

Dee Jepsen, **Jami Dellifield**, **Sarah Noggle**, **Bridget Britton**, **Ken Martin**, **Chris Zoller**
Ohio State University.

Mental health professionals do not always understand the unique occupational pressures of farming, the legacy pressures to maintain a family farm, or the steadfast tenacity and resilience of the people involved in agricultural work. To address this need in the health care system, a cross-disciplinary team of Ohio State University Extension (OSUE) professionals came together to create an accredited course called Farm Stress Certified. Using the Social Ecologic Model, this program targets the community health care system to effectively serve the agricultural population for a holistic approach to mental wellbeing. The curriculum includes three stand-alone modules: Farming 101, Managing the Farm, and Farming - the Real World. Each module provides 2.5 CEUs and upon completion of the series, participants receive a "Farm Stress Certified" designation to use for marketing their services to farm families, and likewise Extension offices can access a roster of participants who completed the course to share with farm clientele who seek a counselor "that understands them." Funding from a USDA-NIFA Farm and Ranch Stress Assistance Network (FRSAN) grant provided the course free of charge for the past three years. To date, over 1000 Ohio professionals have received this certification. A post-program evaluation is conducted after each session yielding high remarks. Results included: course content was suitable and useful (97.5%), instructors presented course content effectively (98.9%), and the course content met expectations (98.6%). Based on enrollment and evaluation results, our partners in the College of Social Work requested future training opportunities to be offered, including the addition of an asynchronous course to meet the demand between live course offerings. Ultimately the OSUE Farm Stress Certified Program improves statewide services through behavioral health awareness, health literacy, and enhanced outcomes for agricultural workers and their families.

Injuries and injury prevention

Using agricultural injury and illness data from social insurance records for evidence-based prevention

Risto Rautiainen[1]
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Introduction:
Recent studies of the EU-funded SafeHabitus project indicate that Eurostat agricultural accident statistics under-estimate the true incidence of injuries in agriculture. Particularly non-fatal injuries to self-employed farmers are missing from statistics. Only few countries have accident insurance systems that compensate and report reliable data on injuries to self-employed farmers.

Methods:
As a case study, data from the Finnish Farmers' Social Insurance Institution were examined to describe injury and occupational disease rates and characteristics, and how these data have influenced preventive actions among farmers in Finland over time. Published statistics and landmark preventive policies and programs are discussed in this presentation.

Results:
Finnish farmers' insurance data show a declining trend from 8.7 injuries/100 person years in 1991 to 7.3/100 in 2020. Machinery injuries have increased, and occupational diseases have decreased. Working environment (27.0%), animals (23.8%), and machinery (23.7%) remain prominent injury causes. Accident insurance statutes require that part (1.75%) of the insurance funds must be used for prevention; mostly education, outreach, and communication, and partly for external competitive research projects. This funding has enabled collaboration between insurance, research, extension, education, media, farmers' organizations, and government agencies to promote safety and health among farmers and agricultural workers. Insurance data have also enabled total population-based research, targeted outreach, and policy development. Examples of major programs available for farmers include occupational health services, relief worker service during vacation and illness, work ability and mental health counseling, national campaigns, and evaluation of interventions.

Conclusions:
The Finland case highlights how data resources from social insurance can be used for informing and guiding policies and actions to prevent occupational injuries and diseases in agriculture – in addition to the primary purposes of these programs: retirement at a similar age as employed workers, and receiving compensation for medical care and lost time during recovery from accident and occupational disease incidents.

Leveraging Emergency Medical and Trauma Registry for Agricultural Injury Surveillance

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University of Florida, Agricultural and Biological Engineering Department, Gainesville, Florida, United States

Agricultural work is among the most hazardous occupations, yet existing surveillance systems often fail to capture the scope of injuries in this sector. These gaps are particularly pronounced for self-employed farms, workers on small farms, and migrant or undocumented laborers. Leveraging emergency medical services and trauma registry data offers a novel approach to address these limitations. This study investigates the prevalence of fatal and nonfatal agricultural injuries that required either emergency medical services or care from a trauma center in Florida.

The data were obtained from the Florida Trauma Registry and the Florida Emergency Medical Services Tracking and Report System (EMSTARS). The trauma registry collects patient data from the state's verified and provisional trauma centers. EMSTARS is a statewide database that collects and manages information from prehospital EMS providers—such as paramedics and ambulance services—on emergency medical incidents treated and transported in Florida. The data for this study will include the years 2017-2021. Agricultural-related injuries were identified by multiple identifiers.

The preliminary results revealed that from 2017 to 2021 in Florida, 949 agricultural-related injuries required EMS care and 750 required trauma care. The EMSTARS data revealed that 623 injuries were to males and 310 to females. The median age was 42 with a range of age from 1-93. The trauma registry revealed that 573 injuries were to males and 167 were to females. The median age for the trauma registry was 51 with a range of age from 1-98.

Understanding risk behavior through anthropological field work and AI-based analysis of incidents

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Introduction:
In a project aimed at influencing the overall safety culture in the Danish agricultural sector, the first part focuses on both a qualitative behavioral and cultural study on farms and a statistical analysis of incident sequences to understand behavioral factors in the occurrence of workplace accidents.

Methods:
Through an anthropological approach, the study aims to uncover farmers' and workers' risk-taking behaviors and attitudes towards safety, which is essential for creating a cultural shift and improving safety in agriculture. In addition to observations and interviews on 8-10 farms, interviews with agricultural students are conducted to understand how future farmers are prepared for safety risks.

The statistical analysis is conducted using artificial intelligence. When workplace accidents are reported, which is mandatory in Denmark if they result in incapacity for work, they are partly described in text form of diverse volume and content. By combining AI-generated data on the content of these reports with knowledge from the qualitative study and previous research, a deeper understanding of risk behavior and its motivations is achieved.

Results:
Preliminary results show the main tasks in agriculture leading to injuries are handling of animals and working with machinery. The typical causes of injury are due to sudden and unforeseen animal behavior, failure of or no safety equipment, lack of space, poor interior design, and maloperation of equipment. Risk behavior is in some cases described and falls into categories such as ignoring safety instructions or lack of attention to a known hazard. Anthropological studies also show lack of knowledge as a factor in poor accident prevention.

Conclusions:
Conclusions are yet to be determined. The goal of this first part of the project is to identify similarities and differences between observations, interviews, and accident reports to recognize behavioral characteristics for the prevention of workplace accidents.

Behavioral Science Insights: Nudging Workers and Employers Toward Safer Behaviors

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[3] GLS-A
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Introduction
Identifying viable behavior change strategies that address the shortcomings of more traditional approaches is a crucial step for improving population health. Since many behavioral decisions are made automatically or intuitively, efforts to identify behavior change strategies that do not require an engaged thought process or effort may be more fruitful. Nudging strategies typically target these types of behavioral decisions but have been criticized for being manipulative and therefore unethical.

Methods
In this presentation, we discuss an innovative approach to nudging that involves engaging the target population in nudge creation. To that effect, a type-2 nudge (i.e. a subconscious cue to action for an individual's intended behavior) was developed to address worker safety on dairy farms. In a slight departure from the norm, the farm owner, supervisor and workers identified the safety issues to be resolved and assisted the research team with developing the nudging intervention

Results
In conversations with the dairy farmer owner, cross-shift communication was identified as an issue for workers. Lack of communication had led to product loss and had the potential to create safety issues. The research team coordinated with workers to develop a soccer-themed, cross-shift communication board to make communication easier and more engaging. The board was generally well-received, however, although several issues and challenges were encountered.

Conclusions
Collaborating with target populations to develop type-2 nudges may be an effective and more ethical approach to providing behavioral cues to action. However, further research needs to be conducted to identify effective ways of evaluating these types of nudging interventions.

Changing the Risk Culture in Agriculture: A Pathway to Fewer Accidents

Christina Edstrand[1]
[1] SEGES Innovation

Introduction:
Agriculture remains one of the highest-risk sectors for occupational accidents. This national initiative aims to strengthen the safety culture in Danish agriculture through lasting changes in behaviour and mindset. The focus is on prevention by increasing safety awareness among farmers and workers, encouraging shared responsibility for creating a safe work environment. A key insight is that risk-taking may sometimes be seen as a source of pride, efficiency, or even reward. Understanding these motivations is essential to support a mindset shift where safety becomes part of professional identity.

Methods:
The approach builds on behavioural insights into how farmers and employees perceive occupational safety. A communication campaign supports attitude change by encouraging stakeholders to integrate safety into their everyday messages. Social media platforms specific to the agricultural sector are used to spark conversations about safety practices and promote peer-to-peer learning.

Results:
The campaign activates agricultural influencers as “safety culture ambassadors.” These role models receive knowledge-sharing and sparring to enhance their ability to influence others by example. They include farm network members, organizational leaders, and consultants in management, HR, and occupational safety. Industry stakeholders—such as food producers, financial institutions, and equipment manufacturers—are engaged as both target audiences and co-communicators. A key output is a high-quality campaign film designed to resonate with the farming community and be widely shared across the sector.

Conclusions:
Combining behavioural insights with peer-driven communication supports ownership and long-term commitment to safer practices. This coordinated, multi-actor approach lays the groundwork for a sustainable transformation of safety culture in agriculture, helping to reduce accidents and foster a healthier, more responsible work environment.

10 Years of Creating a Community-of-Practice: Rural Firefighters Delivering Agricultural Safety and Health (RF-DASH) in Review

Casper Bendixsen, Jakob Hanschu
National Farm Medicine Center, Marshfield Clinic Research Institute

Introduction:
RF-DASH is a community-based intervention that aims to increase rural firefighters' capacities to prevent and prepare for agricultural emergencies. The program was established in 2016 based on results from a cognitive mapping study that found that farmers and ranchers trusted rural first responders enough to voluntarily adopt agricultural safety improvements recommended by the latter. This paper will reflect on the various methods/approaches and results that have led to program's sustained development over a ten-year period.

Methods:
During the first five years of RF-DASH research (2016-2021), dissemination analysis, observation, interviews, and post-training surveys were utilized to evaluate the program, assess first responder acceptance, and identify areas in need of improvement. The current cycle of research (2021-present) leverages semi-structured interviews to identify successes, challenges, and strategies for RF-DASH dissemination and implementation by first responders across the U.S. and Canada. Interviews with 25-30 fire/EMS personnel with 1-7 years of RF-DASH experience were analyzed for themes.

Results:
Results of the 2016-2021 study revealed strong acceptance and program dissemination among rural first responders. To date, over 200 first responders representing over 20 states/provinces/territories have been directly trained in RF-DASH, with an estimated total reach of several thousand persons. Since 2021, RF-DASH has been endorsed by agricultural industry, is aligned with national firefighter policy, has gained international significance, and continues to garner interest and enthusiasm among rural first responders and community members more broadly. Current interview results have led to several innovations within the RF-DASH program, identified several novel avenues for program dissemination, and revealed strategies for implementing aspects of RF-DASH with different target audiences.

Conclusions:
In total, the RF-DASH program is an example of one possible path for community-based intervention design and, specifically, to further reduce injuries, fatalities, and property loss on agricultural operations through voluntarily partnerships with rural fire/EMS personnel.

Reducing Agricultural Machinery Accidents: Expert Group Analysis and Recommendations

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Introduction:
After decades of declining work-related fatalities, the trend in Denmark has stagnated over the past ten years. Consequently, in 2024, the Ministry of Employment established an Expert Group tasked with investigating the causes of occupational accidents and providing recommendations for prevention. The group included a three-person secretariat, four investigators, two thematic experts, and four experts in accidents and prevention. In 2024, the group focused on serious occupational accidents involving machinery in the agricultural sector, which accounted for 24 of the 48 fatal accidents in the agricultural sector over the past decade.

Methods:
The group carried out in-depth investigations of 17 occupational accidents with large agricultural machines using the Accident Mapping (Accimap) method, plotting actors and contributing factors at six levels from the societal (international and national), authority, branch and employer levels, to the process and events surrounding the accidents. Recommendations for prevention were drafted based on e.g.: a) the principles of the hierarchy of controls, b) Initiatives that can be targeted to specific areas, such as selected machinery, where challenges exist and c) initiatives based on well-known practices.

Results:
The AcciMap analyses identified three primary contributing factors: (a), (b) and (c). Based on these findings, three broad recommendations were formulated, focusing on: (1), (2), and (3). The recommendations should be viewed as a comprehensive package, where the implementation of all three is necessary to achieve the desired preventive effect.

Please note that the precise details about the recommendations are first available upon the publishing of the report to the minister in April 2025 – after which we will gladly revise the abstract with precise details.
Conclusions: *The Expert Group's recommendations were submitted to the Minister of Employment in April 2025. It is now crucial for industry stakeholders to collaborate with authorities and other relevant parties to implement the recommendations.*

Which Technologies Make Australian Farm Machinery Safer? Developing A Decision Support Tool for Agricultural Safety Effectiveness

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[4] University of Sydney, Australia

Introduction:
Farm machinery-related incidents continue to claim the lives of farmers, family members, and their employees across the globe. This project combined systems engineers, farm safety researchers, work health and safety inspectorate and policymakers with the aim of designing a method with which to reduce fatal farm injury caused by run-overs and roll-overs by tractors and side-by-side vehicles.

Methods:
This research commenced with an analysis of minimum safety requirements and solutions for manufacturers of machinery from the warehousing and logistics, mining, industrial manufacturing, and construction industries. The team compared farm machinery and powered mobile plant used in the industrial manufacturing, warehousing and logistics, mining, and construction sectors. Current and emerging safety technologies and engineering solutions were collated. Safety standards, legislated engineering controls, retrofit designs, and known ways in which farmers' workaround safety features were considered. These elements were used as criteria to propose a way to resolve which safety technologies or engineering controls should be recommended for aftermarket retrofitting or incorporated at the original equipment manufacturer design stage.

Results:
The concept of measuring safety effectiveness to prevent fatal farm injury emerged. This developed into a score sheet and a corresponding matrix to highlight engineering strength and industry acceptance. The project resulted in the conceptual design of the agricultural safety effectiveness score (ASES).

Conclusions:
This work unveiled gaps in our knowledge of Australian tractors and side-by-side vehicles. Further research is required on farmers', original equipment manufacturers (OEMs'), aftermarket manufacturers', and machinery sales representatives' risk perception of tractors and side-by-sides. Multi-stakeholder validation is now required to test the theory that when safety technologies and engineering solutions are mature in other industries, or if they are associated with agricultural productivity gains, their adoption into the agricultural sector is more likely—which in turn, will reduce the incidence of tractor and side-by-side run-overs and roll-overs on farms.

AGRO-WELL Agricultural Robotics and Augmented Reality for Workplace Enhancement and Labour Linkage

Martina Jakob[1], **Prathamesh Bachche**[1], **Dushica Santa**[2], **Fabian Frick**[3]
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[3] Technical University Munich

Introduction:
The AGRO-WELL project aims to develop innovative solutions using augmented reality (AR), robotics, and digital technologies to enhance working conditions in agriculture. These solutions will be co-designed with farmers based on their specific needs, following a multi-actor approach. The project targets four sectors—greenhouses, open fields, orchards, and pig farming—each of which faces challenges such as high injury risks, health issues, and a shortage of workforce.

Methods:
To address these challenges, the project seeks to adapt farming practices to reduce risks while improving both production efficiency and the health and safety of farmers and farm workers. Smart farming technologies, including robotics, IoT, and data-driven solutions, will play a crucial role in supporting this transition.

Results:
One key component of the project is the development of an AR-based solution designed to improve worker safety and reduce physical strain. An integrated vision system enables real-time safety monitoring, protecting workers from hazards associated with automated equipment. This system significantly lowers the risk of accidents. The AR app also simplifies farming tasks, making it easier for inexperienced, disabled, or foreign workers to perform their duties. By reducing technical barriers, the app contributes to making farm-related jobs more attractive. Additionally, the AR solution will streamline the management of regulations and data by centralizing information in a user-friendly format, raising awareness among farmers and workers, and facilitating decision-making. This will also help reduce the stress associated with data handling and management.

Conclusions:
The AGRO-WELL project will provide valuable insights into the impact of smart farming technologies on key social issues such as working conditions, seasonal labor, and the lack of attractiveness of farm work. The presentation will showcase the initial achievements of this five-year EU project and highlight upcoming open calls for collaboration.

Occupational Safety Card Training for Agricultural Entrepreneurs

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[1] Farmers' Social Insurance Institution (Mela)
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Introduction:
The Occupational Safety Card training program was developed in Finland to enhance workplace safety across various sectors. Initiated by the Centre for Occupational Safety in collaboration with industrial companies, labor market organizations, insurance providers, and training institutions, the program has been running for approximately 25 years. To date, nearly three million Occupational Safety Cards have been issued.

Methods:
Recognizing the unique risks present in agriculture, the Farmers' Social Insurance Institution (Mela), in partnership with the Centre for Occupational Safety, launched a tailored version of the training specifically for agricultural entrepreneurs in 2023. Agriculture is a high-risk industry with a high incidence of serious accidents, and farms often serve as shared workplaces with agricultural entrepreneurs, employees, relief workers, and service providers all working together. While participation in the training is voluntary, the Occupational Safety Card is increasingly required by companies for subcontracted labor, and it provides valuable tools for improving safety on farms.

Results:
The course is delivered by occupational safety specialists certified by Mela and covers essential topics such as legal responsibilities, hazard identification and risk management, workplace safety practices, and stress management. The training is grounded in practical agricultural examples to ensure relevance and applicability.
Agricultural entrepreneurs can access the training free of charge, either online or in-person. The course spans three days and includes lectures, interactive discussions, practical exercises, personal protective equipment evaluation, and a final assessment. Successful participants receive an Occupational Safety Card issued by the Centre for Occupational Safety, valid for five years.

Conclusions:
To date, more than 100 agricultural entrepreneurs have completed the training. Feedback indicates that participants find the course highly beneficial in understanding safety responsibilities and improving risk management practices. Future studies will explore the relationship between Occupational Safety Card training and the incidence of occupational injuries in agriculture.

Education and learning

Enhancing Pesticide Safety Training for Young Adults through Immersive Technology in the Southeastern U.S.

CAROLYN SHERIDAN[1], JENNA GIBBS[1], OP MCCUBBINS[2]
[1] Ag Health and Safety Alliance(TM)
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Introduction:
Agricultural workers face significant risks from pesticide exposure, highlighting the critical need for effective safety training. Recognizing the potential of immersive learning, this two-year project, funded by the Pesticides Educational Resources Collaborative, addresses this need by developing and implementing innovative educational resources, including 360° video and graphic novel illustrations, for young adult working in Mississippi, in partnership with Mississippi State University, to improve worker protection and promote Worker Protection Standard compliance.

Methods:
This initiative utilized immersive 360° video technology, developed using AHSA's experience with CentarioVR and 360° editing software, offering a novel and engaging learning experience accessible via VR headsets, computers, or cell phones. The project also incorporated graphic novel illustrations to present information in a visually compelling and interactive format. Specifically, two 360° videos demonstrating proper PPE use and an illustrated poster reinforcing key PPE recommendations were created and integrated into a 2-hour Gear Up for Ag Health and Safety(™) program delivered to 30 individuals at the MSU farm.

Results:
This presentation will showcase the development and implementation of these outreach materials, including participation in a "walk through" of the 360° pesticides donning and doffing videos. Feedback from young adult participants on the 360° video highlighted the importance of proper doffing and glove washing. Suggestions for improvement included audio levels and the potential addition of subtitles.

Conclusions:
The use of innovative and accessible tools like immersive 360° video and engaging graphic novel illustrations has great potential to enhance young adult engagement and knowledge retention regarding pesticide safety, ultimately contributing to a safer agricultural workforce. AHSA plans to explore the use of subtitle settings in YouTube based on participant feedback and recognizes the potential of these materials in multiple languages for training purposes.

Safe Respirator Use by Youth in Agriculture: A Review of Pediatric Filtering Facepiece Respirator Use

JENNA GIBBS[1], **Carolyn Sheridan**[1]
[1] Ag Health and Safety Alliance(TM)

Introduction:
Respirator use is increasing to protect against respiratory hazards like SARS-CoV-2, wildfires, and avian influenza. However, confusion exists regarding proper use by youth in agriculture. This systematic review aimed to identify current evidence and make recommendations for safe filtering facepiece respirator (FFR) use by farm youth in the United States and abroad.

Methods:
A seven-researcher multidisciplinary panel conducted a systematic review using PRISMA guidelines and both reviewer and AI-generated tools. All studies on youth FFR use pertaining to agriculture were included.

Results:
Thirty-one studies were included. While respirators effectively protect against respiratory exposures, concerns exist about CO2 rebreathing within the respirator. Most studies found no significant health effects on youth from FFR use, but some reported discomfort and shortness of breath. Studies highlighted the importance of proper fit due to variations in facial dimensions between youth and adults. Current NIOSH-approved respirators primarily focus on adult users, only-- noting a major gap in research needs.

Conclusions:
Future research should focus on youth facial anthropometrics, fit testing, respirator design, and the impact of CO2 levels on youth. Educational programs and professional consultations are crucial for proper respirator use on farms. Manufacturers should consider pediatric FFR designs to address youth facial variations. A one-size-fits-all approach for youth FFR design is not suitable. In this session, we will focus on some key recommendations from the review on safe FFR use by farm youth, including a) provision or access to well-fitting, preferably youth-sized FFRs, b) improvement of respirator designs and discouraging overreliance on “modified” adult FFRs for youth, c) educational programs for youth and parents/supervisors, d) developing guidance for pediatric medical evaluations for respirator use.

Shifting Gears: Transforming Teacher-led Farm Safety Education for Young Australians

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[2] National Centre for Farmer Health, Hamilton, Victoria, Australia
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Introduction:
There is a gap in avaiable audio-visual resources that depict young people discussing safety in agriculture. Entirely teacher-led, Shifting Gears demonstrates the broader context of agricultural injury in rural Australia through relatable content specifically for young people. Role models demonstrate what farm safety looks like and why it is important. Young people are empowered to be safer on farms by making deliberate choices about what they do.

Methods:
A co-design process determined priority safety topics. A nationally selected steering committee ranked a range of topic areas. An introduction to the industry, agricultural exposures, agricultural hazards and prevention strategies were rated the highest priority. The process determined the best conduit to teach these farm safety topics. It was indicated that teachers wanted to lead discussions and activities, allowing teachers to adapt their methods to the unique needs of their classroom and students. Resources were mapped to the national training package for Work Health and Safety training.

Results:
Resources were piloted from July 2023, across eight secondary schools, reaching students in Years 8-12 (14-18Yrs). Contributing to both secondary and vocational education certificates the resource was used in elective subjects including Agriculture and Advanced Manufacturing. A total of five schools completed the post-pilot survey. All teachers state that they would re-use the Shifting Gears resources again. Teachers found Shifting Gears to be easy to integrate into curriculum. The discussion-led activities were reported to be moderately to extremely useful, and 3 out of 5 found Shifting Gears was “extremely easy” to integrate into the curriculum.

Conclusions: Shifting Gears is set to revolutionise how agricultural education is delivered in Australian classrooms. It aims to enhance farm safety culture by using real industry leaders to connect with young people about why farm safety is important. This work showcases the power of co-design to make young people safer on farms.

Wearable devices and new technologies

The impact of passive exoskeletons on perceived physical strain in primary food production

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Introduction:
This study investigated the impact of passive exoskeletons on perceived physical strain in primary food production. Additionally, the study aimed to determine the perceived comfort, suitability, and limitations of exoskeleton usage.

Methods:
The Swiss Auxivo LiftSuit 2.0 (sizes S/M and L/XL) and the French ErgoSanté Hapo Front (support up to 4 kg or 6 kg) were chosen for the study. These passive exoskeletons, along with guidance on how to operate them, were provided to experienced agricultural and horticultural farmers (n=5) and coastal fishermen (n=5).

Results:
Based on the collected user experiences, the tested exoskeletons reduce physical strain and are comfortable during various tasks. These tasks include activities such as tie-stall and parlor milking, handling feed and bedding, using hand tools, preparing potatoes for sale, pressure washing machinery and buildings, manually processing firewood, and various tasks that involve bending over and repetitive lifting in honey production and coastal fishing. These exoskeletons can also be used while operating vehicles.
Exoskeletons must always be adjusted according to the user's body measurements and clothing. The level of support should be adjusted according to the user's needs, the nature of the work, and the required support. Therefore, it is not practical to rotate exoskeletons among users.
Limitations and potential hazards were also identified, some of which can be addressed by changing work practices. For example, narrow passageways or structures where the exoskeleton can get caught diminish their usability.
According to the users, additional areas of use may be found in manual labor-intensive tasks, such as construction, maintenance, repair, and installation work, and harvesting vegetables and fruits. Motivation to use exoskeletons increases when the work where they are useful is continuous and long-lasting.

Conclusions:
In conclusion, the passive exoskeletons tested in this study are suitable – under certain conditions – for reducing physical strain during various tasks in primary food production.

Application of Wearable Devices and New Technologies to Protect Farmworkers

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Introduction:
The rapid advancement of robotics and emerging technologies is transforming the agricultural industry, offering increased efficiency and productivity. However, ensuring that these innovations do not compromise farmworkers' health and safety is critical. In California, a unique challenge arises where operators must supervise autonomous agricultural vehicles from a close distance. Current safety regulations, such as Section 3441 Title 8—designed for conventional tractors—do not adequately address the operation of autonomous machinery. With over 50 manufacturers producing various autonomous vehicle models, some lacking operator stations, compliance with outdated regulations becomes increasingly difficult. This study examines the intersection of evolving technology and worker safety, considering discussions from the Occupational Safety and Health Standards Board (OSHSB) on connectivity issues, data security, and the experimental variance of autonomous tractors.

Methods:
A comprehensive review of recent studies was conducted to evaluate the effectiveness of new technologies and wearable devices in protecting farmworkers. The research focused on the application of innovative health monitoring systems, exoskeletons, and rollover detection devices. Additionally, data from regulatory meetings and industry reports were analyzed to assess current challenges and potential solutions for integrating autonomous machinery into agricultural safety standards.

Results:
The study highlights key technological advancements improving farmworker safety, including:

1. **Wearable health monitoring systems** for detecting heat-related illnesses, vibration exposure, and falls.
2. **Exoskeletons** designed to reduce physical strain and prevent musculoskeletal injuries.
3. **Rollover and incident detection devices** to enhance workplace safety.
4. **Challenges in regulation compliance** for autonomous tractors, with insights from industry discussions and safety board meetings.

Conclusions: The integration of wearable devices and new technologies presents promising solutions for farmworker safety. However, regulatory frameworks must evolve to accommodate autonomous machinery and ensure worker protection. Addressing connectivity, data security, and safety standard updates will be essential for a seamless transition into a more automated agricultural industry.

Smart workwear as a tool for accurate, continuous monitoring of postural exposure during work – an example from the equine sector

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Introduction:
Musculoskeletal disorders are a known significant hazard of agricultural occupations. Risk factors for work-related musculoskeletal disorders are well-known and include heavy lifting, repetitive movements, and awkward postures. Musculoskeletal disorders may result in disability, lost worktime, and increased costs. To identify relevant measures to reduce risks of musculoskeletal disorders, a risk assessment of the physical strain is required. Common evaluation methods for assessing workload and ergonomics often rely on observations and self-reported data, which are subjective and prone to inaccuracies.

Methods:
The Smart Workwear System (Wergonic) offers accurate, continuous monitoring of postural exposure during work. The system is designed as a t-shirt with embedded pockets where inertial measurement units are placed. The t-shirt can be worn for a full workday while recording arms and trunk angles. The system also includes sensors for heart rate measurements. The system facilitates identification of hazardous postures, allowing for timely interventions that contribute to sustainable agricultural practices. It also enables opportunities for the user to be provided with automated exposure assessments and real-time feedback.

A study has been conducted in the Swedish equine sector to evaluate the usefulness of the Smart Workwear System in quantitatively describing postural exposure during work. Employees at Swedish riding schools are a relevant empirical setting for exploring postural work exposure and ergonomics. The aim was to increase knowledge of postural exposure and related risk factors in the equine sector to reduce hazardous exposure, which in the long run could promote healthy work environments and decrease work-related sick leave.

Results:
Preliminary analysis indicates that the group is generally within acceptable ergonomic limits, but with some notable risks. Individual cases highlight significant deviations, which underscore the importance of targeted interventions, despite acceptable group averages, to effectively manage risks for specific individuals.

Conclusions:
The results can be used as inspiration for designing studies in an agricultural setting.

Advisory services

Holistic HSE Advisory for Agriculture: Experience, Expertise, and Safety

Ellen Helstad, Halle Arnes, Kolbjørn Taklo, Arnfinn Særheim, Kari-Anne Aanerud, Linn Thorud

Introduction
Norsk Landbruksrådgiving (NLR) has over 30 years of experience in promoting health, safety, and environmental (HSE) standards in Norwegian agriculture. Their advisory service is tailored to the specific needs of farmers, aiming to improve safety, health, and productivity on farms.

Key components of the HSE service include:

Occupational Health Services (BHT): Regular health check-ups and consultations with medical professionals.
Routine Farm Visits: Every three years, advisors assess working conditions and suggest improvements.
Crisis Support: Immediate help during emergencies.
Training: Courses on risk management, machinery safety, and regulatory compliance.
Collaboration with BHT ensures continuous health monitoring and effective crisis management, linking working conditions directly to farmers' well-being. This partnership allows for continuous monitoring and follow-up on the farmer's health, ensuring that any health issues related to the working environment are promptly addressed.

HSE Advisors play a central role by offering practical, farm-specific guidance. Their local knowledge and trusted relationships help ensure that safety measures are implemented and maintained. These advisors bring a combination of practical experience, HSE knowledge, and local insight, allowing them to build trust-based relationships with farmers. Through regular visits, personalized guidance, and follow-up, the advisor becomes a reliable partner in the farmer's everyday work life

NLR's interdisciplinary approach—combining expertise in HSE, agronomy, economics, and construction—enables holistic support for farmers.

Systematic follow-up through regular contact helps create safer, healthier, and more sustainable farming environments.

The HSE advisory services provided by Norsk Landbruksrådgiving are a testament to the organization's commitment to improving the health, safety, and well-being of farmers in Norway. With over 30 years of experience, NLR has developed a comprehensive and effective framework that addresses the unique challenges of agriculture. The HSE agreement, with its systematic follow-up, ensures that farmers receive the support they need to maintain a safe and productive working environment.

Easing farmers' regulatory burden: The role of farm advisors

Lisa Blix Germundsson [1]
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Introduction

Legal regulation serves an important role in society and have increased significantly over recent decades. In Swedish agriculture, the number of regulations has risen by 134% over the last 25 years. Research on farmers' sources of stress indicates that regulatory frameworks, bureaucracy, and inspections are among the most taxing factors. In response, farm advisors have increasingly focused their efforts on supporting farmers in complying with current legislation. This study examines a project in which a group of farm advisors initiated a dialogue with regulatory authorities regarding perceived farm bureaucracy.

Methods

This is a qualitative case study of a project aimed at regulatory improvement, led by advisory organisations in southern Sweden, with the goal of developing a method for identifying, processing, and submitting proposals for regulatory improvement to relevant authorities. Data were collected through semi-structured interviews with stakeholders and meeting notes, all analysed using structural and thematic coding.

Results

The results reflect why and how the advisors decided to address the issue of regulatory improvement. Their project worked stepwise to collect proposals for improved regulations, sort and prioritize them, develop problem descriptions and impact assessments, and finally facilitate dialogue meetings with regulatory authorities. Of the 150 collected proposals, a total of 82 regulations were assessed by the group of advisors as difficult to comply with, and 63 were considered to cause unnecessary anxiety among farmers.

Conclusions

This study highlights the expanding role of farm advisors in easing farmers' regulatory burden and illustrates how advisors can facilitate dialogue to bridge the gap between farmers' knowledge and that of regulatory authorities. Previous research on farmers' stress factors has not given much attention to the area of legal regulation, nor has it acknowledged the role of farm advisors in supporting farmers to comply with, and feel secure in their adherence to, relevant legislation.

Best Practices from Germany – SVLFG Services for Farmer Health and Mental Wellbeing

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Introduction:
Mental health and wellbeing of farmers are increasingly recognised as a problem throughout Europe. Sector-specific working conditions and stress factors must be taken as the basis for solutions. In Germany, the Social Insurance for Agriculture, Forestry and Horticulture (SVLFG) has developed a comprehensive range of services to promote mental health and wellbeing of its insured. This abstract describes particularly effective measures and tailor-made services for people working in the green sector, who are struggling with mental health problems.

Methods:
The aim of the presentation is to introduce the support structures and services offered by SVLFG to promote mental health and wellbeing of farmers. Among other things, it will cover a individual telephone coaching programme, digital health trainings and support with legally required risk assessment for mental stress on farms. Mention should also be made of the European Network of Agricultural Social Protection Systems (ENASP), whose presidency and general secretariat is held by the SVLFG, and which serves as a transnational platform to exchange, harmonise and disseminate common approaches also in this subject area.

Results:
SVLFG's services offer a holistic and adaptable framework for promoting farmers' mental healh and wellbeing. They focus on early intervention, low-threshold access and sector-specific tailor-made services. The services are furthermore not just reactive measures to alleviate existing symptoms, but an overall preventive concept that starts at an early stage to prevent mental stress and promote the resilience of insured persons in the long term.

Conclusions:
Tailored mental health and wellbeing support adapted to the specific needs of farming life and working conditions in the green sector leads to higher acceptance and better outcomes. Germany's experience suggests that a combination of legal obligation (e.g. risk assessment), low-threshold accessibility (e.g. phone/online formats), and social participation (e.g. insured self-governance) can foster sustainable mental health and wellbeing in the green sector.

Occupational Health and Safety Challenges in Agriculture: Insights from STAMI's Fact Book 2024

Anne Marie Heiberg[1]
[1] Fact Book on Working Environment and Health (2024). STAMI Report, Vol. 25, No. 7, Oslo: National Institute of Occupational Health (STAMI)

Introduction:
This presentation summarizes key findings from the 2024 edition of STAMI's Fact Book, with a particular emphasis on occupational health and safety (OHS) in the agricultural sector.

Methods:
The foundation for the 2024 Fact Book is data collected from a variety of sources. The Survey of Living Conditions – Working Environment (LKU-A) is one of these sources.

Results: Over the past few decades, employment in Norway's primary industries—including agriculture, fisheries, forestry, and hunting—has markedly declined. Despite this reduction, the sector continues to present significant OHS challenges. Recent data indicate that nearly 28% of workers in primary industries report reduced work ability, reflecting a mismatch between job demands and individual capacity. Work ability is compromised by both physical strain and mental health concerns.

The agricultural sector is characterized by a high prevalence of physically demanding work and exposure to adverse environmental conditions, including noise, vibration, and extreme temperatures. Workers are also frequently exposed to skin- and respiratory-irritating agents, and the risk of occupational injuries remains elevated.

Furthermore, there are pronounced deficiencies in the implementation of risk assessments, occupational training, and the use of protective measures—particularly concerning chemical and biological hazards. Psychosocial and organizational work factors, such as workload and control, are also significantly associated with mental health disorders and prolonged sick leave.

Conclusions:
These findings underscore the urgent need for targeted interventions to improve health, safety, and working time arrangements in agriculture and other primary industries. Ensuring sustainable employment in these sectors is critical to safeguarding worker health and maintaining productivity.

Farmworkers, farmers and fisheries

Promoting mental well-being among farm workers

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Introduction:
Mental health is an important component of well-being. Numerous studies have documented that farmworkers often experience high rates of mental health conditions, including stress and depression. Farmworkers, particularly im/migrant workers, may be culturally, linguistically, and geographically isolated from the greater community; thereby decreasing their access to health promoting resources.

Methods:
Since 2021, our team has conducted Bienvenido, a group-based multisession mental health promotion program. This community-defined evidence program addresses topics such as good mental health, managing anger, assertive communication, risk and protective factors, acculturation, and substance use. To date the program has served, 155 Spanish-speaking migrant farmworkers in Nebraska. We conducted the program at farmworker housing sites, parking lots, and other public places after working hours.

Results:
Based on pre/post-test surveys, there has been a significant increase in mental health knowledge and willingness to seek help from partners, friends, parents and other family members, mental health professionals, healthcare providers, and religious leaders. There has been a significant increase in reporting the use of positive reframing and active coping strategies. There has also been a significant decrease in hazardous alcohol use.

Conclusions:
Mental health promotion programs specifically tailored for the agricultural work environment are needed. These programs may not only educate farmworkers about the signs and symptoms of mental health conditions but also equip them with skills to communicate more effectively about how they are feeling and their needs. Such programs may integrate information on available resources and provide referrals into more formalized mental health services if needed. Investing in mental health promotion may have a positive long-term impact on farmworkers, farm-level productivity, agricultural communities, and public health.

Early Support Services for Work Ability for Farmers, Reindeer Herders, and Fishermen

Arja Peltomäki-Vastamaa[1]
[1] Arja Peltomäki-Vastamaa, Farmers´ Social Insurance Institution (Mela), Finland

Introduction:
After eight years of operation, "Support the Farmer" project became permanent as early support services on December 1, 2024. This change extended eligibility to reindeer herders and fishermen. The goal is to support the work ability of food producers, prevent work disability and extend careers. The operational model remains largely unchanged.

Methods:

Help for Challenging Situations

Early support services include counseling and guidance from Mela's work ability advisors, discretionary service vouchers for mental health expert services, training related to work ability, communication and digital services, and network cooperation with stakeholder organizations. Advisors offer comprehensive support to farmers by mapping their situation, coordinating, and finding solutions together with the farmer and with the necessary experts. The service is confidential and free of charge. Additionally, there is a discretionary €500 service voucher for mental health support.

Early Support Operational Model

The model aims to identify and address factors threatening work ability early and guide individuals to get help. The early support network includes stakeholders who work with farmers, reindeer herders, and fishermen, observe their coping, and inform them about available help. Timely assistance prevents work ability challenges from progressing to work disability. Guidance is always provided with mutual understanding and consent.

Training and Digital Services

Support for well-being is available through training and courses organized by Mela. The Farmer's Work Ability Scale is a free of charge tool for farmers to assess their work ability. It consists of 10 questions that help evaluate and compare different aspects of work ability. Individual feedback is generated based on the answers, considering the specific characteristics of agricultural work. The feedback helps understand one's work ability better and guides the use of free of charge support services. The Farmer's Work Ability Scale received an honorable mention in the ISSA's Good Practice Award competition in 2024.

Beneath the Surface: Mental Health in Commercial Fisheries

Amanda Roome[1]
Kimberly Gertz[1], Madeline Pain[1], Heidi Bruggink Sulman[2], Judith Graham[1], Brian Quinn[1], Rebecca Weil[1], Laurel Kincl[3], Jerry Dzugan[4], Leigh McCue-Weil[5], Paul Jenkins[6], Julie Sorensen[1]
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[4] Alaska Marine Safety Education Association, USA
[5] Department of Mechanical Engineering, George Mason University, USA
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Introduction:
Commercial fishing is a dangerous occupation where injuries, stress, and traumatic events are common. Work stressors include variable working hours, social isolation, economic pressures, changing weather patterns, competition for coastal resources and regulations. These can contribute to higher levels of anxiety, depression, or other mental health issues, however, little research has been conducted on mental health in commercial fisheries. Limited access to healthcare services, combined with mental health stigma and cultural/masculine norms, often means that fishermen are less likely to receive care for conditions like PTSD.

Methods:
This study determined Post-Traumatic Stress Disorder (PTSD) rates in a cohort of 142 commercial fishermen in the United States and assessed factors that influence PTSD outcomes and severity. Fishermen representing four fisheries were sampled: salmon gillnetters (Alaska), Dungeness crab (Oregon), scallopers and lobstermen (Massachusetts). Participants were given surveys to gather information on health, sleep, activity, substance use, and a PTSD screening.

Results:
PTSD rates in male fishermen were nearly 12%, roughly three times the national average for US men (4%), and comparable to rates in US military veterans. Fishermen with self-reported depression, financial struggles, feeling unable to control important things in their lives, and having trouble going to ($p=0.0278$) or staying asleep ($p=0.038$) were significantly more likely to have PTSD. Factors that influenced the severity of PTSD in those that have experienced a traumatic event included: financial insecurity, interpersonal concerns (family, crew), stress, and concern for safety on the vessel. Interestingly, sleep variables did not impact the symptom severity of PTSD, only the outcome of PTSD.

Conclusions:
These results suggest the need for improved working conditions to limit injuries and reduce the prevalence of traumatic events. Additionally, tailored behavioral health care for fishermen is essential to effective treatment and recovery from trauma.

ATV / Quadbike safety

Impact of Mandatory All-Terrain Vehicle (ATV) Training in Ireland, A Safety Practitioner's Perspective

Andrew Reilly[1]
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Introduction:
Between the years, 2014 – 2023, inclusive, there have been ten fatalities on Irish farms involving sit astride ATVs. There were an additional eight non-fatal incidents involving ATVs reported to the Health & Safety Authority (HSA) over that time. The number of non-fatal incidents that go unreported is unknown but likely to be a multiple of the number reported. The figures exclude leisure ATV use or incidents that did not occur in a work environment.

These serious incidents are a continuation of rates recorded over a long number of years. In response the Irish Government enacted regulations that came into effect on 20th November 2023. The regulations place three requirements of all users of ATVs in workplaces, including farmers, the purpose is to achieve behavioural change in ATV use and reduce the rate of ATV accidents. These requirements are:

1. Mandatory wearing of helmets while using ATVs.
2. ATV training to be undertaken with a registered training provider to a specific certified standard.
3. Completion of risk assessments for the use of ATVs in the workplace.

Methods:
This paper attempts to establish the impact of the training on the behaviours of ATV users among those who have undertaken accredited ATV training. A retrospective pre-post questionnaire approach was used. Training participants (N=235) who had completed training between May 2023 and March 2025 were asked to self-assess their knowledge, attitudes and intended behaviours before and after participating.

Results:
Not available at time of submission of abstract.

Conclusions:
The results of the survey will be analysed and the results presented at the Nordic Meeting.

In addition, the presenter will give a practitioner's perspective on the opportunities and challenges of training farmers on farms and give details of the types of incidents and near miss scenarios that are commonplace with ATV use.

Understanding Barriers to ATV Safety in Agriculture and Forestry

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Introduction
ATVs are widely used in agriculture and forestry but have usage restrictions. Due to frequent accidents and increasing use, safety is a key concern. Authorities recommend safety measures such as helmets, rollover protection, side-by-sides, alcohol locks, and reduced child use and road driving to prevent injuries and fatalities.

The aim of this study was to explore users' resistance to safety measures and provide information on laws, regulations, and risks.

Methods
Three initial interviews identified key risks and issues related to regulatory gaps and user knowledge. A detailed survey was then developed to assess users' safety behaviors, knowledge, capabilities, and motivation. The survey included questions on ATV use, protective gear, legal compliance, and access and motivation to safe driving, along with a knowledge test on relevant regulations.

The COM-B model was used to analyze responses and identify if unsafe Behaviour stemmed from lack of knowledge and skills (Capability), low Motivation, or limited Opportunities.

Results
Two out of three instructors identified excessive speed as the primary risk, while the third highlighted towing heavy loads in rough terrain. In forestry, all agreed the greatest risk was operating a fully loaded trailer on hilly terrain.

Survey results (67 responses) showed only 10 users ever used rollover protection, and none had alcohol locks. Most users occasionally drove on public roads, and only 15% had received ATV training. The majority never or rarely wore helmets. Initial results show a correlation between motivation and safety behavior but no clear link to capability or opportunity. Additionally, knowledge of regulations was generally low.

Conclusions
The study revealed significant gaps in ATV safety practices, emphasizing the need for targeted education and easier and better enforcement of regulations to reduce risks, especially on public roads and in challenging terrain. Further efforts should focus on improving both awareness and opportunities for safer ATV usage.

Enhancing Safety in Agricultural All-Terrain Vehicles (ATVs) Operations: An Overview of Lab Research

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Introduction:
Agriculture consistently ranks among the top three most hazardous industries worldwide, with agricultural vehicles, particularly all-terrain vehicles (ATVs) and tractors, among the leading causes of fatalities and injuries. Addressing ATV-related incidents is complex, requiring interdisciplinary solutions. The Agritech Safety Lab at the University of California, Davis, focuses on reducing fatalities and injury severity through engineering control methods. Major research areas include rollover prevention (through experimental and computational simulations), operator protection structures and tools, and youth and female operator safety.

Methods:
The Agritech Safety Lab employs engineering methods for ATV safety research. An ATV test station has been developed at the University of California, Davis, to evaluate static and dynamic stability and simulate rollover incidents for ATVs. In addition, several studies include mathematical simulations, human-machine interactions, rollover prediction, detection, and notification devices that have been conducted in the lab.

Results:
Research conducted at the Agritech Safety Lab has led to several key findings. Rollover incidents remain a significant concern, particularly on uneven terrain and during high-speed maneuvers. Engineering solutions, such as improved stability devices and rollover protection systems, have shown promise in reducing injury risks. Studies focusing on youth and female operators highlight the need for size-appropriate vehicles and targeted training programs. The Static and dynamic stability tests provide recommendations regarding the amount, type, and location of added load to the agricultural ATV to decrease the chance of rollover incidents. In addition, the lab’s outreach disseminates findings to stakeholders, including farmers, safety organizations, and policymakers.

Conclusions:
The Agritech Safety Lab's research advances ATV safety through engineering solutions, stability testing, and targeted training. By addressing rollover risks and operator protection, the lab contributes to reducing injuries and fatalities. Ongoing studies and outreach efforts ensure that safety innovations reach farmers, policymakers, and other key stakeholders in agriculture.

Health & safety in dairy production

Cattle farmers; their total strain, its influence on well-being and wanted health-promotion interventions

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Introduction
Farmers are exposed to high levels of workload and stress, influencing their well-being. There is lot of research regarding well-being, and how to increase facilitators and reduce barriers influencing it. Research also states that increasing the chance of success with preventive and health-promotive, can be done by involve the target group and their wishes. Therefore, this study`s purpose was to explore the cattle farmers own experience of total strain and its influence on well-being. Furthermore, to investigate which kind of interventions they want, and their relations to the once already existing.

Methods
Semi-structured in person interviews with six male and seven female cattle farmers (dairy and/or beef) from Inland County in Norway were conducted. Further earlier research by Dølen et.al was used together with relevant theory and other similar studies, to form the interview guide. A thematic analysis was done in F4, based on the research question's themes; total strain and well-being, preventive and health-promotion work and past and future development.

Results
Results show farmers being exposed to a high level of challenges that could influence their well-being, such as imbalance between work and leisure and effort and reward. However, they also seem to experience having facilitators to help them cope, such as help from family and friends. Furthermore, they seem aware of what they want as preventive and health-promotive interventions, to increase their chance to take care of themselves. Gender and production also seem to have a certain influence, regarding technological help tools and the farmers attitude towards sick-leaves. Eventually, from an external point og view, it might seem like the narrower the farmers blinders are regarding their own resources and options, the higher their total strain seems to be.

Conclusions
It needs to be taken action, with interventions they want themselves, to increase their well-being.

Evaluation of safety leadership training effectiveness and supervisor behavior change in U.S. dairy farm operations

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Introduction:
Prior research has demonstrated that leader-focused training interventions are considered to have a much stronger influence on worker safety behavior and climate than worker-based training interventions. However, no prior research has evaluated training effectiveness of safety-specific leadership skill development for front-line supervisors on dairy farms. A tailored safety leadership training program targeting U.S. dairy farm supervisors was developed, delivered, and evaluated for its training effect on reported supervisor safety leadership behavior.

Methods:
A 12-module safety leadership training program was developed and delivered in an asynchronous format using e-learning methods to 73 dairy farm supervisors, representing 30 farms across five western U.S. states. The Kirkpatrick Model was utilized to evaluate different levels of training effectiveness. Safety leadership behavior was assessed using novel methodology which utilized mobile devices to report daily safety leadership behaviors and experiences.

Results:
Evaluation of knowledge gained among training participants revealed significant differences between pre- and post-test scores with medium to very large learning effect sizes across all training modules, particularly with training modules addressing safety culture, workplace conflict and safety meetings. Safety leadership behavior change evaluation revealed significant pre-post training effects across most training modules, particularly regarding safety dialogue, hazard assessment, safety modelling and conducting safety meetings.

Conclusions:
Our findings suggest that safety leadership training can result in essential leadership behavior change among front-line dairy farm supervisors. Additional research is needed on the effectiveness and sustainability of safety leadership training in high-risk industrial sectors such as agriculture.

Improving workplace safety climate through a dairy farm supervisor e-learning program

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Introduction:
Ensuring the health and well-being of dairy farmers is increasingly challenging as dairy farms expand herd sizes to improve efficiency and sustainability, and where effective leadership is essential for managing a growing and often multicultural workforce. Workplace safety climate surveys are widely recognized as tools for assessing workplace safety culture. This study aimed to develop, implement, and evaluate an e-learning safety leadership and management training program for front-line dairy farm supervisors, hypothesizing that it would positively impact supervisor and work-group safety climate.

Methods:
A 12-module e-learning program was developed, covering topics such as injury prevention, hazard recognition, supervisor and worker safety roles, modeling safe behavior, safety communication, safety meetings, workplace conflicts, and fostering a safety culture. Changes before and after training were assessed using a 24-item, 8-factor safety climate survey. Research-to-practice and knowledge-transfer-and-exchange strategies were integrated throughout the study, including collaboration with dairy extension specialists in program design and farm recruitment.

Results:
A total of 65 out of 103 enrolled supervisors from 28 of 35 participating farms fully completed the program, along with pre- and post-training safety climate surveys. An average of four to five of their workers under their direct supervision also participated, with 313 completing the pre-training survey and 238 the post-training survey. Significant improvements were observed in most safety climate scores, particularly in the 14-item supervisor safety climate scale and the 10-item work-group safety climate scale. Significant gains were found in supervisors' prioritization of safety, worker empowerment, and conflict resolution. No significant change was detected in supervisors' encouragement of workers to report safety incidents, as baseline scores were already high.

Conclusions:
The findings suggest that e-learning-based safety leadership training can enhance the safety climate among dairy farm supervisors and workers. Further research is needed to evaluate the long-term and salutogenic effectiveness and sustainability of such training.

Automatic milking system and the new way of work: Some preliminary results from an ongoing ethnographic study

Isa Larsson[1]
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Introduction:
According to the Swedish Board of Agriculture, the number of dairy-producing farms in Sweden decreased by 96 percent between 1981 and 2023. Concurrently, the number of dairy cows per farm has increased, each cow produces more, and the number of annual work units per produced milk has decreased. Alongside the reduction in the number of dairy farms, agricultural production has undergone significant technological development in recent decades (Ayre et al., 2019; Gaworski, 2021). Automatic Milking Systems (AMS) are a key example of significant technological advancement that has redefined milk production. AMS renegotiates the relationship between humans and cows, and thereby also the work performed by dairy farmers (Holloway & Butler, 2015). This study examines how changes in the interaction between humans, cows, and technology are related to and affect both work processes and the work environment.

Methods:
To gain a deeper understanding of how AMS affects the work environment, an ethnographic study is conducted on dairy farms in Northern Sweden. Data is collected through workplace visits, where each farm is studied for two to four weeks, with participant observations approximately three days a week. By following daily work in real-time, both explicit and implicit risks can be identified, as well as work environment aspects that are often taken for granted. Concluding interviews to obtain farmers' perspectives on the changes brought about by automation, will be conducted.

Results:
This study aims to provide an in-depth perspective on how AMS affects work processes and the work environment for dairy farmers in northern Sweden. The presentation will include preliminary results from the in-depth farm study initiated in the spring of 2025.

Conclusions:
By highlighting how work and the work environment have changed with technology, the study can contribute to a better understanding of the challenges faced by dairy producers in northern Sweden.

Avian Influenza on Dairy Farms in the U.S.: The Human Impact in a Challenging Working Environment

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Introduction

A multistate outbreak of HPAI A(H5N1) bird flu in dairy cows was first reported on March 25, 2024. This is the first time that these bird flu viruses had been found in cows. As of May 1, 2025, the outbreak has spread to 17 states, affecting over one thousand dairy herds. The outbreak has now spread to poultry operations. On April 1, 2024, one human infection in a person with exposure to dairy cows was confirmed in Texas that was presumed to be infected with the virus. This is thought to be the first instance of likely mammal to human spread H5N1 virus. As of May 1, 2025, 70 human cases of H5N1 have been reported.

Methods

Researchers at the Texas A&M University School of Public Health embarked on a 12-month study of H5N1 on dairy farms to assess worker exposures and human health impact. Workplace exposures were assessed via the administration of a questionnaire to workers, and biospecimens were collected from workers to assess seroprevalence of H5N1 antibodies.

Results

Research findings are in process at the time of abstract submission.

Conclusions

The avian influenza virus outbreak in production agriculture presents unique challenges and underscores a need for collaboration, partnership, and intentional discussion for successful assessment and mitigation efforts. The current situation is not only a public health challenge, but also an occupational health challenge that results in the need for industry engagement and partnerships. Affected working populations on dairy farms are vulnerable and often lack access to testing, treatment, and other health resources. Protection in high-risk settings is imperative – yet there are cultural, linguistic, and social sensitivities to consider in these working populations. In this presentation, research team members will provide an update of the current H5N1 situation, as well as present on the project to include methodology and challenges encountered.

Farm safety – Good practices

Good Practices in Selected Farm Safety and Health Risk Management Tools

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Introduction:
This study examines good practices in selected farm safety and health risk management tools to support the development of a safety and health risk management database for farms. This is emphasized as the new social conditionality rules became a part of CAP in EU. Research indicates that one of the greatest risks to farm sustainability is safety and health hazards. An accident or health issue affecting a key farm worker could have severe consequences for the farm business.

Methods:
The analysis compared the good practices of five occupational safety and health programs for farms, which are implemented in agricultural training and official programs across Europe, North America, and Australia. A qualitative thematic analysis was used as the research method, with the results systematically organized in an excel database. The good practice assessment criteria were based on the key elements of risk management outlined in the ISO 31000 standard.

Results:
An essential practice in farm safety is the clear communication of farm safety policies and objectives to all farm workers and family members. This reinforces a strong safety culture by demonstrating the farm manager's commitment to safety and ensuring that safety instructions are followed. Risk management include tools for identifying risks, handling and monitoring risks, and ensuring safety communication on a farm. The identified risk management tools address critical risk factors in six key areas: 1. farm vehicles and machinery, 2. farm safety culture, 3. health and well-being, 4. ergonomics, 5. chemical handling and 6. handling of animals.

Conclusions:
Risk management tools should provide clear guidance on fostering a good safety culture. It will enable farmers to apply these tools independently in managing safety on their farms. However, it is also important to recognize that farming is not solely about risks—there are many positive aspects to the work that should be acknowledged as well.

Good practices for farm safety and farmer health

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Introduction:
Improving working conditions and safety at work is a key element of the social sustainability of agriculture and is essential for attracting and retaining new generations in the sector. The Safehabitus project addressed these challenges by identifying and documenting good practices that are responsive to the needs of farmers across the EU.

Methods:
The project applied a Multi-Actor Approach (MAA) through 11 national Communities of Practices (CoPs) that engaged 180 farm health and safety (FHS) stakeholders, including farmers, policymakers, researchers, and farm advisors. This collaborative process produced 78 Technical Notes (TN) and 56 Practice abstracts (PA) describing the socio-economic and policy context of FHS, the set-up of the CoP's, the key FHS issues and needs, and good practice examples.

Results:
The shared good practices highlight a wide range of innovative approaches that help to strengthening FHS knowledge and awareness. Examples include practical solutions for on-farm working conditions, targeted educational resources, and organising health services. They highlight methods to improve work-life balance, mental health support, and overall wellbeing and quality of life of farmers, workers and their families. Specific examples include farmers' holiday and stand-in scheme and occupational health and safety services in Finland, and promoting peer-to-peer training in tractor safety and a farmer cardiovascular health check program in Ireland. Each good practice is accompanied by a short assessment outlining benefits and areas needing further development. These insights offer guidance on implementation, effective practice, and services that are tailored to the real needs of farmers. One common future need is reaching of diverse farmer sub-populations, such as part-time farmers or hard-to-reach and high-risk farmers.

Conclusions:
This work supports context-specific knowledge exchange for farm advisors and policy stakeholders working to improve FHS. Using CoP's to identify context-specific practices offers a solid framework for addressing safety and health challenges across Europe's diverse agricultural settings

Managing safe and sustainable work processes in Swedish agriculture: Insights from field observations

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Introduction:
This paper focuses on challenges with safe and sustainable work processes for agricultural entrepreneurs in Sweden. The agricultural sector remains one of the most accident-prone industries, with severe consequences for individuals. The Swedish Government highlights the economic and personal costs of occupational injuries, while the Swedish Work Environment Authority stresses the importance of cultivating strong safety cultures and systematic safety practices. Previous research shows that several factors have an impact on safety processes. In general, previous research shows that managerial and leadership behaviors affect safety and well-being regardless of the type of industry. Specifically, in agriculture, leadership commitment to safety is more predictive of outcomes than employee attitudes or formal procedures, with trust in leadership playing a crucial role.

Methods:
The study is based on direct observations through shadowing eleven agricultural entrepreneurs over two full working days, following Mintzberg's classic framework on managerial work.

Results:
Preliminary findings reveal that agricultural entrepreneurs work with several physical and psychosocial challenges. Physical risks include handling large animal groups, high noise levels, slippery surfaces, and working in cold, damp conditions without appropriate clothing. Psychosocial aspects are also evident, such as unpredictability regarding work hours, difficulty in taking breaks, and stress from demanding schedules and environments.

Conclusions:
The study contributes to a deeper understanding of challenges in the daily safety work in Swedish agriculture. These observations also emphasize the high-risk nature of agricultural work and underline the importance of leadership in promoting safe, sustainable practices. A contribution is also the processual work after the observations with feedback to the agricultural entrepreneurs. This can, in a next step, be a potential tool in developing the safety culture in Swedish agriculture.

Cultivating Health and Safety: Driving Behavior Change for the Next Generation of Agriculture

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Introduction
Elevated rates of morbidity and mortality characterize agriculture compared to other sectors. US data indicates a fatal injury rate seven times the national average, with a disproportionate impact on older workers (>55 years comprising 80% of 2017 fatalities). Non-fatal injuries are also prevalent; over 21,000 incidents, of which one-third were falls, required days away from work in 2021-2022. Socio-economic determinants influence access to, and the effectiveness of, occupational health and safety (OHS) interventions. This research aimed to identify behavior drivers and change methodologies for agricultural OHS, emphasizing the potential of novel technologies to enhance equity.

Methods
We developed a PubMed search strategy using MESH terms: "Agriculture"[Mesh] AND ("Health Behavior"[Mesh] OR "Behavioral Sciences"[Mesh] OR "behavior change"[TIAB] OR "Behavior model"[TIAB]) AND ("Accidents"[Mesh] OR "Occupational Injuries"[Mesh] OR "health and safety"[TIAB] OR "safety and health"[TIAB]). Practical data were derived from an online educational intervention targeting college students, employing demonstrations, skill practice, knowledge exchange, and immersive virtual reality (VR)/360-degree video modalities.

Results
The adoption of safety behaviors in agriculture is mediated by a complex interplay of determinants: individual attitudes and beliefs (e.g., risk perception, self-efficacy, perceived inevitability of accidents), socio-cultural influences (e.g., community norms, farming identity), psychological states (e.g., stress, fatigue), and structural constraints, particularly economic and time pressures. Effective behavior change interventions must adopt approaches that extend beyond knowledge dissemination to address these determinants. Digital platforms and immersive VR/AR serve as valuable tools, enabling personalized content delivery and facilitating experiential learning through risk-free simulation. The GearUP for Ag program operationalizes these principles, employing technology-enhanced methods to improve OHS knowledge, risk perception, and behavioral adoption.

Conclusions
Effective OHS improvement in agriculture demands strategies beyond informational campaigns to address complex behavioral determinants. Modern technologies enable personalized, simulation-based training without incurring real-world risk, thereby offering a critical adjunct for cultivating sustained safety practices within the agricultural workforce.

Safety work in agri-business – What do we know and where do we go?

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Introduction:
This paper explores safe and sustainable work processes in agricultural businesses and is part of a larger project on safety work in Swedish agri-businesses. The importance of this topic is underscored by the Swedish government's updated work environment strategy for 2021–2025, which highlights the severe financial and personal consequences of occupational injuries. The strategy emphasizes creating a safe and healthy working life for all, and the Swedish Work Environment Authority stresses the need for a strong safety culture and systematic safety efforts to reduce fatal incidents. The agricultural sector is one of the industries most affected by workplace accidents, including fatalities, making it crucial to investigate safety and sustainability in its work processes. Despite this, there is still limited research on how safety work is conducted within agricultural businesses.

Methods:
This paper aims to map existing international research on how agricultural entrepreneurs implement safe and sustainable practices in their daily operations. While the study has a global scope, special attention is given to Nordic and Swedish perspectives in the analysis. The research process began by identifying 680 articles published between 2014 and 2024. After removing duplicates, 622 articles were screened, resulting in a final selection of 309 relevant studies from databases including Proquest One Business, Emerald, Scopus, and Web of Science.

Results:
The analysis is ongoing and preliminary findings show that most research is published in the USA, with fewer studies focusing on Europe and the Nordic countries. Although leadership is often highlighted as a key factor in promoting safety culture in other industries, there is a noticeable gap in research addressing leadership's role in agricultural settings.

Conclusions:
This paper contributes to filling that gap by offering a comprehensive overview of the current research landscape, aiming to deepen understanding of how agricultural businesses work toward safe and sustainable operations.

Exposures and health

Manure Gas Accidents in Norwegian Agriculture 2000–2024

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Introduction

When liquid manure is stored, different types of gases, known as manure gases, will develop. Exposure to manure gases such as hydrogen sulfide, methane, and ammonia poses a significant health risk for animals and farmers who keep livestock or use liquid manure as fertilizer. Accidents related to manure gases happens yearly, but the number of accidents are unknown. This study aimed to investigate the frequency, characteristics, and causes of such incidents in Norway. The last survey of manure gas-related accidents in Norway was conducted in the 1980s.

Methods

A questionnaire was distributed to 12,539 cattle and pig farmers in the spring of 2024. A total of 4,354 farmers (35%) responded. The demographics of the respondents were similar to the demographics of the invited group. This makes data generalization possible to consider. The survey covered accidents and near-misses from 2000 to 2024 including consequences, farm characteristics and suggestions for preventive measures.

Results

Sixteen percent of respondents reported at least one incident. Considering that not all farms handle liquid manure, the incidence among relevant farms becomes around 20%. A total of 1,333 incidents were reported, including 2,175 animal deaths, 515 human exposures, and five human fatalities. Causes reported by the farmers included manure handling, unfavorable weather conditions, poor ventilation, and building design. Pig herds and young animals were particularly vulnerable. The most common symptoms in humans were dizziness, headache, and difficulty breathing. Experience did not appear to be protective, as average farmer age at the time of incident was 42 years.

Conclusions

Despite a reduction in the number of farms, the proportion of farms experiencing incidents has remained constant or increased since the 1980s. The severity per incident appears to have grown. These findings highlight the need for a comprehensive approach combining technical, organizational, and structural measures to prevent manure gas accidents in Norwegian agriculture.

Inhalable dust concentrations in broiler chicken production during farm tasks

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Introduction

Dust exposure in poultry production is associated with respiratory and bone problems in broilers as well as respiratory symptoms among workers. The poultry industry strives to control dust for both bird and worker health. Information about which tasks are associated with dust exposure is limited, which creates challenges for recommending control strategies [e.g., bedding amendments, ventilation, personal protective equipment (PPE)]. The purpose of this study was to measure personal inhalation exposure to inhalable dust on farms during litter maintenance tasks such as litter sampling, windrowing, and litter tilling. Our goal is to develop recommendations to control dust in poultry production for the health of the birds and the workers who care for them.

Methods

Inhalable dust concentrations were measured in the breathing zone of field personnel while collecting composite litter samples from 30 broiler farms in the US. Similar samples were collected during bedding maintenance tasks [i.e., litter tilling (n=13) and windrowing (n=4)]. Information on temperature, relative humidity and building conditions were recorded.

Results

Inhalable dust concentrations were 1.62 mg/m^3 (SD=.83) during litter windrowing, 3.8 mg/m^3 (SD=2.8) during litter sampling and 18.1 mg/m^3 (SD=15.5) during litter tilling. As outdoor temperatures increased, dust exposure concentrations decreased (R^2 = .339) suggesting increasing ventilation was a predictor of lower dust concentrations.

Conclusions

Respiratory protection is needed with low ventilation conditions during dusty tasks (e.g., litter tilling). The Occupational Health and Safety Administration (OSHA) has established an 8-hr Time Weighted Average Permissible Exposure Limit (PEL) to be at or below 15 mg/m^3 for inert dust for a 40-hour work week. Among the tasks, tilling litter exceeded the PEL concentration. However, this task is performed infrequently. Workers should use additional ventilation or PPE to protect themselves from hazards. A voluntary use policy is an effective approach to provide PPE to farm workers with low administrative cost.

Putting the Farmer First: Collaborating to support the physical and behavioral health of people working in agriculture in Colorado and beyond

Clinton Wilson

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Since 1998, Colorado AgrAbility Project (CAP) has promoted independence and enhanced the quality of life among producers by providing the support they need to begin, remain in, or regain employment in agriculture. CAP has developed a comprehensive collaborative framework that integrates multiple evidence-informed training programs to address the critical physical and behavioral health needs of people working in agriculture throughout Colorado. CAP combines the strengths of in-person on-farm assessments[1] with four key behavioral health programs: COMET (Changing Our Mental and Emotional Trajectory) training[2], LandLogic Model trainings for practicing mental health providers[3], Legacy video community screenings and community workshops, and the ag-tailored counseling voucher program known as the Colorado Agricultural Addiction and Mental Health Program (CAAMHP).

Together, these programs create a comprehensive physical and behavioral health support ecosystem that addresses the elevated suicide rates, injury risks, and unique psychological challenges faced by Colorado's agricultural workforce. These collaborations represent a model for rural mental health intervention that other states and countries can adapt; demonstrating how targeted, culturally competent programming can effectively serve populations traditionally underserved by conventional mental health services.

This collaborative approach addresses the documented need for physical and behavioral health support for over 70,000 people working on 36,056 farms or ranches in Colorado. By integrating prevention, intervention, and treatment across multiple delivery mechanisms, the Colorado AgrAbility Project's collaborative framework provides a sustainable, evidence-informed model for physical and behavioral health challenges while respecting the unique cultural and practical needs of rural agricultural communities.

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Posters

Biomechanical Analysis of Watermelon Harvesting

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Watermelon harvesting workers are at high risk of developing work-related musculoskeletal disorders (MSDs) due to the physical demands of their work. While previous studies have explored MSDs in the agricultural area, there is a notable research gap specifically addressing MSDs in watermelon harvesting. This study aims to observe and evaluate the watermelon harvesting process in a field environment to gain deeper insights into its physical impact on workers. The primary objectives are: (1) to identify the regions of the body most susceptible to injury during watermelon harvesting, and (2) to analyze physiological and biomechanical changes in the body while performing watermelon harvesting tasks. Ten workers performed tasks associated with watermelon harvesting in the field with a camera recording. Kinematic data was analyzed using an AI based software. Joint angles were analyzed to examine statistical changes, contributing to a better understanding of the risks associated with watermelon harvesting.

Further risk assessment based on joint angles indicated that workers engaged in the Pick-and-Toss task had a higher proportion of body segments falling into the Cautious and Hazardous categories compared to those performing Receive-and-Toss. REBA and RULA assessments also confirmed that the Pick-and-Toss task posed a higher overall ergonomic risk. Additionally, within-task comparisons revealed that the upper body had a higher injury risk level than the whole-body average in both task types. This highlights the need to pay closer attention to upper body fatigue among watermelon harvest workers

Occupational and Non-Occupational Chainsaw Injuries

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Chainsaws are widely used in forestry, landscaping, agriculture, and residential work. While essential, their use carries significant risk of injury to both operators and bystanders. This study aimed to quantify and compare occupational and non-occupational chainsaw-related injuries in the United States from 2018 to 2022.

A cross-sectional analysis was conducted using occupational injury data from the Occupational Safety and Health Administration (OSHA) and non-occupational injury data from the U.S. Consumer Product Safety Commission's National Electronic Injury Surveillance System (NEISS). The study evaluated injury frequency, type, and cause over the five-year period.

From 2018 to 2022, an estimated 25,589 non-occupational chainsaw injuries were treated annually in emergency departments. In the same period, 202 non-fatal and 57 fatal occupational injuries were reported. Most occupational injuries occurred in the landscaping and forestry sectors. The majority of injuries involved open wounds to the upper and lower extremities. Fatal injuries were most often caused by falling objects, such as trees or tree limbs, during chainsaw operation.

Chainsaw use presents a consistent risk of serious injury, particularly in occupational settings. Injury prevention strategies, including user training, proper use of personal protective equipment (PPE), and establishing safety zones for bystanders—are essential to reduce both fatal and non-fatal incidents.

Strengthened working conditions for labor in the horticultural sector

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Background

The Swedish horticultural sector is characterized by being labor-intensive and employing many people. There are long, labor-intensive shifts and the jobs are largely available during the summer season. Thousands of foreign workers come in Sweden every season. The use of foreign labor is important for the Swedish food production and the consequence, if the labor is not available, is smaller harvests and lower profitability. Foreign labor is sometimes used in a way that may conflict with the labor law and social regulations that exist in Sweden. Various descriptions have pointed to living and working conditions that deviate from the existing standards in Swedish working life and do not meet the minimum requirements of health and safety legislation.

Purpose

IP Working Conditions, launched by Sigill Quality System AB, was started for employers in 2018, to ensure that employees and mainly seasonal labor have good working conditions and can feel safe and secure at work. Sigill Quality System AB and The horticultural Section of the Federation of Swedish Farmers, as well as other stakeholders in the standard, see a need to follow up on the outcome of the certification. In order to prove whether IP Working Conditions has contributed to positive work environment conditions, the purpose of the study is to show whether the working conditions/work environment have improved since the start in 2018.

The study that is ongoing 2025, will also help to identify and possibly propose initiatives that result in a certification that is attractive and that makes it easier for employers to work with. The follow-up also concerns whether the certification has led to increased/reduced costs for the employer.

Method

The study applies a qualitative methodology, including semi-structured interviews with farm owners and seasonal workers.

Results

The results obtained in the project will be presented and discussed at a seminar with the Swedish trade, The horticultural Section of the Federation of Swedish Farmers, Green employers, The Swedish Municipal Workers and Swedish University of Agricultural Science.

The results of the study may also be used as a basis for the need for continued in-depth research, since the study may raise questions that cannot be answered within the framework of this project. Preventive measures may be required in the form of expanded initiatives such as work environment advice and training for employers in the horticultural sector.

What does the green transition mean for Swedish and Nordic agriculture and its impact on the work environment

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Swedish University of Agricultural Sciences

Purpose and Objective(s) of presentation:
The green transition affects the whole of society, with agriculture being a key sector with major changes, for example linked to fossil-free transition and green growth. This can bring both opportunities and challenges related to the work environment. However, there is limited compiled research on the implications of the green transition for the agricultural sector and its impact on the work environment.

Methods / Efforts:
The aim of this on-going study during 2025 and 2026 funded by the Swedish Agency for Work Environment Expertise is to identify, highlight, and analyse the green transition and its effects on the work environment for farmers and farm workers. This work will provide insights into the opportunities and risks that come with the transition.

To address the study's questions and identify, highlight, and analyse the green transition in Sweden, as well as its impact on the work environment from a Nordic perspective, the project is carried out in several steps. These steps include gathering facts and data from various sources, such as scientific materials and relevant stakeholders, to systematically investigate what the green transition means for agriculture. Direct experiences are also collected from several Swedish farms that have undergone transitions. Additionally, the green transition and its consequences for the work environment in agriculture within the Nordic countries are examined through focus groups and surveys.

Application to the Field / Implications of the Research*:*
The goal is to contribute increased knowledge about how the green transition in agriculture affects the working environment of those operating there and to what extent the transition has resulted in sustainable, healthy and safe workplaces. With increased knowledge of the green transition in agriculture it might be possible to be aware of new risks at an early stage that might lead to preventive measures before any negative outcome for health & safety.

Development and Validation of Linear Regression Models for Predicting Wet-Bulb Globe Temperature to Prevent Heat-Related Illness Among Farmworkers

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Introduction: Heat-related illness (HRI) poses a significant risk to farmworkers, worsened by rising global temperatures and intensive outdoor labor. This study develops Wet-Bulb Globe Temperature (WBGT) estimation models using linear regression, leveraging California Irrigation Management Information System (CIMIS) weather station data and direct WBGT measurements. The objective of this study is to protect farmworkers by providing a WBGT estimation methods for real-time and proactive HRI risk assessment.

Methods: Black Globe Temperature (GT), Natural Wet-Bulb Temperature (NWB), and Dry-Bulb Temperature (DB) were measured across four diverse California climates. Linear regression models for GT and NWB estimation were developed using air temperature, solar radiation, relative humidity, and wind velocity from CIMIS data. Data cleaning and splitting were performed to ensure accuracy, enabling the development of predictive models specific to farmworker environments, with validation in comparison to direct WBGT measurement.

Results: The linear regression models showed strong performance: R-squared of 0.94 for NWB (RMSE = 1.17°C) and 0.97 for GT (RMSE = 2.17°C). Scatter and Bland-Altman plots confirmed reduced bias (LOA: 2.32 to -2.28°C for NWB; 4.17 to -4.35°C for GT). The ambient temperature and relative humidity played the most substantial factors in the impact on WBGT estimation. The accuracy of the WBGT model weakened in the range of high WBGT, but it performed steadily in the intermediate range.

Conclusions: This study validated the performance of linear regression models to predict WBGT with high accuracy (R^2: 0.94-0.97) through the direct WBGT measurement. The linear models accurately predicted WBGT but the diminished accuracy at extremes suggests the need for recalibration. The findings demonstrate the feasibility of proactive heat stress management in agriculture for protecting farmworkers from HRI by estimating WBGT based on readily available meteorological measurements.

Educational intervention project to improve farm safety and health

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Introduction

Safety training enables farmers to reduce the high number of accidents. Nevertheless, farmers tend not to be consider as the part of critical business success.

This educational intervention project was newly introduced by Rural Development Administration (RDA) in 2024 as part of national programs for safety and health in agriculture.

Methods

The purpose of this project is to help farmers improve their knowledge and stay more safe by providing practical education. The program is divided into two parts. One part is for general farmers and the other part is for farmers who can deliver useful intervention to the community.

Standard courses(including lecture manual) and education materials(textbook, video etc.) to teach good knowledge and skills about agricultural health and safety were designed by RDA.

It was highly helpful to operate education programz in the field where is the lack of safety instructors.

Contents of the safety training includes basic agricultural health and safety, self identifying risks and management plan, using safety equipment, safe work procedures and first aid measures and safety management as farm owner. It can be offered various personal safety equipment and demonstrated how to use it.

Results

In 2024, the first year of the project, a total of 16,115 farmers participated in safety courses and 93.7% of participants completed their courses.

The result of the evaluation in the awareness level of safety practice showed an increase of 22.5% between before and after taking the course.

Learning usefulness of the safety course showed high scores 8 out of 10 points.

Farmers who completed this education program can get an extra discount on farmers' safety insurance. This new policy has been implemented to encourage more farmers to take safety courses since 2023.

Conclusions

We plan to continue developing the nationwide educational intervention to establish safe culture in agricultural industry.

Embedded Sensor System for Evaluating the Dynamic Stability of Agricultural All-Terrain Vehicles

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Introduction: All-terrain vehicles (ATVs) are extensively used in agriculture, but their instability poses significant rollover risks. Rollover incidents account for approximately 85% of ATV-related fatalities in rural areas. Improving dynamic stability is essential to mitigate these risks, as it is influenced by factors such as lateral acceleration thresholds and body roll angles. This study aims to develop a sensor-based system to assess ATV stability under dynamic conditions.

Methods: An industrial-grade Inertial Measurement Unit (IMU) was used to measure lateral acceleration, body roll angle, and yaw rate. An optical encoder was incorporated to measure

steering angle data. All sensors were integrated into a Raspberry Pi, which served as the central processing unit for real-time data acquisition and analysis.

Results: Preliminary testing demonstrated that the sensor system effectively captured key stability parameters, allowing for accurate monitoring of ATV dynamics.

Conclusions: The proposed embedded sensor system provides a robust framework for evaluating ATV dynamic stability in agricultural settings. These findings contribute to the development of improved safety assessments and rollover prevention strategies, enhancing ATV operation safety in agricultural environments.

Impact of Load Characteristics on the Static Stability of Agricultural All-Terrain Vehicles

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Introduction: Rollover crashes involving All-Terrain Vehicles (ATVs) are a leading cause of injuries and fatalities in agriculture. Studies have highlighted the impact of different attachment types (solid and liquid) on ATV stability, with reports indicating that over 40% of ATV-related farm fatalities involved a sprayer. The static stability of an ATV, measured by lateral and longitudinal stability angles, is a key indicator of rollover risk. Although previous research has acknowledged the effects of load types on ATV stability, no study has specifically quantified these effects for agricultural ATVs.

Methods: Static stability tests were conducted using a tilt table, following the ANSI/ROHVA 1-2016 standard for measuring lateral and longitudinal stability angles. Different ATV models with varying weights, wheelbase, track width, and center of gravity were tested. Solid and liquid loads were placed on the ATV carrying racks according to manufacturer-recommended load capacities. Liquid loads consisted of rectangular sprayer tanks filled to half capacity, representing the most unstable condition. To determine the statistical significance of load type on stability angles, ANOVA tests were performed, followed by Tukey multiple-range tests when significance was found.

Results: The attachment characteristics significantly influenced ATV stability angles. Load type affected stability in 60% of tests, with liquid loads resulting in greater stability reductions compared to solid loads. The findings highlight the role of load dynamics in altering ATV rollover risk.

Conclusions: This study provides quantitative insights into how different load types influence agricultural ATV stability, offering critical information for improving safety guidelines and mechanization practices. The results can inform ATV design modifications, regulatory standards, and operator training programs to mitigate rollover risks in agricultural settings.

Predicting Wet-Bulb Globe Temperature Using Linear Regression for Heat-Related Illness Prevention in Farmworkers

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Introduction: Heat-related illnesses (HRI) are a significant threat to farmworkers, particularly in high-temperature agricultural environments affected by global warming and limited healthcare access. Accurate estimation of Wet-Bulb Globe Temperature (WBGT) is essential for proactive heat stress management. This study evaluates Linear Regression (LR) for WBGT forecasting based on weather forecasts from the National Digital Forecast Database (NDFD) in four of California's most important agricultural regions—Davis, Salinas, Parlier, and Meloland—to enhance the safety of farmworkers by adjusting work schedule.

Methods: WBGT was measured directly at one-minute intervals from 25 May 2024 to 15 October 2024 and averaged hourly as the ground truth. Input variables—air temperature, relative humidity, wind speed, and estimated solar radiation—were standardized and organized temporally and spatially. LR models were developed to predict Natural Wet-Bulb Temperature (NWB) and Black Globe Temperature (GT). Model performance was evaluated using R^2, RMSE, MAE, MAPE, and visual analysis through scatter and Bland-Altman plots.

Results: Stable prediction accuracy of the LR model was observed with R^2 of 0.93 for NWB and 0.97 for GT. The accuracy of LR was higher than NDFD's WBGT forecast in terms of high R-squared value and low RMSE. The limit of agreement was between -2.25 to 3.32 °C with a mean bias of 0.54 °C. Confusion matrices were used to evaluate the accuracy of HRI risk classification. It confirmed that the model was highly reliable in extreme WBGT ranges but moderate over-forecasting in mid-range values.

Conclusions: LR is a practical, data-driven methodology for real-time WBGT prediction, supporting improved HRI risk management for farmworkers by optimizing work schedules and interventions. Although the model shows high accuracy and reliability, limitations such as regional specificity and potential biases under extreme conditions warrant further validation. This study demonstrates that LR can be used to enhance farmworker safety by adjusting the working schedule.

Enhancing Farm Safety through Crop-Specific Safety Management Practices

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Introduction

The type and frequency of agricultural accidents vary depending on crop-specific work characteristics and environments. To address this, the Rural Development Administration (RDA) implemented the field-oriented “Crop-Specific Safety Management Pilot Project” aimed at creating safer farming environments and promoting farmers’ safety awareness.

Methods

This project was conducted in collaboration with local agricultural extension agencies, targeting farmer groups cultivating the same crops or raising the same livestock. Major hazards and risk factors were identified and improved at each stage of agricultural work. To ensure safer work environments, the project provided personal protective equipment (PPE), improved worksites, encouraged voluntary safety inspections and adherence to safety rules, and offered customized on-site safety education to raise safety practice levels.

Results

In 2024, the project was carried out in 76 cities and counties across the country, involving 1,641 participants. A total of 451 safety education sessions were held, reaching a cumulative 8,076 participants. Through crop-specific risk assessments, expert consultations for work improvement, distribution of safety support equipment, and recordkeeping of safety activities, the project achieved a 62.0% increase in safety management levels, a 77.6% reduction in risk indices, and a 70.5% decrease in agricultural work-related accidents.

Conclusions

Crop- and task-specific safety management centered on farmer organizations proved effective in reducing agricultural work-related accidents and risks, and in encouraging farmers to adopt safer work practices.

Qualitative analysis of work accident risks related to agricultural machinery

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Introduction: In the agricultural sector, although the number of workers has decreased over the last few decades, the rate of work accidents resulting in severe injuries remains persistently high. In Estonia, research on work accidents has predominantly used quantitative methods, which do not allow for identifying the cognitive causes of the accidents. The aim of the study was to analyze the root causes and consequences of injuries caused by agricultural machinery among the victims, using qualitative analysis methods.

Methods: The study included workers from the animal and crop production sub-sectors of an Estonian agricultural companies, who have been involved in a severe work accident related to agricultural machinery. The research was conducted using semi-structured interviews, fault tree analysis and cognitive tasks' analysis. In addition to the interviews, the educational films on similar cases, produced by the Irish National Health and Safety Authority, were selected out for comparative analysis with similar national cases in this study. The qualitative analysis method developed identification of the root causes and consequences of injuries caused by agricultural machinery among the victims.

Results: The main root causes were identified through structured interviews, which included improper handling of the device, device malfunction and inappropriate agricultural machinery repair techniques. The most often critical points of the accident were identified as organizational shortcomings, distracted attention, weather-related factors, and deficiencies

in the use of safety mechanisms in equipment or machinery. The main cognitive-behavioural factors of work accidents were incorrect assessment of situation awareness by the employee, wrong decisions in problem-solving, time pressure and the resulting haste, and attention disruption during decision-making.

Conclusions: The used qualitative research methodology allows to identify the cognitive-behavioural causes of work accidents, to focus on them to better prevent similar work accidents in the future. So, more effective educational materials can be created focusing on cognitive-behavioural factors of work accidents.

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