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Boletín de Seguridad y Salud en el Trabajo del Sector Agrícola

Instituto Andaluz de Prevención de Riesgos Laborales
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Laboratorio-Observatorio Andaluz de Condiciones de Trabajo en el Sector Agrícola (LASA)

https://www.juntadeandalucia.es/organismos/iaprl/areas/investigacion/lasa.html

FINALIDAD DE ESTE DOCUMENTO

Este boletín, realizado desde el Laboratorio-Observatorio Andaluz de Condiciones de Trabajo en el Sector Agrícola (LASA), engloba diferentes artículos científicos sobre Seguridad y Salud en el Trabajo (SST) en el sector de la agricultura. Recoge trabajos que han sido publicados en revistas del Journal Citation Reports en el segundo cuatrimestre del año 2025. Se expone el título y resumen en inglés de cada artículo junto con su información principal. Además, en todos se presenta un breve resumen en español de los aspectos más destacados. Este boletín pretende facilitar la revisión de los artículos publicados en este ámbito en el período de tiempo indicado y el acceso a las revistas correspondientes.

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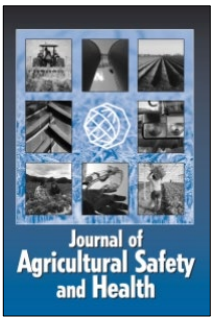
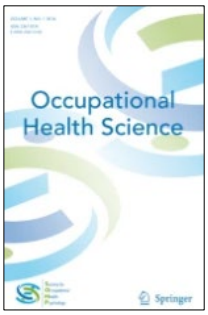
REVISTAS QUE CONTIENEN ARTÍCULOS EN ESTE BOLETÍN

JOURNAL OF AGRICULTURAL SAFETY AND HEALTH

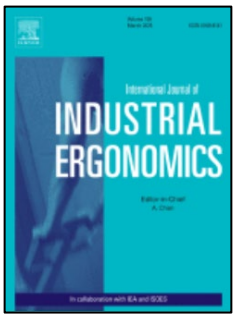


OCCUPATIONAL HEALTH SCIENCE



OCCUPATIONAL & ENVIRONMENTAL MEDICINE

INTERNATIONAL JOURNAL OF INDUSTRIAL ERGONOMICS



JOURNAL OF AGROMEDICINE

SAFETY SCIENCE

AGRICULTURE-BASEL

WORKPLACE HEALTH & SAFETY

SAFETY

JOURNAL OF AGRICULTURAL SAFETY AND HEALTH

ARTÍCULO 1: Advancing All-Terrain Vehicles Safety in Agriculture: An Insightful Summary from Global Experts

All-terrain vehicles (ATVs) or quad bikes have raised serious concerns, especially in rural areas where they are used for occupation (i.e., agriculture and forestry) and recreation (i.e., hunting and recreational riding). ATVs are unstable vehicles, and their incidents have been linked to factors such as the rider's physical capabilities (such as strength, anthropometry, and visual acuity) and behavior, safety awareness (training), application of personal protective equipment, lack of protective structure, and regulations. This manuscript presents perspectives of ATV safety experts from several countries, including Australia, Canada, Israel, Sweden, and the USA. The topics include the state of the art in youth riders, engineering control methods, stability, protective structures, safety rating systems, training and education, personal protection equipment, and new regulations.

Avances en la seguridad de los vehículos todoterreno en la agricultura: un resumen revelador de expertos mundiales

Se desarrollaron las opiniones de expertos en seguridad sobre vehículos todoterreno de diferentes países, incluyendo Australia, Canadá, Israel, Suecia y Estados Unidos; debido a sus usos profesionales en la agricultura, silvicultura, conducción recreativa, etc. que podían conducir a diversos accidentes por su inestabilidad. Para ello, se tuvieron en cuenta numerosos temas como la técnica de los conductores jóvenes, sistemas de clasificación de seguridad, estabilidad, estructuras de protección, equipos de protección personal y nuevas normativas.

AUTORES	Farzaneh Khorsandi, Payam Farhadi, Gerene Denning, Raphael Grzebieta, Jenna Gibbs, Yigal Godler, Gary Heydinger, David Hicks, Charles Jennissen, Peter Lundqvist, Andrew McIntosh, George Rechnitzer, Keith Simmons, Aaron Yoder
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TEMÁTICA	Vehículos y Maquinaria Agrícola

ARTÍCULO 2: Occupational Safety Research Needs in the Field of Robotics and Autonomous Machines in Agriculture

In 2022, the SAfety for Emerging Robotics and Autonomous AGriculture (SAFER AG) Workshop was held to discuss and understand emerging challenges related to safety, occupational safety research needs, workforce implications, and other issues associated with robotics and autonomous machines in agriculture. This paper presents the major findings from the occupational safety research track of the workshop. This track identified existing hurdles to conducting occupational safety research including logistical barriers, intellectual property concerns, long timelines, and lack of funding. Considerations for developing a tracking or surveillance system for adverse events as well as exposure related to these technologies were also discussed, emphasizing the need for a comprehensive system. Finally, the priority occupational safety research needs identified during the session were related to human and non-human machine interaction, adoption of automation in the work setting, and event tracking/surveillance. To overcome barriers to research, collaboration between occupational safety researchers and technology developers is crucial. Enhancements to existing surveillance systems can facilitate better understanding of captured events. Additionally, prioritizing research on worker risk from robotics and autonomous machines in agriculture is essential. The integration of robotics and autonomous machines in agriculture has revolutionized the industry but requires evidence-based safety research, outreach, and education to ensure worker safety and health.

Necesidades de investigación en materia de seguridad laboral en el ámbito de la robótica y las máquinas autónomas en la agricultura

Este estudio recopiló las conclusiones más relevantes obtenidas de un taller celebrado en 2022 (Taller de Seguridad para Robótica Emergente y Agricultura Autónoma), centrado en la seguridad laboral de las personas trabajadoras del sector de la agricultura asociada a la integración de la robótica y máquinas autónomas. En dicho taller se determinaron las barreras presentes en la investigación sobre seguridad en el trabajo y se analizaron los aspectos necesarios para el desarrollo de un sistema de seguimiento o vigilancia de eventos adversos y exposiciones relacionados con estas tecnologías. Se determinó la necesidad de investigación sobre la relación entre máquinas y humanos, la automatización en el entorno de trabajo y el seguimiento y vigilancia de eventos, además de la identificación de riesgos para las personas trabajadoras derivados de la robótica y máquinas autónomas. Para hacer frente a las barreras de investigación era necesaria la colaboración entre investigadores en seguridad laboral y desarrolladores de tecnología.

AUTORES	Jennifer Lincoln, Serap Gorucu, Farzaneh Khorsandi, Guy R. Aby, KC Elliott, John Shutske, Salah F. Issa
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TEMÁTICA	Vehículos y Maquinaria Agrícola

ARTÍCULO 3: A Summary of Fatalities and Injuries Involving Horizontal Bunk or Open Pile Silos Used in Agricultural Production

Horizontal bunk silos, including open or surface storage of silage, though not new concepts, have rapidly replaced conventional wood, concrete stave, and steel tower silos at dairy and beef production operations. Horizontal silo designs have allowed for much larger capacities, in some cases exceeding thousands of tons. These storage structures have reduced the need to climb 70–120 feet (21.3-37.6 meters) vertically to access the surface of the silage or internal equipment, such as distributors and top unloading silo unloaders for service or repair. The use of horizontal silos has increased the filling and unloading rates by eliminating the restriction of forage blower capacities and height limitations. Furthermore, they have contributed to increased uniformity and quality of silage due to more rapid filling and increased packing density. However, a relatively few highly publicized injuries and fatalities over the last decade involving these structures have resulted in considerable attention by agricultural safety and health professionals and enhanced regulatory enforcement by state and federal Occupational Safety and Health Administrations (OSHA), resulting in citations for unsafe work practices and civil litigation due to personal injuries and economic loss. There has been, however, no reliable assessment of the frequency and severity of these incidents upon which to develop effective evidence-based prevention strategies or assess relative risk between silage handling practices. Research was undertaken to identify and document horizontal silo-related injuries and fatalities building on cases included in the Purdue Agricultural Confined Space Incident Database (PACSID), OSHA reports, the National Institute for Occupational Safety and Health's Fatality Assessment and Control Evaluation (NIOSH FACE) reports, online databases such as AgInjuryNews, state farm fatality summaries, and prior legal litigation. Approximately 2,400 cases identified as occurring in agricultural confined spaces, including "silos," and related structures were reviewed. A total of 33 cases, involving 35 individuals, were confirmed as having occurred in the U.S. in bunk-type silos or associated with open silage storage piles between 1962 and 2023. This frequency was considerably lower than originally anticipated. In some instances, the same cases were repeated by the media numerous times, giving the appearance of multiple incidents. Of the cases examined, the primary contributing factors were suffocation due to being buried by collapsed silage caused by undercutting of the silage face or silage instability, being crushed by a tractor rollover, entanglement during silage packing operations, and falls from the silage surface or sidewalls. In addition to farm operators and farm workers, victims included veterinarians buried at the face of the silage while attempting to collect silage samples for nutritional analysis. Prevention recommendations include discouraging the overfilling of bunk silos, restricting unprotected worker access to the face of the silage at any time, especially if overhanging silage is present, use of appropriate unloading equipment that can access the full face of the silage and still protect the operator, safer means of accessing the top surface of the silage, and restriction of packing equipment to only vehicles equipped with rollover protection for the operator. Prevention strategies should target primarily dairy and beef producers with horizontal or open pile storage of silage. The inclusion of warning signage and safer access to the surface of the silage pile for removal of coverings should be considered. Considering the infrequency of these incidents, the need for additional regulatory language does not appear justified. The need for an expanded engineering standard for bunk silos that includes a safety component, such as safety signage, should, however, be considered.

Resumen de muertes y lesiones relacionadas con silos horizontales o silos abiertos utilizados en la producción agrícola	
Se desarrolló una investigación para identificar y documentar las lesiones y muertes relacionadas con silos horizontales. Para ello se revisaron unos 2400 casos ocurridos en Estados Unidos entre 1962 y 2023, de los cuales 33 corresponden a silos horizontales, involucrando a 35 personas incluyendo operadores, personas trabajadoras agrícolas y veterinarios. Las principales causas fueron asfixia por ensilado derrumbado, aplastamiento por vuelco del tractor, enredo en el empaque del ensilado y caídas desde la superficie o pared lateral del ensilado. Se concluyó la necesidad de adoptar estrategias de prevención para aumentar la seguridad de las personas trabajadoras.	
AUTORES	Noah Joel Haslett, William E. Field, Mahmoud Nour, James Carrabba, Martin Huseman
DOI	https://doi.org/10.13031/jash.16058
PUBLICACIÓN	Journal of Agricultural Safety and Health, 2025, Volumen 31, Número 3, pp. 231-243
TEMÁTICA	Accidentes y Enfermedades Laborales

ARTÍCULO 4: A Multi-State Evaluation of Agricultural Safety Learning through Secondary Students' Supervised Agricultural Experience Journal Entries

The Supervised Agricultural Experience Safety Award program was launched with Montana, Utah, and South Dakota agriculture teachers. A combination of video conferencing and in-person training workshops were offered to school-based agriculture teachers in Montana, Utah, and South Dakota. Zoom webinar workshops were held with teachers during the COVID-19 pandemic. The five annual training topics included: Year 1) Tractor/Equipment Roll-over Hazards, Year 2) ATV/UTV Operation Hazards, Year 3) Tractor/Equipment Operation Hazards, Year 4) PTO/Entanglement Hazards, and Year 5) Agricultural Machinery Transport Hazards Associated with use on Public Roadways. To assess the influence of agricultural machinery safety training, students' journal reflections were collected through the Agricultural Experience Tracker. Students' production-based agricultural experiences were coded by USDA National Agricultural Statistics Service (NASS) Commodity Codes, describing students' safety reporting using Supervised Agricultural Experience (SAE) journal entries, and quantifying teachers' workshop participation. A total of 2,257 journal entries were reviewed from Montana, Utah, and South Dakota. A total of 760 unique student journal entries were associated with a teacher participating in the training program. Most student journal entries focused on machinery operations. A total of 49 journal entries specifically reported safety. A total of 203 journal entries recorded the use of tractors. A total of 160 agricultural production work entries (38.8%, n = 412) noted crop production as the agricultural production work experience. The results provide recommendations for developing an application model for translation using an FFA award structure.

Evaluación multilateral del aprendizaje sobre seguridad agrícola a través de los registros del diario de experiencias agrícolas supervisadas de estudiantes de secundaria

Profesores de agricultura de Montana, Utah y Dakota del Sur desarrollaron un programa de Premios de Seguridad para la Experiencia Agrícola Supervisada que incluía videoconferencias y talleres de formación presencial con 5 temáticas anuales: riesgos por vuelco de tractores/equipos, riesgos en la conducción de vehículos todoterreno/vehículos utilitarios todoterreno, riesgos en la conducción de tractores/equipos, riesgos por atrapamiento y riesgos por transporte de maquinaria agrícola por vías públicas. Para evaluar la formación se consultaron los registros de los diarios de estudiantes a través de la web "Agricultural Experience Tracker", obteniendo 2257 registros, siendo la mayoría sobre el funcionamiento de la maquinaria. Los resultados de dichos registros concluyeron en recomendaciones para desarrollar un programa de seguridad basado en la estructura de premios de los Futuros Agricultores de América (FFA).

AUTORES	Scott W. Smalley, Dustin K. Perry, Rebecca G. Lawver, Michael L. Pate, Roger Hanagriff, Clay Ewell
DOI	https://doi.org/10.13031/jash.16142
PUBLICACIÓN	Journal of Agricultural Safety and Health, 2025, Volumen 31, Número 3, pp. 245-256
TEMÁTICA	Formación

OCCUPATIONAL HEALTH SCIENCE

ARTÍCULO 5: Does Telephone Coaching Improve Farmers' Mental Health in the Long Term? Results of the 12- and 18-month Follow-Up of a Pragmatic Randomized Controlled Trial

Farmers and related professionals are at risk of depression due to laborious work requirements, financial challenges, seasonal working conditions, high residence in under-resourced areas, and low help-seeking behavior. This study aimed to evaluate the long-term effectiveness of personalized telephone coaching in reducing depressive symptom severity and other mental health problems in farmers. Participating farmers with elevated depressive symptoms (PHQ-9≥5) were randomly allocated to receive up to six months of personalized telephone coaching (N=160) or enhanced treatment-as-usual (TAU+) with psychoeducational material via mail (N=154). The coaching was conducted by psychologists and personalized in terms of sessions frequency, duration, and content. Depressive symptom severity and other mental health and work-related outcomes were assessed at baseline, and long-term after 12 and 18 months. Group differences were determined by covariance analysis adjusting for baseline severity. Group differences were observed in favor of the telephone coaching compared to TAU+in depressive symptom severity ($d_{12months}$=-0.34, $d_{18months}$=-0.31), perceived stress ($d_{12months=-}$0.41, $d_{18months}$=-0.37), emotional exhaustion ($d_{12months}$=-0.29, $d_{18months}$=-0.28), and cynicism ($d_{12months}$=-0.32, $d_{18months}$=-0.34) at both follow-ups. Group differences in anxiety (d=-0.28) and quality of life (d=0.30) were only observed at the 12-month assessment. No group differences were observed in depression onset, insomnia severity, panic and agoraphobia symptoms, alcohol consumption, professional efficiency, or self-reported prognosis of working capacity. Personalized telephone coaching as a promising remote prevention offer can reduce depressive symptom severity, generalized anxiety, perceived stress, emotional exhaustion, and cynicism, while additional support may be necessary to address aspects related to professional performance.

¿Mejora el coaching telefónico la salud mental de los agricultores a largo plazo? Resultados del seguimiento a los 12 y 18 meses de un ensayo controlado aleatorio pragmático	
Se realizó un estudio cuyo objetivo era evaluar la eficacia a largo plazo del asesoramiento telefónico para reducir los síntomas de depresión y otros relacionados con la salud mental en los agricultores y profesionales de este sector. Para ello, se evaluó la gravedad de dichos síntomas al inicio y tras 12 y 18 meses. Los participantes con síntomas depresivos elevados recibieron hasta seis meses de asesoramiento telefónico personalizado con un psicólogo o un tratamiento habitual mejorado con material psicoeducativo por correo. Los resultados mostraron como el asesoramiento telefónico podía reducir la gravedad de síntomas depresivos, ansiedad, estrés, agotamiento emocional y cinismo, pero para tratar el rendimiento profesional podría ser necesario un apoyo adicional.	
AUTORES	Janika Thielecke, Ingrid Titzler, Lina Braun, David Daniel Ebert, Johanna Freund, Harald Baumeister, Matthias Berking, Claudia Buntrock
DOI	https://doi.org/10.1007/s41542-024-00216-9
PUBLICACIÓN	Occupational Health Science, 2025, Volumen 9, Número 2, pp. 437–468
TEMÁTICA	Riesgo Salud Mental

OCCUPATIONAL & ENVIRONMENTAL MEDICINE

ARTÍCULO 6: Education and training program in sleep habits and health promotion in an agricultural company in piura, Peru

Objective: The purpose of the study was to describe good practices on education and training (ET) in sleep habits and health promotion in workers at an agricultural company in the city of Piura and its impact in their health status.

Material and Methods: This research was a case report study in an agricultural company which had 925 workers. Unit of analysis was the indicators of ET program as characteristics of participants (demographic, level of education), education methods used, questionnaires solved, and clinical parameters. The instruments used were Data collection sheet, Sleep Hygiene Index, and Epworth Sleepiness Scale. The instruments and clinical parameters were assessed at the beginning of the study and after 2 years.

Results: 287 workers participated, of which 68% were between the age of 30 and 50 years old. 75% lived in a rural area. 31% finished a professional career, 24% had finished a short-technical program and 45% had only finished high school. The ET practices implemented were Case discussion, Role games, Performance-feedback and game workshops. The topics of the ET program were Sleep habits, Prevention of Fatigue, Strategies for dealing with stress, and Cardiovascular and metabolic diseases. The frequency of sleep habits reported as poor was reduced in 21%. Poor sleep habits that were more reduced included: going to bed at different hours, going to sleep feeling stressed, upset, sad or nervous; using alcohol, tobacco or coffee within 4 hours before sleeping, and eating within 2 hours before sleeping. The frequency of excessive daytime sleepiness was reduced in 16%. Body mass index and blood pressure levels improved after 2 years of ET practices.

Conclusions: ET program in Sleep Habits and health promotion had good results in reducing poor sleep habits, excessive daytime sleepiness and improving health status in workers in an agricultural company.

Programa de educación y formación sobre hábitos de sueño y promoción de la salud en una empresa agrícola de Piura, Perú	
Se realizó un programa para describir buenas prácticas en educación y formación sobre hábitos de sueño y promoción de la salud en las personas trabajadoras de una empresa agrícola de Perú y el impacto de estas en su salud, tratando los temas de los hábitos de sueño, prevención de la fatiga, estrategias para lidiar con el estrés y enfermedades cardiovasculares y metabólicas. Para ello, se realizó un estudio a 287 personas trabajadoras evaluando sus propias características (demográficas, nivel de educación), métodos educativos empleados, cuestionarios y parámetros clínicos, al inicio del estudio y tras 2 años. Emplearon como instrumentos para la evaluación una hoja de recopilación de datos, el índice de higiene del sueño y la escala de somnolencia de Epworth. Los resultados mostraron como se redujo un 21 % la frecuencia de los hábitos de sueño deficientes y un 16 % la frecuencia de la somnolencia diurna excesiva. Además, el índice de masa corporal y los niveles de presión arterial mejoraron tras dos años de formación. Se concluyó que este programa proporcionaba buenos resultados para reducir los malos hábitos de sueño, la somnolencia diurna excesiva, así como la mejora del estado de salud de las personas trabajadoras de una empresa agrícola.	
AUTORES	Norvil Antonio Mera Chu
DOI	https://doi.org/10.1136/oemed-2024-EPICOHabstracts.54
PUBLICACIÓN	Occupational & Environmental Medicine, 2025, Volumen 82, A25
TEMÁTICA	Formación

ARTÍCULO 7: Glyphosate use and mosaic loss of chromosome Y in male pesticide applicators

Objective: Glyphosate, the most widely applied herbicide worldwide, has been linked to certain hematologic malignancies; however, the underlying biological mechanisms remain poorly understood. We previously reported an association between high lifetime glyphosate use and mosaic loss of chromosome Y (mLOY), a marker of genotoxicity and genomic instability, in circulating blood of male farmers from a subcohort of the Agricultural Health Study (AHS). Here, we further investigated glyphosate use in relation to mLOY in buccal cell-derived DNA among pesticide applicators in an independent AHS sub-study.

Material and Methods: This investigation included 1,868 male pesticide applicators who were cancer-free controls from a case-control study nested within the AHS and scanned with the Illumina OncoArray. mLOY was detected using genotyping array intensity data (median log-R ratio [mLRR]) in the male-specific region of chromosome Y. Total lifetime days and intensity-weighted lifetime days (lifetime days multiplied by an exposure intensity score) of glyphosate use were derived from questionnaires. Logistic regression was used to estimate associations between glyphosate use and any mLOY (mLRR≤-0.15) and mLOY affecting a high fraction of cells (≥median [27.55%]), adjusted for potential confounders (e.g., age, smoking).

Results: mLOY was detected among 16% of pesticide applicators, with a frequency that increased with age (P<0.0001). Approximately 86% of all applicators reported using glyphosate during their lifetime. High intensity-weighted lifetime days of glyphosate use (highest vs. lowest quartile) was associated with increased odds of any mLOY (OR=1.54, 95%CI=1.01-2.37), in particular mLOY affecting a high fraction of cells (OR=1.99, 95%CI=1.11-3.57), although exposure-response trends were not statistically significant (P-trend=0.40 and P-trend=0.15, respectively).

Conclusions: Our results from buccal cell-derived DNA provide additional evidence supporting the previously observed association between glyphosate use and mLOY, especially mLOY affecting higher cell fractions. Together, these findings can help inform our understanding of the genotoxicity of glyphosate and its potential role in carcinogenesis.

Uso de glifosato y pérdida del cromosoma Y en hombres que aplican tratamientos fitosanitarios	
Se realizó un estudio para investigar cómo el uso del glifosato (herbicida más usado a nivel mundial) afecta a la pérdida del cromosoma Y (mLOY) en el ADN de las células bucales de los hombres que aplican tratamientos fitosanitarios. Participaron 1868 hombres con controles de cáncer negativos detectando la pérdida del cromosoma Y a través pruebas de genotipado en la región específica del cromosoma Y. Se realizaron cuestionarios sobre los días totales de uso del glifosato y los días ponderados por la intensidad de exposición. Los resultados mostraron que el 86% de los hombres habían usado glifosato a lo largo de su vida. Además, en el 16% de ellos se detectó pérdida del cromosoma Y con una frecuencia que aumentaba con la edad. Un gran número de días ponderados por la intensidad de exposición también correspondieron a un aumento de la probabilidad de pérdida del cromosoma Y. Se concluyó que dicho estudio ayudaba a comprender la toxicidad genética del glifosato y su implicación en el desarrollo del cáncer.	
AUTORES	Vicky C Chang, Stella Koutros, Lauren M Hurwitz, Weiyin Zhou, Gabriella Andreotti, Christine G Parks, Dale P Sandler, Nathaniel Rothman, Mitchell J Machiela, Laura E Beane Freeman, Jonathan N Hofmann, Sonja I Berndt
DOI	https://doi.org/10.1136/oemed-2024-EPICOHabstracts.58
PUBLICACIÓN	Occupational & Environmental Medicine, 2025, Volumen 82, A26-A27
TEMÁTICA	Tratamientos Fitosanitarios

ARTÍCULO 8: Umbilical cord plasma cholinesterase activity and birth weight in babies delivered by mothers engaged in horticulture activities in Northern Tanzania

Objective: Little is known about potential adverse health effects on newborn babies caused by prenatal exposure to pesticides, for instance organophosphates that have cholinesterase inhibiting effects. We aimed to investigate if maternal exposure to pesticides during pregnancy affected umbilical cord plasma cholinesterase activity and birth weight in delivered babies among women engaged in horticulture activities in Northern Tanzania.

Material and Methods: We investigated 250 newborns of women anticipated to be exposed to pesticides or actively involved in horticulture (occupationally exposed) and 250 newborns of women not involved in horticultural activities (not occupationally exposed) from Northern Tanzania. Based on interviews, using a questionnaire, data on occupational history and pesticide exposure from pregnant women was collected. Additionally, data on birth weight was collected from the medical records, and cord blood samples were collected at delivery. Cholinesterase activity in the umbilical cord plasma was assessed by plasma cholinesterase assay kits (Model 470 EQM Research, Cincinnati). Statistical analysis was done by SPSS version 23, including comparisons of groups by the use of t-tests and correlation tests, p values < 0.05 were considered significant.

Results: Both mean cholinesterase activity in umbilical cord plasma (1.338 vs 1.916, $p<0.0001$), and mean birth weight (2.82 vs 3.27, $p<0.0001$) were lower in newborn babies delivered by occupationally exposed mothers compared to babies from mothers with no occupational exposure. There was a positive correlation between plasma cholinesterase levels and birth weight of the babies ($r=0.553$, $p<0.0001$).

Conclusions: Babies delivered by mothers exposed to pesticides or actively involved in horticulture during pregnancy had lower plasma cholinesterase activity in their umbilical cord plasma and lower birth weight than babies delivered by mothers not involved in horticultural activities. This raises concern for reproductive health and prenatal exposure in areas where pesticides like organophosphates are much used.

Actividad de la colinesterasa en el plasma del cordón umbilical y peso al nacer en bebés de madres que realizan actividades hortícolas en el norte de Tanzania

Se realizó un estudio para investigar si la exposición durante el embarazo a tratamientos fitosanitarios afectaba a la actividad de la colinesterasa en el plasma del cordón umbilical y peso al nacer en bebés de mujeres dedicadas a la horticultura en Tanzania. Se investigaron a 250 bebés de mujeres que estaban expuestas a tratamientos fitosanitarios o que participaban activamente en la horticultura y a 250 bebés de mujeres que no participaban en esta. Se realizaron cuestionarios sobre el historial laboral y la exposición a tratamientos fitosanitarios de las mujeres embarazadas, y se recopilaron los datos del peso al nacer mediante registros médicos. Además, se tomaron muestras de sangre del cordón umbilical en el parto. Los resultados mostraron que la actividad media de la colinesterasa en el plasma del cordón umbilical y el peso medio al nacer eran menores en bebés de madres expuestas a tratamientos fitosanitarios. Por tanto, las zonas donde se aplican dichos tratamientos presentan una mayor preocupación por la salud reproductiva y la exposición prenatal.

AUTORES	Baldwina Tita Olirk, Simon Henry Mamuya, Gro Tjalvin, Bente Elisabeth Moen, Aiwerasia Vera Ngowi
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PUBLICACIÓN	Occupational & Environmental Medicine, 2025, Volumen 82, A25-A26
TEMÁTICA	Tratamientos Fitosanitarios

ARTÍCULO 9: Examining the occupational exposome of male agricultural workers in Canada and abroad

Objective: Limited data document the occupational exposome of agricultural workers. We aimed to characterize the occupational exposome of Canadian men who had worked in agriculture in Canada or abroad.

Materials and Methods: We used data from a population-based case-control study of prostate cancer including 3,925 male participants residing in Montreal, Canada in 2005-2012. Lifetime occupational histories and detailed job descriptions were collected during in-person interviews. Industrial hygienists and an agronomist conducted semi-quantitative evaluations of exposure, including intensity and reliability, to some 300 chemical agents in each job held. Analyses focused on the 156 agricultural jobs ever held.

Results: Agricultural activities had taken place between 1946 and 2012, across small- to large-scale agricultural settings. Many (43%) agricultural jobs took place in Canada, in the province of Quebec. Ten percent were held in Haiti, and some 10% comprised collectively jobs that took place in Italy, Portugal and Greece. Jobs entailed exposure to an average of 10 chemical agents (± 7), and 54% of jobs were exposed to at least two recognized carcinogens. The most common exposures coded with medium or high reliability and classified as definite or probable carcinogens were ultraviolet radiation (92% of jobs), environmental tobacco smoke (39%), diesel engine exhaust (23%), wood dust (20%), lubricating oils and greases (20%) and lead (15%). Pesticide exposures occurred in only 31% of jobs. Most jobs entailed exposure to long working hours, high physical activity levels, and did not provoke stress or anxiety. Few involved early morning shifts. Exposomes varied according to country, agricultural activities (general, crop, vegetable or animal farming, etc.), and types of crops grown.

Conclusions: Findings highlight the heterogeneity of the agricultural exposome based on its setting and activities involved. Future studies on health-related effects of farming should account for numerous occupational agents, beyond the usual focus on pesticides.

Análisis del exposoma laboral de las personas trabajadoras masculinas del sector de la agricultura en Canadá y en el extranjero	
Se analizó el exposoma en el ámbito laboral de hombres que trabajaron en el sector de la agricultura en Canadá o en el extranjero. Se utilizaron datos de un estudio sobre el cáncer de próstata en el que participaron 3925 hombres de Montreal (Canadá) entre 2005-2012. Se realizaron entrevistas para obtener información sobre historiales laborales y descripciones de los puestos de trabajo. Además, profesionales en higiene industrial y un agrónomo llevaron a cabo evaluaciones de exposición semicuantitativas a 300 agentes químicos en cada puesto de trabajo. Se evaluaron 156 puestos de trabajo. Los resultados mostraron que las actividades agrícolas se realizaban entre 1946 y 2012, concentrándose la mayor parte (43%) en Quebec (Canadá). Todos los trabajos estaban expuestos a una media de 10 agentes químicos, el 54% a mínimo dos agentes cancerígenos y el 31% a tratamientos fitosanitarios. La mayoría de los trabajos se asociaban con largas jornadas laborales y altos niveles de actividad física, pero no provocaban estrés ni ansiedad. Se concluyó la variación del exposoma agrícola según el contexto y las labores realizadas.	
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TEMÁTICA	Seguridad y Salud General

ARTÍCULO 10: Evaluation of occupational exposure to pesticides and workers' health status in an agricultural area

Objective: To evaluate pesticide exposure qualitatively, assess its impact on workers' health

Materials and Methods: Descriptive cross-sectional study from 4 agricultural companies in Jendouba, Tunisia, comprising qualitative environmental assessment and a medical study on respiratory, skin, and neuropsychological effects through a questionnaire administered by the occupational physician.

Results: A total of 54 workers participated, with a mean age of 49.12±7.21 years, mainly males (94 %), and a mean professional seniority of 23.22±9.65 years. The most common job positions were general workers (65%), drivers (22%), and control station operators (4%). Insecticides represented 34% of pesticides, fungicides (38%), and herbicides (28%). The agricultural companies using pesticides were an arboriculture company, a seeds and plants company, a two cereal and vegetable farming companies Pesticide inventory revealed 67 active substances. The exposure matrix included key agricultural chemicals such as organochlorines (e.g., Endosulfan), organophosphates (e.g., Malathion, Dimethoate, Chlorpyrifos-ethyl), and carbamates (e.g., Carbaryl, Aldicarb). In all studied companies, pesticide preparation occurred outdoors with recommended dosage adherence; however, there was no adherence to wind speed recommendations during their application. Exposed employees inconsistently wore protective equipment: gloves were used by 35%, masks by 7%, and no company provided work uniforms. A medical study highlighted the importance of chronic toxic effects related to pesticide exposure: respiratory (43%), skin (35%), ocular (27.7%), and neuropsychological effects (83%). Specifically, organic psychosyndrome was found in seven employees and acute cholinergic syndrome in three. Primary male infertility issues were noted in 7 employees, and further investigation is ongoing. These toxic effects are more frequent and severe with higher levels of risk.

Conclusions: Greater pesticide exposure increases risks worsened by inadequate prevention measures, necessitating a robust strategy to minimize health, environmental, and socioeconomic impacts.

Evaluación de la exposición en el trabajo a tratamientos fitosanitarios y del estado de salud de las personas trabajadoras en una zona agrícola

Se evaluó la exposición a tratamientos fitosanitarios y su impacto en la salud de personas trabajadoras en cuatro empresas agrícolas de Jendouba (Túnez). Para ello, se realizó una evaluación ambiental cualitativa y un cuestionario de los efectos respiratorios, cutáneos y neuropsicológicos. Participaron 54 personas trabajadoras con edad media de 49 años, de las cuales el 94% eran hombres y con una experiencia profesional media de 23 años. Los puestos de trabajo más frecuentes fueron: personas trabajdoras generales (65%), conductores (22%) y operadores de estaciones de control (4%). Los tratamientos fitosanitarios se dividían en: insecticidas (34%), fungicidas (38%) y herbicidas (28%). Los resultados mostraron como las personas trabajadoras no usaban el equipo de protección, sólo el 35% usaba guantes, 7% mascarillas y ninguna de las empresas proporcionaba uniformes de trabajo. Se detectó un síndrome psicoorgánico en siete personas trabajadoras y un síndrome colinérgico agudo en tres, además de problemas de infertilidad masculina primaria en siete personas trabajadoras. Por otra parte, el estudio médico recalcó la importancia de los efectos tóxicos crónicos por la exposición a tratamientos fitosanitarios, produciendo en un 43% efectos respiratorios, 35% cutáneos, 27,7% oculares y 83% neuropsicológicos. Se concluyó que cuanto mayor es la exposición a tratamientos fitosanitarios mayores son los riesgos, que se agravan por las incorrectas medidas de prevención.

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TEMÁTICA	Tratamientos Fitosanitarios

ARTÍCULO 11: Socio-health determinants in the living and working conditions of female migrant berry agricultural workers. Methodological challenges.

Objective: To analyze the working conditions and the actual and perceived health status of female migrant agricultural workers as well as the perspective and experience of health professionals, considering cross-sectional sociocultural, economic-labor and environmental factors.
Materials and Methods: We followed an ethnographic methodology and qualitative techniques, with an intersectional gender perspective. We conducted individual and group interviews with female migrant berry agricultural workers, health professionals and key informants in Huelva.
Results: Participants reported the following health problems: muscle pain, skin problems, urinary tract infections, vaginal bleeding, stomach pain, bronchitis, blood pressure problems and anxious-depressive disorders. With respect to barriers to access to health services identified: language, illiteracy, technological deficiency, insufficient records in the User Database, improper use of the appointment and emergency system, cultural barrier, not allowed to miss working hours and non-existence of transportation. The problems related to working conditions were: lack of knowledge of the signed contract working rights, irregularities in medical certificates at origin, anomalies in social security, excess of daily working hours, lack of information on occupational risk prevention, nonexistence of labor contracts, lower wages, irregular housing conditions, unhealthy environmental, no access to basic supplies, abuse of labor and sexual power.
Conclusions: Contrary to the official version of the farmers' associations and the administration with competence on the subject, the participants' stories indicate the existence of serious deficiencies in the living and working conditions of the migrant berry workers in Huelva. Studies with appropriate design are necessary that can evaluate, without the interference of 'structural barriers', the magnitude and real scope of the problem. We have observed a reduction in healthcare and control system assistance and involvement compared to the COVID-19 pandemic. It has been a complex and risky methodological approach, in a hostile terrain, with a significant fear and rejection of migrant workers.

Determinantes sociosanitarios en las condiciones de vida y trabajo de las mujeres trabajadoras migrantes del sector agrícola dedicadas a la recolección de bayas. Retos metodológicos.	
Se analizaron las condiciones laborales y el estado de salud de mujeres migrantes del sector de la agricultura y la perspectiva y experiencia de los profesionales de la salud, considerando los factores socioculturales, económicos, laborales y ambientales. Para ello, se realizaron entrevistas individuales y grupales con mujeres migrantes del sector agrícola dedicadas a la recolección de bayas, profesionales de la salud y personas clave en Huelva. Los resultados mostraron que los problemas de salud que presentaron fueron dolor muscular, problemas cutáneos, infecciones urinarias, sangrado vaginal, dolor de estómago, bronquitis, problemas de presión arterial y trastornos ansioso-depresivos, encontrando barreras en el acceso a servicios sanitarios como el idioma, analfabetismo, deficiencia tecnológica, registros insuficientes en la base de datos de usuarios, uso inadecuado del sistema de citas y emergencias, barrera cultural, imposibilidad de faltar al trabajo y falta de transporte. Los problemas derivados de las condiciones laborales fueron el desconocimiento de los derechos laborales del contrato firmado, irregularidades en los certificados médicos de origen, anomalías en la seguridad social, exceso de horas de trabajo diarias, falta de información sobre prevención de riesgos laborales, inexistencia de contratos de trabajo, salarios más bajos, condiciones de vivienda irregulares, entorno insalubre, falta de acceso a suministros básicos, abuso de poder laboral y sexual. Se concluyó como las mujeres participantes manifestaban graves deficiencias en las condiciones de vida y de trabajo a diferencia de la versión de las asociaciones de agricultores y de la administración competente en la materia, por ello es necesario realizar estudios para evaluar la magnitud y alcance real del problema sin la existencia de barreras estructurales.	
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TEMÁTICA	Seguridad y Salud General

ARTÍCULO 12: Uncovering fungal contamination in poultry farms: an occupational hazard with global health implications

Objective: Globally, poultry production has been identified as a significant menace to global health due to microbial contamination. When examining the poultry environment, one of the key contributors to both indoor and outdoor air pollution is the bedding material for animals. Currently, there is a lack of information concerning the impact of the bedding material utilized on the growth of fungi and the associated health risks for workers. The preparation of animals' bedding is one of the duties that exposes poultry workers to more dust, as well as fungi and their metabolites (mycotoxins). Indeed, some studies have already pointed out fungal exposure in poultry facilities, thereby jeopardizing farmers with occupational respiratory ailments. This research aims to evaluate fungal exposure within poultry facilities throughout the growth phases of birds, with a specific focus on wood shavings as the animals' bedding material.

Materials and Methods: Samples will be collected from each poultry pavilion across three stages of poultry growth (Early-, Middle- and Late-Flock) during both Summer and Winter seasons. Indoor air samples will be obtained at the central point of the poultry pavilion using a MAS-100 air sampling device positioned at a 1m height. A composite sample of bedding material and feed will be compiled from random places of each pavilion. Also, surface swabs on pavilion walls will be performed and electrostatic dust collectors (EDC) will be placed weekly.

Results and Conclusions: The sampling campaign is currently underway. The expected results will enable to delineate the risk of fungal exposure in poultry farms, enhance consciousness, and advocate for workplace strategies that foster a safe working environment. Ultimately, evaluating exposure in the poultry sector will aid in addressing health and environmental threats by pinpointing critical areas for intervention to mitigate microbial exposure, promote a secure atmosphere for workers and animals within poultry facilities, and reduce environmental impact.

Detección de la contaminación fúngica en granjas avícolas: un riesgo laboral con implicaciones para la salud mundial	
En las granjas avícolas uno de los principales factores que contaminan el aire es el material empleado para la cama de los animales. Sin embargo, es escasa la información sobre el impacto de dicho material en el crecimiento de hongos y riesgos para la salud de las personas trabajadoras. Se realizó una evaluación de la exposición a hongos en instalaciones avícolas. Para ello, se recogieron muestras en las granjas durante las tres etapas del crecimiento de las aves en las temporadas de verano e invierno, obteniendo una muestra del aire interior en el punto central de la granja, una muestra del material de la cama y pienso en lugares aleatorios, se realizaron hisopados superficiales en las paredes y se colocaron colectores de polvo electrostáticos semanalmente. Los resultados permitieron determinar el riesgo de exposición a hongos en las granjas avícolas, aumentar la concienciación y promover estrategias que fomentaran un entorno laboral seguro.	
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TEMÁTICA	Exposición

INTERNATIONAL JOURNAL OF INDUSTRIAL ERGONOMICS

ARTÍCULO 13: Comparative analysis of classical and ensemble models for predicting whole body vibration induced lumbar spine stress. A case study of agricultural tractor operators

Accurate prediction of lumbar health is necessary for developing effective ergonomic strategies for tractor operators exposed to whole-body vibration. This study aims to predict static compression dose (S_{ed}), a key measure of lumbar spine stress as per ISO 2631-5, by comparing classical regression and ensemble models. Three tractor operation parameters (average speed, average depth, and pulling force) are considered to assess S_{ed} during rotary tillage operation. The performance of two classical models (Linear and Huber regression) is compared with five ensemble models (Random Forest, Gradient Boosting, XGBoost, AdaBoost, and Bagging regressors) in predicting S_{ed}. The comparison identifies the best models in each category, with linear regression achieving a mean bootstrap R2 of 0.91 (95 % CI: 0.87 to 0.94) and Random Forest achieving 0.93 (95 % CI: 0.90 to 0.95). To further enhance performance, meta-models are developed using two meta-learners (Random Forest and Gradient Boosting) to integrate classical and ensemble models. These models are optimized using different ensemble strategies: simple averaging, weighted averaging, stacking, and voting regressors. Among these, the stacking method proves most effective, achieving a mean bootstrap R2 of 0.94 (95 % CI: 0.93 to 0.96). Feature importance analysis reveals that the multi-model combination of ensemble models achieves the highest predictive score (0.99) for Sed. These findings demonstrate that ensemble models outperform classical models in predicting S_{ed}, particularly when combined through stacking methods. This advancement has significant implications for improving occupational health and safety among tractor operators, potentially leading to better ergonomic tractor designs aimed at reducing lumbar spine stress.

Análisis comparativo de modelos clásicos y ensamblados para predecir el estrés en la columna lumbar inducido por la vibración de todo el cuerpo. Un estudio de caso de operadores de tractores agrícolas.

Se realizó un estudio comparando los modelos de regresión clásicos y modelos de conjunto para predecir el nivel del estrés lumbar por vibración en operarios de tractores agrícolas, considerando tres parámetros de funcionamiento del tractor (velocidad media, profundidad media y fuerza de tracción) durante una labor agrícola. Se comparó el rendimiento de dos modelos clásicos (regresión lineal y de Huber) con cinco modelos de conjunto (Random Forest, Gradient Boosting, XGBoost, AdaBoost y Bagging regressors). Los mejores resultados obtenidos para cada tipo de modelo fueron el de regresión lineal y Random Forest. Sin embargo, la combinación de varios modelos de conjunto mejoraba la precisión en la estimación del nivel del estrés lumbar por vibración, suponiendo un avance para la mejora de la salud y seguridad de operadores de tractores al conducir a mejores diseños ergonómicos de los tractores para reducir la tensión en la columna lumbar.

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TEMÁTICA	Riesgo Físico

ARTÍCULO 14: A new measurement for workload assessment in agricultural tasks: EDA-based real-time model
Agriculture is vital for the global economy but remains one of the most hazardous industries due to the high prevalence of musculoskeletal disorders (MSDs). This study aimed to develop and validate an electrodermal activity (EDA)-based model for non-invasive, real-time assessment of upper limb task workload, addressing the impact of environmental factors on workers' mental and physical strain. To achieve this, participants engaged in simulated pruning and harvesting tasks, which are known for imposing substantial workload and injury risks on the upper extremities in agriculture. Anthropometric data, EDA signals, and the Borg rating of perceived exertion (RPE) were collected. A multinomial logistic regression (MLR) model was employed to classify workload levels based on EDA wavelet features and key task-related variables. The developed models for pruning and harvesting tasks explained 40–50 % of the variance in RPE, demonstrating the highest accuracy in the middle RPE group (88–89 %). Specificity was notably high (>91 %) across both tasks for low and high RPE groups. Additionally, the middle RPE group exhibited recall and F1 scores above 84.5 %, while the high RPE category demonstrated recall, precision, and F1 scores ranging from 73 % to 92 % for pruning and from 60 % to 75 % for harvesting. These findings underscore the model's potential for precise workload categorization and the development of effective management strategies. Furthermore, the proposed EDA-based framework may hold broader applicability across various occupational domains that require non-invasive and continuous workload monitoring.

Una nueva medida para evaluar la carga de trabajo en tareas agrícolas: modelo en tiempo real basado en la AED	
Se realizó un estudio para desarrollar un modelo basado en la actividad electrodermal (AED) que permitiera evaluar la carga de trabajo de las extremidades superiores, considerando el impacto de los factores ambientales en la fatiga mental y física de las personas trabajadoras. Para ello, los participantes realizaron tareas simuladas de poda y recolección. Se recopilaron los datos antropométricos, las señales de la actividad electrodermal y el esfuerzo percibido con la escala de Borg. Los resultados demostraron el potencial del modelo para determinar la carga de trabajo, contribuyendo al desarrollo de estrategias eficaces frente a trastornos musculoesqueléticos.	
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TEMÁTICA	Riesgo físico

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ARTÍCULO 15: Seaweed Farming in Tanzania: A Study of Working Practices and Geospatial Analysis of Occupational Hazards and Adverse Health Outcomes

Objective: Work in seafood harvesting and processing has been associated with a range of occupational hazards and associated health problems. However, limited information exists regarding the occupational health risks among workers engaged in seaweed handling.

Methods: A cross-sectional study was conducted to map seaweed co-operatives (n=45), assess working practices, and identify common work-related symptoms, occupational hazards, and interventions in seaweed farming sites (n=24), across three regions of Zanzibar, Tanzania.

Results: Seaweed farming in Zanzibar primarily involves the cultivation of Eucheuma Spinosum, with the majority of workers being women. Common work-related symptoms identified include musculoskeletal symptoms, mainly affecting the wrist (87%), back (84%) and lower limbs (73%). Furthermore, a significant proportion of workers were reported to have skin problems (80%) as well as heat and asthma-related symptoms (51%). Walk-through hazard evaluations of work sites identified a range of occupational hazards, with ergonomic (58–68%), biological (50–63%) and chemical (55–65%) hazards obtaining higher scores across the three regions. Geospatial analysis revealed regional variations in occupational hazards and work-related symptom prevalence, with Unguja South having a statistically significant ($p<.05$) higher mean prevalence of skin symptoms (95%) and Mjini Magharibi region reporting a higher prevalence of lower limb pain (100%), back pain (100%), and heat-related symptoms (90%). Despite the high hazard scores, interventions were generally lacking across all regions.

Conclusion: Occupational health hazards and adverse health outcomes vary across seaweed farming and processing regions. Tailored interventions will be key to improving workplace health and safety of workers engaged in this sector.

Cultivo de algas en Tanzania: estudio de las prácticas laborales y análisis geoespacial de los riesgos laborales y los efectos adversos para la salud

La información sobre riesgos laborales en personas trabajadoras encargadas de manipulación de algas marinas es escasa. Se llevó a cabo un estudio para identificar las cooperativas de algas (45), analizar las prácticas laborales y determinar síntomas frecuentes relacionados con el trabajo, riesgos laborales e intervenciones llevadas a cabo en tres regiones de Zanzíbar (Tanzania). El cultivo de algas para la zona analizada se centraba principalmente en Eucheuma Spinosum y la mayor parte de las personas trabajadoras eran mujeres. Los resultados mostraron que los síntomas más habituales relacionados con el trabajo eran los musculoesqueléticos, afectando principalmente a la muñeca, espalda y extremidades inferiores; además de problemas cutáneos y síntomas relacionados con el calor y el asma. Los riesgos laborales más destacados eran ergonómicos, biológicos y químicos. El análisis geoespacial mostró variaciones regionales en los riesgos laborales y en la prevalencia de síntomas relacionados con el trabajo. Las tres regiones mostraron ausencia de intervenciones. Se concluyó que los riesgos y los efectos adversos para la salud variaban entre las regiones dedicadas al cultivo de algas marinas, siendo muy importantes las intervenciones para mejorar la salud y seguridad en el lugar de trabajo.

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TEMÁTICA	Seguridad y Salud General

ARTÍCULO 16: Weather and Marine Aquaculture Workers' Safety in Atlantic Canada

Objective: Marine aquaculture workers are at high risk of injury and fatalities. Understanding the role of weather in occupational safety and health (OSH) in marine aquaculture is important for work design, planning, and for safety management and hazard reduction, but there is limited research on this subject.

Methods: Using findings from a review of research and grey literature and from key informant interviews and roundtable discussions in Atlantic Canada, this paper explores the impact of weather-driven hazards on marine aquaculture in Northern and temperate regions, along with the strategies employed to mitigate these impacts.

Results: Findings indicate primary concerns for aquaculture OSH include sun and cold exposures; working on and under surface ice; strong winds; waves; current; reduced visibility; and ice build-up.

Conclusions: Key changes that could help reduce weather-related injury risk include improved forecasting capacity; improved reporting of weather conditions at the time of an incident in administrative injury and fatality data; incorporation of weather-related OSH hazards and risks in industry risk assessments; mechanization, including increased use of remote operation technologies on farm sites; and improved infrastructure standards and design.

El clima y la seguridad de las personas trabajadoras de la acuicultura marina en la costa atlántica de Canadá

Se realizó una revisión de información de investigaciones, literatura, entrevistas y mesas redondas celebradas en la costa atlántica de Canadá para examinar los impactos de los riesgos meteorológicos en la acuicultura marina en las regiones septentrionales y templadas, así como las estrategias para mitigarlos. Los resultados mostraron que las principales preocupaciones sobre la seguridad y salud en el trabajo en el sector acuícola fueron la exposición tanto al sol como al frío, trabajo sobre y bajo el hielo superficial, vientos fuertes, olas, corrientes, visibilidad reducida y acumulación de hielo. Se concluyó que para reducir las lesiones provocadas por estos riesgos había que mejorar la predicción meteorológica, mejorar la notificación de estas condiciones en caso de incidente en los datos administrativos sobre lesiones y muertes, incluir en las evaluaciones de riesgos los peligros y riesgos meteorológicos para la seguridad y salud en el trabajo, la mecanización con un mayor uso de tecnologías de operación remota en las explotaciones y mejorar las normas y diseño de infraestructuras.

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TEMÁTICA	Seguridad y Salud General

ARTÍCULO 17: Adding Insult to Injury: The Impact of Musculoskeletal Pain on Fishermen's Sleep Patterns

Objectives: Commercial fishing is one of the most dangerous industries in the United States, and although injuries have been a prominent focus for research, some health and safety risk factors such as sleep are understudied. In this paper, data from a multi-modal research study of sleep patterns, lifestyle factors, occupational exposures, medical histories, and health assessments in four U.S. fisheries are used to explore the connections between pain and sleep.

Methods: A mixture of randomized cluster sampling, study promotions, and dockside recruitment was utilized to gather a sufficient number of fishermen in the Alaska Salmon, Oregon Dungeness Crab, Massachusetts Scallop, and Massachusetts Lobster fisheries for the study. Fishermen were surveyed about sleep patterns, occupational exposures, and lifestyle factors. Surveyed fishermen were provided with free comprehensive health assessments by occupational health nurses and physicians or Advanced Practice Providers. Data were collected in REDCap and downloaded into SAS for analysis using a variety of analytic methods.

Results: A total of 262 surveys and 162 physical examinations were completed with captains and crew members in the four fisheries targeted for study. The average self-reported consecutive hours of sleep for fisheries workers that spend several days at sea (i.e. Crab, Scallop, and Salmon fisheries) were roughly 3.5 to 4.0 h in a 24-h period. Of particular note, the majority of fishermen, regardless of fishery, suffered from back pain, and roughly 40% of fishermen noted pain and discomfort significantly impede their ability to sleep.

Conclusions: This study underscores the connections between musculoskeletal pain and sleep, providing yet further impetus for preventing musculoskeletal injuries among fishermen. Given the ties between existing sleep debt in the industry and the health and safety risks posed by repeated exposure to insufficient sleep, this study highlights the need for the prevention of these injuries and potentially better treatment options for fishermen who suffer from musculoskeletal disorders.

Añadiendo agravante a la lesión: el impacto del dolor musculoesquelético en los patrones de sueño de los pescadores	
Se investigó la relación entre el dolor y el sueño en personas trabajadoras de cuatro pesquerías de Estados Unidos. Participaron pescadores de salmón en Alaska, cangrejo Dungeness en Oregón y vieira y langosta en Massachusetts. Se realizaron 262 encuestas sobre los patrones de sueño, exposiciones ocupacionales y factores relacionados con el estilo de vida y 162 exámenes físicos a capitanes y tripulantes. Los resultados mostraron una media de 3,5-4 horas consecutivas de sueño en 24 horas en personas que trabajaban varios días en el mar. La mayoría (independientemente de la pesquería) padecían dolores de espalda y el 40% informaron de que dicho dolor afectaba significativamente a su capacidad para dormir. Se concluyó la existencia de una relación entre el dolor musculoesquelético y el sueño, destacando la necesidad de prevenir estos dolores para reducir los riesgos en la salud y seguridad en el sector pesquero por la falta de sueño.	
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TEMÁTICA	Riesgo Físico

ARTÍCULO 18: Psychosocial Work Environment Risks Among Danish Fishers

Objective: Our paper focuses on psychosocial risks that are under-researched within the fishing industry. The study was conducted in Denmark. Firstly, we investigated how Danish fishers perceive their psychosocial work environment. Secondly, we formed a group of industry partners and stakeholders with the purpose of designing ways to mitigate the reported stressors.

Methods: The study design is action research, employing qualitative co-creative methods for data collection in both the first and the second stages. The methods include chronicle workshops and design thinking workshops. Participants in the workshops came from different stakeholder groups, including fishers. We ensured that the focus remained on centering the voices of the fishers to understand the psychosocial risks within the industry context.

Results: In the first stage, we used thematic analysis, which led to the identification of ten themes: (1) discouragement, (2) stress, (3) poor economy, (4) negative atmosphere, (5) distrust, (6) injustice, (7) fear, (8) unpredictability, (9) powerlessness, and (10) lost pride. This study explored the key risks and highlighted that a lack of influence and meaning, reduced rewards, and increased unpredictability are likely to lead to increased stress in an environment that lacks social support.

Conclusion: Existing research into the psychosocial working environment has established six dimensions where an imbalance leads to negative health effects. They are sometimes referred to as "the 6 gold nuggets" where an imbalance leads to negative health effects. We compared our themes to these gold nuggets and identified a clear overlap, which gave us confidence in the relevance of our data. Through the workshops, we co-created six recommendations to address the reported risks and provide policymakers with actionable recommendations.

Riesgos psicosociales en el entorno laboral de los pescadores daneses

Se realizó un estudio para evaluar los riesgos psicosociales en el sector pesquero en Dinamarca. Se investigó la percepción de los trabajadores sobre el entorno laboral psicosocial y se formó un grupo con partes interesadas y socios del sector para diseñar medidas de prevención de factores de estrés. Para ello, se hicieron talleres de crónica y de *"design thinking"*, centrándose en la opinión de los pescadores sobre los riesgos psicosociales. Se empleó un análisis temático donde se identificaron 10 temas: desánimo, estrés, mala situación económica, ambiente negativo, desconfianza, injusticia, miedo, imprevisibilidad, impotencia y pérdida de orgullo. Se evaluaron los riesgos clave, mostrando como la falta de influencia y sentido, la reducción de recompensas y el aumento de imprevisibilidad conducían a un aumento del estrés. Se establecieron seis recomendaciones para afrontar los riesgos identificados y se proporcionaron recomendaciones prácticas para los responsables políticos.

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ARTÍCULO 19: Safety and Accidents in Fishing: A Study of Causes and Risk Factors in the Norwegian Fishing Fleet

Objectives: The Norwegian government declared Vision Zero for serious injuries and fatalities for everyone working at sea in 2022. Occupational accident rates in the Norwegian fishing fleet are higher than those for other maritime industries, and measures must be based on a thorough knowledge of causes. This article aims to provide updated knowledge on causes and risk factors for occupational accidents in the Norwegian fishing fleet.

Methods: Three sources of data were used: 1) A database of fatal accidents updated by the research institute SINTEF Ocean and a registry of occupational injuries kept by the Norwegian Maritime Authority, 2) 40 accident investigation reports published by the Norwegian Safety Investigation Authority, and 3) interviews with 12 active fishers and representatives for key stakeholders involved in fishers' safety.

Results: Analyses of occupational accidents indicated more than half of fatalities in the period 2000–2022 were due to vessel disasters and fisher overboard events. Most of those involved worked on vessels that were 6–10.99 m in length. Accident investigation reports published in the period 2013–2023 indicate many overboard accidents happened to fishers working alone and were caused by fishers being dragged overboard with equipment, fishers falling overboard, or ropes under tension suddenly snapping. The interviews revealed the fishers and key stakeholders were concerned about accidents. The underlying causes and risk factors they described were technological (vessel, fishing gear, and equipment), organizational (planning and decision-making, competence and training, working hours, and rest), and regulatory (control and inspections, requirements for safety management, and fisheries management and safety). Furthermore, the interviews indicated fisheries management may have a negative influence on safety and working conditions and need be considered to improve fishing safety.

Conclusion: Coastal fishers are overrepresented in fatal accidents, while most occupational accidents are reported from sea-going trawlers. Measures should target technological, organizational, and regulatory factors, as well as framework conditions.

Seguridad y accidentes en la pesca: estudio de las causas y los factores de riesgo en la flota pesquera noruega

Se investigaron las causas y factores de riesgo de accidentes laborales en la flota pesquera noruega, debido a que sus tasas de accidentes laborales eran más altas que las de otras industrias marítimas. Se emplearon tres fuentes de datos: una base de datos de accidentes mortales y un registro de lesiones laborales, 40 informes de investigación de accidentes, y entrevistas con 12 pescadores en activo y representantes de las principales partes interesadas en la seguridad de los pescadores. Los resultados de los análisis de los accidentes mostraron que el 50% de las muertes entre 2000-2022 fueron por desastres marítimos y caídas de pescadores al agua, estando la mayoría trabajando en embarcaciones de entre 6-10,99 m de eslora. Los informes del 2013-2023 mostraron que muchas de las caídas al mar les ocurrieron a pescadores que trabajaban en solitario y fueron arrastrados al mar por equipos, pescadores que cayeron por la borda o cuerdas bajo tensión que se rompieron. Las entrevistas mostraron que los pescadores y las principales partes interesadas estaban preocupados por los accidentes. Las causas y factores de riesgo que identificaron eran de carácter tecnológico, organizativo y normativo, indicando que la gestión de la pesca podía influir negativamente en la seguridad y condiciones de trabajo y debía tenerse en cuenta para mejorar la seguridad de la pesca. Se concluyó que los pescadores tenían demasiados accidentes mortales, siendo la mayoría en barcos de arrastre en alta mar, por lo que era necesario aplicar medidas.

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ARTÍCULO 20: Occupational Injuries and Fatalities in Norwegian Fish Farming

Objective: People working in the Norwegian fish farming industry work in a high energy environment, where there are many hazards in the daily work. An important part of mitigating hazardous situations is to keep track of the characteristics of the accidents that have already happened and to learn from these, when planning future work. The objective of this study was to strengthen the knowledge of factors and conditions influencing personnel safety in Norwegian fish farming, based on analyses of registered occupational fatalities and injuries.
Methods: We gathered reported injuries and fatalities from vessels and fish farms from three different registries. Two of these are based on mandatory reporting to authorities, and one is a privately maintained registry. The accidents from the three registries are analyzed separately, and different types of characteristics are presented.
Results: The results demonstrate that fall and crush/impact are the most common types of accidents both on vessels and fish farms. Other characteristics described are the type of vessels involved and during which type of operations injuries happened. During the last 10years, fatalities have happened mainly in relation to lifting and maintenance operations. The reported accidents are discussed in relation to the quality of accident reports, the development in the industry towards more specialized and outsourced operations, and it points to some of the major challenges that the industry faces when planning for safe working places and operations.
Conclusion: This overview can be used in the fish farming industry as a basis for going into further details about how accident prevention should be planned.

Lesiones y muertes laborales en la piscicultura noruega

Se realizó un estudio sobre los factores y condiciones que influyen en la seguridad de las personas trabajadoras en la piscicultura noruega, debido a que hay gran cantidad de riesgos en su trabajo diario. Se recopilaron las lesiones y muertes notificadas en embarcaciones y piscifactorías de dos registros basados en la notificación obligatoria a las autoridades y un registro privado. Los resultados mostraron que las caídas y los aplastamientos/impactos eran los accidentes más comunes en buques y piscifactorías, y las muertes en los últimos 10 años han sido producidas principalmente por operaciones de elevación y mantenimiento. También se analizaron los retos principales del sector para planificar de forma segura los lugares de trabajo y operaciones. Se concluyó que este estudio sirve de base para planificar la prevención de accidentes en el sector de la piscicultura.

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TEMÁTICA	Accidentes y Enfermedades Laborales

ARTÍCULO 21: Understanding the Risks to Artisanal Fishers on Lake Victoria Using Design Methodstraduce

Objectives: The purpose of this study was to document, understand, and communicate the daily activities and associated risks faced by artisanal fishers working on Lake Victoria, Tanzania, in order to identify opportunities for intervention design.

Methods: Established human-centered design techniques were combined with drowning risk analysis to create a process that visually captured and analyzed the risks to fishers in two lakeside communities engaged in long-line fishing (mostly by day) and net fishing at night.

Results: Two visual journey risk maps were developed. One map detailed the long-line fishing process for larger fish like Tilapia and Nile Perch, while the other focused on seine net fishing for dagaa at night. Each journey map covered the "before," "during," and "after" stages of fishing activities. For long-line fishers, preparation began early in the morning, including food and equipment collection, launching the boat, and setting long lines at the fishing site. Risk scenarios, such as storms or boat capsizing, were identified, with fishers often relying on makeshift flotation devices. For seine net fishers, the journey began in the afternoon with preparatory tasks at the fishing camp. Night fishing required the deployment of solar lamps to attract fish, followed by net casting. Risk factors like boat collisions, crew fatigue, and engine failure were noted. Both groups identified common risks and discussions around these journey risk maps emphasized the need for holistic safety interventions, including access to accurate weather forecasts, buoyancy devices, and formal safety training. The participatory mapping approach enabled fishers to provide valuable insights into how risks can be mitigated.

Conclusion: Small-scale artisanal fishers working on Lake Victoria face significant drowning risks. The design-led co-creation of visual journey risk maps with fishers and drowning prevention experts allows a deep understanding of livelihood journeys and associated risks. Opportunities for risk mitigation and intervention design are presented visually. Further research combining other design tools with scientific analysis could highlight points where control measures can be most effectively implemented, but this must be documented, and its impact and effectiveness evaluated. Interventions suggested by the process will be co-created and evaluated for effectiveness.

Comprender los riesgos a los que se enfrentan los pescadores artesanales del lago Victoria mediante métodos de diseño	
Se realizó un estudio en el que se documentaron, comprendieron y comunicaron las actividades diarias y riesgos a los que se exponían los pescadores artesanales de dos comunidades ribereñas que trabajan en el lago Victoria (Tanzania). Se elaboraron dos mapas visuales de riesgo de viaje, que englobaban las etapas «antes», «durante» y «después» de las actividades pesqueras. Uno detalló la pesca con línea larga de peces más grandes (principalmente durante el día) y el otro se centró en pesca con redes de arrastre (durante la noche). Los resultados mostraron que para los pescadores con línea larga los riesgos identificados fueron tormentas o vuelcos de barco, y los pescadores solían depender de dispositivos de flotación improvisados. Para los pescadores con redes de arrastre los riesgos identificados fueron colisiones de barcos, fatiga de la tripulación y averías del motor. En ambos casos se evidenció la necesidad de intervenciones de seguridad como el acceso a previsiones meteorológicas precisas, dispositivos de flotación y formación oficial en seguridad. Se concluyó que los pescadores artesanales que trabajan en el lago Victoria sufrían importantes riesgos de ahogamiento.	
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TEMÁTICA	Accidentes y Enfermedades Laborales

ARTÍCULO 22: Health and Safety in U.S. Chesapeake Bay Oyster Aquaculture: A Qualitative Study

Objectives: Aquaculture seafood production exists on every inhabited continent. Small-scale, bivalve shellfish farming is a growing industry on the East Coast of the United States. Aquaculture workers in the US experience high injury and illness rates relative to the average worker, and many small-scale aquaculture operations are exempted from national injury and illness reporting requirements. Given current evidence of occupational safety and health (OSH) risks, planned industry expansion, and limited systematic OSH data collection from small aquaculture farms, it is critical to understand challenges and opportunities to promote worker safety and health on these operations.

Methods: We conducted in-depth interviews with nine oyster producers in Maryland (n=8) and Virginia (n=1) to document their perspectives on occupational safety and health (OSH) issues.

Results: Respondents reported various hazards and safety interventions spanning the hierarchy of controls. Many desired better access to safety training and interventions.

Conclusions: This study contributes to global efforts to improve safety and health in the fast-growing aquaculture sector. Like other developing aquaculture industries, Chesapeake Bay shellfish aquaculture producers face significant OSH challenges, with limited safety resources and guidance. Governmental industry development support should include funding for robust and industry-inclusive OSH surveillance and interventions, concentrating on the most effective hazard control measures, including elimination, substitution, and engineering controls.

Salud y seguridad en el cultivo de ostras en la bahía de Chesapeake (EE. UU.): un estudio cualitativo

La información sobre la seguridad y salud en el trabajo en las pequeñas explotaciones acuícolas es escasa, a pesar de ser un sector con altas tasas de lesiones y enfermedades en comparación con la media y de estar en crecimiento en la costa este de Estados Unidos. Además, muchas de sus operaciones están exentas de los requisitos de notificación de lesiones y enfermedades. En este estudio se realizaron entrevistas a nueve productores de ostras en Maryland (8) y en Virginia (1), que indicaron diversos peligros y su deseo de un mejor acceso a formación sobre seguridad e intervenciones en materia de prevención. Los resultados contribuyeron a mejorar la seguridad y salud en el sector de la acuicultura, concluyendo con la necesidad de tener apoyo gubernamental mediante financiación para vigilancia e intervenciones.

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TEMÁTICA	Seguridad y Salud General

ARTÍCULO 23: Fisher-Centric Methodology: Psychosocial Risks in Fishing Sector of Aotearoa NZ

Objective: Our paper focuses on the psychosocial risks faced by fishers in Aotearoa New Zealand, a sector with limited existing research on this topic. Using a culture-centered approach (CCA), we aimed to develop "voice infrastructure" to capture and present the voices of fishers, addressing the structural inequalities that can often leave fishers (like other marginalized groups) unheard. This paper focuses on the methodology of our pilot project that used a collaborative effort between academics, fishers, government, and non-government agencies, with the goal of understanding and mitigating the psychosocial risks within the commercial fishing industry.

Method: Phase 1 focused on building trust and personal relationships within the fishing community. We organized a day-long hui (meeting) in Nelson, a key fishing port, to facilitate open and flexible interactions. This setting allowed us to co-create the research design and instruments with the fishers, ensuring their perspectives were central to the study. The Copenhagen Psychosocial Risks Questionnaire (COPSOQ) was adapted in consultation with the fishers and piloted as survey (in phase 2) through a support network.

Results: Fishers acknowledged the need for wellbeing research and supported using the adapted COPSOQ. Data collection was inherently challenging in the fishing sector, due to the nature of the work with long shifts, limited communication, and minimal downtime. Trained mentors and counsellors administered the survey and ensured the process was fisher-centric and sensitive to their needs. Following data collection, a second hui (phase 3) was held to provide feedback to fishers about the survey results and review the process. This workshop aims to refine the methodology for potential national-scale implementation. The fishers emphasized the importance of sharing findings with them to ensure data accuracy before public reporting, aligning with the principles of CCA and co-creation of "voice infrastructures."

Conclusion: Our study demonstrates the feasibility and importance of using a culture-centered approach in the fishing sector. By involving fishers in every step of the process, we aimed to create a more accurate and comprehensive understanding of the psychosocial risks they face, ultimately contributing to their wellbeing and the sustainability of the industry.

Metodología centrada en los pescadores: riesgos psicosociales en el sector pesquero de Aotearoa (Nueva Zelanda)	
Se describió la metodología de un proyecto piloto para comprender y mitigar los riesgos psicosociales de los pescadores en Aotearoa (Nueva Zelanda) debido a la falta de información existente, contando con la colaboración de académicos, pescadores, organismos gubernamentales y no gubernamentales. Para ello, se realizó una reunión en un importante puerto pesquero (Nelson) para favorecer las relaciones y se creó el diseño y los instrumentos de la investigación. Se adaptó el Cuestionario de Riesgos Psicosociales de Copenhague consultando a los pescadores, usándose como encuesta para investigar el bienestar. Se realizó una segunda reunión donde se informó a dichos trabajadores sobre los resultados de la encuesta y se revisó el proceso. Estos resultados se compartieron para que fueran más exactos antes de divulgarlos públicamente, y así se perfeccionó la metodología para su posible aplicación a escala nacional. Se concluyó que para un conocimiento más preciso y completo de los riesgos psicosociales del sector pesquero hay que involucrar a los pescadores en todos los pasos del proceso para mejorar su bienestar y la sostenibilidad de la industria.	
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TEMÁTICA	Riesgo Salud Mental

ARTÍCULO 24: Occupational Health and Safety Concerns for Hookah Divers in Small-Scale Fisheries in the Gulf of California, Mexico

Objectives: This study aimed to evaluate the working and health conditions faced by hookah divers in small-scale fisheries in the Midriff Islands Region of the Gulf of California, Mexico.

Methods: The study was conducted in five fishing communities. A semi-structured questionnaire was administered to 113 fishers (~15% of the commercial divers in the region). Non-probabilistic snowball sampling was used to identify participants. Data were analyzed using descriptive statistics; a Chi-squared test was used to identify significant correlations.

Results: Most respondents (98%) were men (average age of 41years), with an average of 17.6years of commercial diving experience. Only 27% of the divers were certified scuba divers, and 40% had received some type of dive training. Notably, 64% of divers had some chronic illness, and 75% had suffered some type of diving-related injury. Marine animal bites were the most common type of injury. The majority of respondents (97%) fished without the proper permits, and 67% did not have access to social insurance. Lastly, 50% had suffered symptoms of decompression sickness.

Conclusion: The conditions surrounding the employment and health of hookah divers are extremely precarious in the Midriff Islands Region, as has been identified in other parts of the world. This study highlights the need to improve working conditions, implement appropriate training programs, and establish public policies that benefit the divers and the ecosystems upon which they depend.

Preocupaciones sobre seguridad y salud en el trabajo para los buzos de hookah en la pesca artesanal en el Golfo de California, México

Se realizó un estudio para evaluar las condiciones laborales y sanitarias de buzos de hookah en cinco comunidades de pesca artesanal en la región de las islas Midriff. Se evaluó mediante un cuestionario a 113 pescadores siendo el 98% hombres con una media de edad de 41 años y de 17,6 años de experiencia en buceo comercial. El 27% tenía certificación de buceo autónomo y el 40% había recibido alguna formación en buceo. Los resultados mostraron que el 64% de los buzos tenían alguna enfermedad crónica, el 75% alguna lesión relacionada con el buceo, siendo la mayoría mordeduras de animales marinos, y el 50% había sufrido síntomas de descompresión. Además, el 97% pescaba sin permisos y el 67% no tenía acceso a la seguridad social. Se concluyó que los buzos en esta región tenían unas condiciones laborales y de salud muy precarias, haciendo hincapié en la necesidad de mejorarlas mediante programas de formación y políticas públicas.

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TEMÁTICA	Seguridad y Salud General

ARTÍCULO 25: Assessment of Occupational Hazards and Role of Life-Saving Gadgets Among Small-Scale Motorised Fishers on India's Southernmost Coasts

Objective: Marine fishing ranks among the most hazardous occupations globally, with risks intensifying for small-sized vessels venturing deeper into the sea due to the scarcity of near-shore fish and high market demand. This study identifies various occupational hazards and the use of safety equipment among small-scale motorized fishers using traditional fishing methods in the southernmost coastal regions of India.

Methods: The primary data were collected from 253 artisanal small-scale motorized fishers through a multi-stage stratified random sampling method. For this purpose, a structured interview schedule, comprising both closed and open-ended questions was employed. The Relative Importance Index (RII) was utilized to compare fishers' perceived impact across various occupational hazard categories, while the frequency distribution of the adoption of life-saving gadgets across various adoption categories was analyzed based on the adoption rate to assess the usage patterns of available life-saving devices.

Results: The findings indicate environmental, psychological, and vessel-related hazards have the greatest impact on fishers, with specific hazards including "cyclones", "collisions", "capsizing", "high currents", "lack of visibility", "fatigue", "stress", "anxiety", and "insomnia". Despite awareness of safety measures, the usage of life jackets and life buoys remains low among fishers. Fishers in motorized crafts benefit from modern communication and navigation tools to mitigate sea-related uncertainties (Mobile phone – 84.19%, GPS – 87.75%, VHF radio – 67.98%, AIS – 20.16%).

Conclusion: The study highlights the urgent need for strict enforcement of safety measures during the registration and renewal processes for fishing vessels. Enhancing safety in this sector necessitates increased safety awareness, comprehensive training, and regular annual inspections.

Evaluación de los riesgos laborales y la función de los dispositivos de salvamento entre los pescadores motorizados a pequeña escala en las costas más meridionales de la India

Se realizó un estudio para identificar los riesgos laborales y el uso de equipos de seguridad de los pescadores de embarcaciones motorizadas pequeñas que usaban métodos de pesca tradicionales en las regiones costeras más meridionales de la India. Para ello, se realizaron entrevistas a 253 pescadores. Los resultados mostraron que los riesgos que más les afectaban eran los ciclones, colisiones, vuelcos, corrientes fuertes, falta de visibilidad, fatiga, estrés, ansiedad e insomnio. Además, el uso de chalecos y boyas salvavidas fue bajo, aunque conocían las medidas de seguridad. Las embarcaciones motorizadas contaban con modernas herramientas de comunicación y navegación para reducir las incertidumbres del mar, teniendo el 84,19% teléfono móvil, el 87,75% GPS, el 67,98% radio VHF y el 20,16% AIS. Se concluyó que en los procesos de registro y renovación de los buques pesqueros hay que aplicar las medidas de seguridad de forma que se incremente la concienciación, se imparta formación y se realicen inspecciones anuales.

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TEMÁTICA	Seguridad y Salud General

ARTÍCULO 26: Reports on Work-Related Injury and Diseases in Brazilian Aquaculture from Industry Participants

Aquaculture is a significant sector in Brazil, ranking as the second-largest aquaculture producer in the Latin American and Caribbean region. Despite its importance, the industry poses various risks to workers' health and safety. This study investigates the diseases and injuries prevalent in Brazilian aquaculture through a survey of stakeholders. Through an online questionnaire distributed from March 2021 to April 2022, the study collected data on work-related illnesses and injuries in aquaculture. Among the 38 valid responses, the majority of injuries occurred among male workers aged between 21 and 35 years-old. Common injuries included falls, animal-related incidents, cuts, punctures, and electrical shocks. Notably, two fatalities were reported, emphasizing the importance of safety measures in aquaculture operations. The findings underscore the need for preventive measures and worker and farmer awareness initiatives to mitigate risks in aquaculture. Moreover, the study emphasizes the collective responsibility of employers, authorities, government agencies, and workers in ensuring a safe work environment in aquaculture.

Informes sobre lesiones y enfermedades relacionadas con el trabajo en la acuicultura brasileña elaborados por participantes del sector

Se realizó un estudio para investigar las principales enfermedades y lesiones en la acuicultura brasileña, al tratarse de un sector con numerosos riesgos para la seguridad y salud de las personas trabajadoras. Se evaluó mediante una encuesta en línea entre marzo de 2021 y abril de 2022, obteniendo 38 respuestas válidas. Los resultados mostraron que la mayoría de las lesiones eran en hombres de entre 21-35 años, siendo las más comunes por caídas, incidentes con animales, cortes, pinchazos y descargas eléctricas, además de dos accidentes mortales. Se concluyó que para mitigar los riesgos en la acuicultura son necesarias las medidas preventivas, así como la responsabilidad por parte de las personas trabajadoras, empleados, autoridades y organismos gubernamentales.

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TEMÁTICA	Seguridad y Salud General

SAFETY SCIENCE

ARTÍCULO 27: Physical load assessment of greenhouse cucumber farmers using OWAS and RULA methods

Work-related musculoskeletal disorders (MSDs) are very common in the agricultural sector because most tasks are manual. This study attempts to analyse the forced postures and repetitive movements in greenhouse cucumber workers. Two semi-quantitative assessment methods (Ovako Working Analysis System and Rapid Upper Limb Assessment) were used following an exhaustive field analysis of the work. The results indicate the need to avoid continuous back flexion, leg flexion and arm elevation. The tasks with the highest risk of MSDs are T1 (transplant furrow) and T4 (planting seedlings), which carry a 46% and 72% level-3 risk, respectively. Postural training for workers, mechanising tasks, and improving their physical state could reduce the risk of MSD.

Evaluación de la carga física de los agricultores que cultivan pepinos en invernaderos utilizando los métodos OWAS y RULA

Se realizó un estudio para analizar las posturas forzadas y los movimientos repetitivos de las personas trabajadoras que cultivan pepinos en invernaderos. Se evaluó mediante dos métodos, el método OWAS (Ovako Working Analysis System) y el método RULA (Rapid Upper Limb Assessment). Los resultados mostraron que las tareas con mayor riesgo (nivel 3) de trastornos musculoesqueléticos (TME) eran realizar el surco para trasplante con el 46% y la plantación con el 72%. Concluyendo que era necesario evitar la flexión continua de la espalda, la flexión de las piernas y la elevación de los brazos, y que se podía reducir el riesgo de TME con la mecanización de tareas, entrenamiento postural y mejora del estado físico de las personas trabajadoras.

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TEMÁTICA	Riesgo Físico

ARTÍCULO 28: Accident prevention in agricultural machinery using radiofrequency technology: A prototype application to olive net collectors

Machine related injuries and fatalities are a major concern across industries. Furthermore, machine safety in the agriculture sector is critical due to the high-risk nature of agricultural work, which often involves heavy machinery and equipment. This study investigates radiofrequency systems designed to improve worker safety when operating olive net collectors and similar machinery. An RFID prototype safety device with IoT capabilities was developed and tested. The study also provides an overview of inductive coupling antennas, including a design methodology that consider various shapes. MATLAB code is provided as supplementary material to this paper for calculating inductance, a key parameter of inductive coupling antennas. A custom 3D antenna based on a rectangular shape was designed an integrated with an olive net collector. The entire system was evaluated using a robotic approach, and a set of statistics was obtained to assess its performance. The conducted tests demonstrate that the developed prototype effectively sends an emergency stop signal and serves as a safety barrier, highlighting its potential benefits.

Prevención de accidentes en maquinaria agrícola mediante tecnología de radiofrecuencia: Una aplicación piloto en recolectores de redes para olivos

Se realizó un estudio para investigar el uso de los sistemas de radiofrecuencia para mejorar la seguridad de las personas trabajadoras al operar con recolectores de olivos y maquinaria similar, debido a que en el sector agrícola el uso de maquinaria y equipos pesados implica un alto riesgo. Para ello, se desarrolló un prototipo de dispositivo de seguridad que usaba la identificación por radiofrecuencia (RFID) con capacidad IoT y se ofreció una visión global de las antenas de acoplamiento inductivo proporcionando un código MATLAB para calcular la conductancia. Se diseñó una antena 3D con forma rectangular que se integró en un recolector de olivos. Todo este sistema se evaluó con un enfoque robótico y para evaluar su rendimiento se obtuvo un conjunto de estadísticas. Se concluyó que el prototipo desarrollado envió de forma eficaz una señal de parada de emergencia, sirviendo como barrera de seguridad.

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TEMÁTICA	Vehículos y Maquinaria Agrícola

ARTÍCULO 29: Technical design requirements of a safety reasoning module for run-time risk reduction in Highly Automated Off-road Mobile Machinery

Highly automated off-road mobile machinery requires reliable safety systems to mitigate work- place risks, particularly when operating in close collaboration with human actors. With the ad- vent of automation, the operator's role has shifted to that of a supervisor, intervening only during event-based scenarios. This supervisor may be situated either in the cabin or remotely, overseeing multiple machines. This article explores the technical design requirements and feasibility of a safety reasoning module (SRM) through a targeted use case involving the automation of a cut-to-length tree harvester. Specifically, it examines the automation of the log-feeding process required for stem inspection. The SRM's primary function is to achieve adequate risk reduction while preserving the supervisor's capacity for effective event-based intervention, thereby supporting a compelling safety case for maintaining a safe operational state at runtime. Currently, the supervisor plays a crucial role in the stem inspection process, requiring cabin presence which adds to the burden placed on required minimum risk reduction and event-based intervention. In the context of this evaluation the realisation of the SRM's requirements for achieving the necessary risk reduction while conforming to Machine Safety standards indicates it is constrained by limitations in existing hardware and software capabilities. Despite these limitations, this use case outlines a structured approach for developing SRMs for highly automated off-road machin- ery. While achieving the desired risk reduction may not be feasible in this specific scenario, the findings provide valuable insights that can guide the development of SRMs in other applications where similar challenges arise.

Requisitos técnicos de diseño de un módulo de razonamiento de seguridad para la reducción del riesgo en tiempo real en maquinaria móvil altamente automatizada para entornos fuera de carretera

Se realizó un estudio para investigar los requisitos técnicos de diseño y la viabilidad de un módulo de razonamiento de seguridad (SRM) en la automatización de una cosechadora de árboles, debido a que la automatización de la maquinaria con sistemas de seguridad fiables implica una reducción de los riesgos laborales al pasar el operador a ser un observador. La función principal del SRM fue reducir el riesgo a la vez que preservó la capacidad del supervisor para intervenir en caso de incidentes. Los resultados mostraron que al realizar los requisitos del SRM para reducir los riesgos a la vez que cumplía con las normas de seguridad de la maquinaria suponía una limitación por las restricciones del hardware y software, pero incluso con estas limitaciones se mostró un enfoque estructurado para desarrollar el SRM para la maquinaria automatizada para entornos fuera de carretera. Se concluyó que se proporcionó información importante para orientar el desarrollo de un SRM en otras aplicaciones con retos similares.

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AGRICULTURE-BASEL

ARTÍCULO 30: First Results of a Study on the Vibrations Transmitted to the Driver by an Electric Vehicle for Disabled People During Transfer to a Farm

This study evaluates the safety aspects of a prototype electric vehicle designed to enable wheelchair users to independently perform simple farm tasks in rural settings, like sample collection and crop monitoring. The vehicle, built at CREA, features four in-wheel electric motors, a pneumatic suspension system, and a secure wheelchair anchoring system. Tests at the CREA experimental farm assessed the vehicle's whole-body vibrations on different surfaces (asphalt, headland, dirt road) using two tyre models and multiple speeds. A triaxial accelerometer on the wheelchair seat measured vibrations, which were analysed in accordance with ISO standards. Frequency analysis revealed significant vibrations in the 2–40 Hz range, with the Z-axis consistently showing the highest accelerations, which increased with the speed. Tyre A generally induced higher vibrations than Tyre B, likely due to the tread design. At high speeds, the effective accelerations exceeded safety thresholds on asphalt and headland. Statistical analysis confirmed speed as the dominant factor, with the surface type also playing a key role—headland generated the highest vibrations, followed by dirt road and asphalt. The results of these first tests highlighted the high potential of the vehicle to improve the agricultural mobility of disabled people, granting safety conditions and low vibration levels on all terrains at speeds up to 10 km h^{-1}. At higher speeds, however, the vibration levels may exceed the exposure limits, depending on the irregularities of the terrain and the tyre model. Overcoming these limitations is achievable through the optimization of the suspensions and tyres and will be the subject of the next step of this study. This technology could also support wheelchair users in construction, natural parks, and urban mobility.

Primeros resultados de un estudio sobre las vibraciones transmitidas al conductor por un vehículo eléctrico para personas con discapacidad durante el traslado a una granja

Se realizó un estudio para evaluar la seguridad de un prototipo de vehículo eléctrico diseñado en el CREA para que los usuarios de sillas de ruedas puedan llevar a cabo tareas agrícolas en entornos rurales como recoger muestras y supervisar los cultivos. El vehículo contaba con cuatro motores eléctricos en las ruedas, sistema de suspensión neumática y sistema de anclaje para la silla de ruedas. En la granja experimental se evaluaron las vibraciones del vehículo transmitidas al cuerpo del conductor en distintas superficies (asfalto, terreno elevado y camino de tierra) con dos modelos de neumáticos (A y B) y varias velocidades. Los resultados mostraron vibraciones significativas que aumentaban a mayor velocidad. El neumático A tuvo vibraciones más altas que el B por el diseño de su banda de rodadura. A altas velocidades, las aceleraciones superaron los límites de seguridad en asfalto y terreno elevado. La velocidad y el tipo de superficie fueron factores determinantes, las vibraciones más elevadas fueron en terreno elevado, seguido de camino de tierra y asfalto. Se concluyó que el vehículo tenía un gran potencial para mejorar la movilidad agrícola de personas con discapacidad cumpliendo con las condiciones de seguridad y bajos niveles de vibración en todas las superficies a una velocidad máxima de 10 Km/h, pero para una mayor velocidad los niveles de vibración podían superar los umbrales de seguridad según el tipo de superficie y de neumático.

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TEMÁTICA	Vehículos y Maquinaria Agrícola

ARTÍCULO 31: Automatic Vibration Balancing System for Combine Harvester Threshing Drums Using Signal Conditioning and Optimization Algorithms

The threshing drum, a core component in combine harvesters, experiences significant unbalanced vibrations during high-speed rotation, leading to severe mechanical wear, increased energy consumption, elevated noise levels, potential safety hazards, and higher maintenance costs. A primary challenge is that excessive interference signals often obscure the fundamental frequency characteristics of the vibration, hampering balancing effectiveness. This study introduces a signal conditioning model to suppress such interference and accurately extract the unbalanced quantities from the raw signal. Leveraging this extracted vibration force signal, an automatic optimization method for the balancing counterweights was developed, solving calculation issues inherent in traditional approaches. This formed the basis for an automatic balancing control strategy and an integrated system designed for online monitoring and real-time control. The system continuously adjusts the rotation angles, θ_1 and θ_2, of the balancing weight disks based on live signal characteristics, effectively reducing the drum's imbalance under both internal and external excitation states. This enables a closed loop of online vibration testing, signal processing, and real-time balance control. Experimental trials demonstrated a significant 63.9% reduction in vibration amplitude, from 55.41 m/s^2 to 20.00 m/s^2. This research provides a vital theoretical reference for addressing structural instability in agricultural equipment.

Sistema automático de equilibrado de vibraciones para tambores de trilla de cosechadoras mediante acondicionamiento de señales y algoritmos de optimización

Se realizó un estudio de un modelo de acondicionamiento de señal destinado a suprimir las señales de interferencia excesivas que ocultaban las características de frecuencia fundamental de las vibraciones procedentes del tambor de trilla de las cosechadoras al rotar a alta velocidad, ya que generaba desgaste mecánico, mayor consumo de energía, altos nivel de ruido, riesgos para la seguridad y mayor coste de mantenimiento. Además, se desarrolló un método automático de optimización de los contrapesos de equilibrado. Se empleó como base para una estrategia de control automático de equilibrado y un sistema de monitoreo en línea y control en tiempo real. Los resultados mostraron una reducción del 63,9% de la amplitud de la vibración, de forma que sirvió como referencia teórica para afrontar la inestabilidad estructural de la maquinaria agrícola.

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WORKPLACE HEALTH & SAFETY

ARTÍCULO 32: Effect of Dairy Farm Supervisor Leadership Training on Workplace Safety Climate

Background: Assessment of workplace safety climate is a recognized approach to assess safe culture in an organization. We developed, implemented, and evaluated a 12-module safety leadership and management e-learning training program tailored for front-line dairy farm supervisors and hypothesized that such a training program would have a positive effect on occupational safety climate.
Methods: We enrolled 103 dairy farm supervisors from 35 U.S. farms to participate in a 12-module dairy leadership training program. We assessed safety climate change among supervisors and their workers using a pre-post training intervention methodology. A 24-item, 8-factor safety climate survey was developed and completed pre- and post-training by 65 supervisors and 313 (pre) and 238 (post) workers under their supervision.
Findings: Significant improvements were seen on the 14-item supervisor safety climate scale, the 10-item group safety climate scale, and subscales regarding safety priority, empowerment, and dealing with conflicts. No significant improvements were seen for the factor regarding leaders encouraging workers to report safety incidents, as these were already rated highly.
Conclusions: Findings suggest safety leadership e-learning training among dairy farm supervisors can result in positive safety climate change among supervisors and subordinate workers.
Application to Practice: This study provides a framework for researchers, safety professionals, and training developers for the successful implementation of a safety leadership training program, and its effect on safety climate. Additional research is needed on the effectiveness and sustainability of safety leadership training in high-risk industrial sectors such as agriculture.

Efecto de la formación en liderazgo para supervisores de granjas lecheras sobre el clima de seguridad en el lugar de trabajo	
Se realizó un programa de formación online de 12 módulos sobre liderazgo y gestión de la seguridad para 103 supervisores de 35 granjas lecheras estadounidenses y se evaluó el cambio en el clima de seguridad laboral entre los supervisores y sus personas trabajadoras. Se realizó, antes y después del programa, una encuesta de 24 ítems y 8 factores a 65 supervisores y a 313 (antes) y 238 (después) personas trabajadoras bajo su supervisión. Los resultados mostraron mejoras en las escalas de clima de seguridad de los supervisores de 14 ítems y del grupo de 10 ítems y en las subescalas de la prioridad de la seguridad, empoderamiento y gestión de conflictos. Por el contrario, no hubo mejoras en promover el aviso de incidentes de seguridad por las personas trabajadoras, debido a que ya contaban con una puntuación elevada desde el principio. Se concluyó que este programa para supervisores de explotaciones lecheras implicó un cambio positivo en el clima de seguridad entre los supervisores y las personas trabajadoras.	
AUTORES	David I. Douphrate, Anabel Rodriguez, Pete Kines, Amir Hossein Javid
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TEMÁTICA	Formación

ARTÍCULO 33: Safety Leadership Training: Implementation and Effectiveness Evaluation in the Dairy Farm Industry

Background: Evidence-based interventions for the prevention of safety incidents at work are most effective when they include a focus on the hierarchy of controls. However, prior studies addressing the effects of safety leadership and safety climate are limited. The determination and adoption of evidence-based interventions specifically in the U.S. Agricultural, Forestry, and Fishing (AgFF) sector can be a challenge, and prior studies have shown a paucity of evidence-based occupational safety and health practices in the AgFF sector.

Methods: We enrolled 73 dairy farm supervisors from 27 U.S. farms to participate in a 12-module dairy leadership training program. We employed the Kirkpatrick Model (KM) to evaluate different levels of training effectiveness.

Findings: Participant reactions to the program were positive (KM level 1), and evaluation of knowledge gained among participants revealed 90% had learned new safety leadership information (KM level 2) that could be applied in their role as a dairy farm supervisor (KM level 3). Nearly 88% reported favorable experiences during their training participation. Post-training group interviews with supervisors (n=21) provided information regarding training experiences and constructive feedback regarding opportunities for training improvement. Behavior change evaluation revealed nearly 50% of observed safety hazards on farms were related to livestock handling (21.6%), trips/falls (17.1%), and moving machinery (10.4%). The largest percentage of observed workplace conflicts were verbal (27.8%).

Conclusions/Application to Practice: The application of the Kirkpatrick Model of training evaluation suggests participating dairy farm supervisors had positive experiences with the training program, and acquired safety hazard and workplace conflict identification skills.

Formación en liderazgo en materia de seguridad: implementación y evaluación de la eficacia en el sector de las explotaciones lecheras

Se realizó un programa de formación de liderazgo en explotaciones lecheras formado por 12 módulos. Participaron un total de 73 supervisores de 27 granjas lecheras estadounidenses. Se aplicó el Modelo de Evaluación de Kirkpatrick para estudiar su efectividad. Los participantes reaccionaron positivamente al programa, el 90% aprendió nueva información de liderazgo en seguridad que podían aplicarla en su función como supervisores y el 88% tuvo experiencias positivas durante su formación. Las entrevistas grupales a los supervisores tras el programa proporcionaron información sobre las experiencias de formación y comentarios de mejora. Los resultados mostraron que casi el 50% de los riesgos de seguridad eran consecuencia del manejo del ganado, tropiezos/caídas y maquinaria en movimiento, y la mayoría de los conflictos en el lugar de trabajo fueron verbales. Concluyendo que el programa mostró experiencias positivas para los supervisores y ampliaron sus habilidades para identificar riesgos de seguridad y conflictos en el lugar de trabajo.

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TEMÁTICA	Formación

SAFETY

ARTÍCULO 34: Perceived Working Conditions and Intention to Adopt Digital Safety Training in High-Risk Productive Sectors: An Exploratory Study in Manufacturing and Agriculture in Northwest Italy

Agriculture and manufacturing report the highest rate of occupational accidents and fatalities in Italy. Safety training provided through digital devices has been shown to be effective in promoting safety behaviors at work. This study aimed to investigate through a questionnaire the perceptions of working conditions, risks in using machines, and interest in using digital devices for safety training purposes in a group of vineyard workers (VWs, N = 40) and manufacturing workers (MWs, N = 39) in Northwest Italy. Referring to working conditions, VWs significantly differ compared to MWs ($p < 0.05$) in fatigue perception, repetitiveness, quantity and definition of tasks compared to the available time, work pace definition, and level of communication. Tractors and lathes were considered the most hazardous machinery for VWs and MWs, respectively. For both groups, workers' age negatively correlated with digital device use ($r = -0.399$ $p < 0.05$ for VWs, $r = -0.673$ $p < 0.01$ for MWs) but not with interest in using them. Device adoption positively correlated with the perceived importance of gamification content ($r = 0.193$ and $r = 0.164$, $p > 0.05$ for VWs and MWs, respectively), but the video lessons reported a higher mean score by both groups as preferred content. These findings suggest that digital safety training requires customized content to effectively adapt to different productive sectors.

Condiciones laborales percibidas e intención de adoptar la formación digital en seguridad en sectores productivos de alto riesgo: un estudio exploratorio en la industria manufacturera y la agricultura del noroeste de Italia

Se realizó un estudio para investigar las percepciones de las condiciones de trabajo, riesgos del uso de maquinaria e interés en usar dispositivos digitales para formarse en seguridad en el sector agrícola y en la industria manufacturera en Italia. Se realizó un cuestionario a 40 personas trabajadoras del sector vitivinícola y 39 del sector manufacturero. Los resultados mostraron que las condiciones de trabajo de las personas trabajadoras del sector vitivinícola diferían de las del sector manufacturero en la percepción de la fatiga, repetitividad, cantidad y definición de las tareas respecto al tiempo disponible, ritmo de trabajo y nivel de comunicación. La maquinaria más peligrosa para el sector vitivinícola eran los tractores y para el sector manufacturero los tornos. La edad de las personas trabajadoras para ambos sectores se correlacionó negativamente respecto al uso de dispositivos digitales, pero no respecto al interés en su uso. Se resaltó la importancia de contenido gamificado y las lecciones en vídeo se especificaron como contenido favorito. Se concluyó que la formación en seguridad a través de dispositivos digitales necesita contenidos personalizados para cada sector productivo.

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TEMÁTICA	Formación

ARTÍCULO 35: Investigating Awareness of Pesticide Exposure as a Risk Factor for Parkinson's Disease and Uptake of Exposure-Mitigating Behaviour in Farming Communities in Ireland

Parkinson's disease (PD) is an age-related neurological disorder with increasing incidence and modifiable risk factors. People exposed to pesticides have up to a 2-fold higher risk of developing PD. Use of personal protective equipment (PPE) when using pesticides can lower an individual's exposure. We examined awareness of the relationship between pesticides and PD risk in individuals working/living on farms in Ireland. We also investigated the practice of behaviours aimed at mitigating exposure, such as using PPE. An online survey was completed by a sample of the farming community (n = 707) attending agricultural fairs, and included demographics, lifetime/current residence/work on farms, pesticide contact, PPE use, PD diagnosis, and awareness of pesticide–PD association. Among participants, 51% worked/lived on farms and 62% reported contact with pesticides. Only 69% of those with pesticide contact reported using PPE, with gloves (57%) and masks (50%) most commonly used. Only 22% were aware of an association between PD and pesticides, and awareness did not increase PPE use. Among people with PD, only 40% had knowledge of the risk. We found that in a highly agricultural economy, occupational exposure to pesticides is common, but mitigation behaviours are not optimal. Educational campaigns to improve awareness of health risks from pesticides and to encourage PPE use could lower the personal and healthcare burden of PD and other health outcomes.

Investigación sobre la concienciación acerca de la exposición a tratamientos fitosanitarios como factor de riesgo para la enfermedad de Parkinson y la adopción de comportamientos que mitigan la exposición en comunidades agrícolas de Irlanda

Se realizó un estudio para evaluar la relación entre tratamientos fitosanitarios y el riesgo de sufrir la enfermedad de Parkinson en personas trabajadoras o que vivían en granjas de Irlanda y se investigaron las prácticas para evitar la exposición a dichos tratamientos, como el uso de equipos de protección individual (EPI). Se evaluó con una encuesta en línea a 707 personas de la comunidad agrícola que asistían a ferias de este sector, preguntando datos demográficos, residencia o trabajo actual y anterior en entorno agrícola, contacto con tratamientos fitosanitarios, uso de EPI, diagnóstico de Parkinson y conocimiento de la relación entre los tratamientos fitosanitarios y el Parkinson. Los resultados mostraron que el 51% trabajaba o vivía en entornos agrícolas y el 62% había estado en contacto con tratamientos fitosanitarios. Solamente el 69% de los participantes que habían tenido contacto con estos productos había usado EPI y el 22% conocía la relación entre los tratamientos fitosanitarios y el Parkinson (no teniendo como resultado un aumento en el uso de EPI). Entre los que sufrían Parkinson, solo el 40% estaba informado del riesgo. Se concluyó que la exposición a tratamientos fitosanitarios en una economía agrícola es muy frecuente, pero las medidas para mitigarla son insuficientes. Se indica la necesidad de campañas educativas y el fomento del uso de los EPI.

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TEMÁTICA	Tratamientos Fitosanitarios

ARTÍCULO 36: FRAM-Based Safety Culture Model for the Analysis of Socio-Technical and Environmental Variability in Mechanised Agricultural Activities

Mechanised agricultural operations are often performed individually, under minimal supervision and across a wide range of unfavourable working conditions, resulting in a complex mixture of hazards and external stressors that severely affect safety conditions. Socio-technical and environmental constraints significantly affect safety culture and require continuous performance adjustments to overcome timing pressures, resource limitations, and unstable weather conditions. This study introduces a FRAM-based safety culture model that embeds the thoroughness-efficiency trade-off (ETTO) in four distinct operational modes that adhere to specific safety cultures, namely, thoroughness, risk awareness, compliance, and efficiency. This model has been instantiated for mechanised ploughing: foreground task functions were coupled with background functions that represent socio-technical constraints and environmental variability, while severity classes for potential incidents were derived from the US OSHA accident database. The framework was also supported by a semi-quantitative Resonance Index based on severity and coupling strength, the Total Resonance Index (TRI), to assess how variability propagates in foreground functions and to identify hot-spot functions where small adjustments can escalate into high resonance and hazardous conditions. Results showed that the negative effects on functional resonance generated by safety detriment on TRI observed between compliance and effective working modes were three times larger than the drift between risk awareness and compliance, demonstrating that efficiency comes with a much higher cost than keeping safety at compliance levels. Extending the proposed approach with quantitative assessments could further support the management of socio-technical and environmental drivers in mechanised farming, strengthening the role of safety as a competitive asset for enhancing resilience and service quality.

Modelo de cultura de seguridad basado en FRAM para el análisis de la variabilidad sociotécnica y ambiental en las actividades agrícolas mecanizadas

Las operaciones agrícolas mecanizadas implican una combinación de riesgos y factores de estrés que afectan a las condiciones de seguridad. Por ello, se realizó un estudio de un modelo de cultura de la seguridad basado en FRAM, incorporando la relación entre exhaustividad y eficiencia en cuatro modos operativos (exhaustividad, conciencia del riesgo, cumplimiento y eficiencia). Se aplicó al arado mecanizado de forma que las funciones en primer plano se combinaron con las del segundo plano que constituían limitaciones sociotécnicas y variabilidad ambiental, las clases de gravedad de los incidentes se adquirieron de la base de datos de accidentes de la OSHA de Estados Unidos y se empleó el índice total de resonancia que evaluó la propagación de la variabilidad en las funciones de primer plano e identificó las funciones críticas donde pequeños ajustes pueden dar lugar a una alta resonancia y condiciones peligrosas. Cuando se prioriza eficiencia/trabajo efectivo antes que cumplimiento de seguridad, los problemas (indicados por el índice total de resonancia) son tres veces más graves que cuando hay una pequeña diferencia entre conciencia de riesgos y cumplimiento. Utilizar evaluaciones cuantitativas junto con este enfoque podría ayudar en mayor medida a la gestión de los factores sociotécnicos y ambientales en la agricultura mecanizada.

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TEMÁTICA	Seguridad y Salud General

ARTÍCULO 37: Occupational and Nonoccupational Chainsaw Injuries in the United States: 2018–2022

Chainsaws are widely used in various occupational settings, including forestry, landscaping, farming, and by homeowners for tasks like tree felling, brush clearing, and firewood cutting. However, the use of chainsaws poses significant risks to operators and bystanders. This research quantified and compared occupational and nonoccupational injuries caused by contact with chainsaws and related objects during the period from 2018 to 2022. The emergency department and OSHA (Occupational Safety and Health Administration) data were used to characterize the cause and nature of the injuries. Results suggest that for this five-year period an estimated 127,944 people were treated in U.S. emergency departments for chainsaw-related injuries. More than 200 non-fatal and 57 fatal occupational chainsaw-involved injuries were found during the same period. Landscaping and forestry were the two industries where most of the occupational victims were employed. Upper and lower extremities were the most likely injured body parts, with open wounds from cuts being the most common injury type. The majority of fatal injuries were caused by falling objects such as trees and tree limbs while using a chainsaw. Our suggestions to reduce injuries include proper training and wearing personal protective equipment, as well as making sure any bystanders are kept in a safety zone away from trees being cut.

Lesiones laborales y no laborales causadas por motosierras en los Estados Unidos: 2018-2022

Se realizó una investigación para cuantificar y comparar las lesiones laborales y no laborales originadas por el uso de motosierras y objetos relacionados entre 2018 y 2022 en Estados Unidos, debido a que su uso es muy amplio en entornos laborales como la agricultura, silvicultura, jardinería y por propietarios de viviendas para tala de árboles. Se usaron los datos de servicios de urgencias y la OSHA (Administración de Seguridad y Salud Laboral) para conocer la causa y naturaleza de las lesiones. Los resultados mostraron que, durante esos cinco años, 127944 personas fueron atendidas por lesiones relacionadas con motosierras. Se registraron más de 200 lesiones laborales no mortales y 57 mortales relacionadas con estos equipos en el mismo período. Las extremidades superiores e inferiores del cuerpo fueron las que tuvieron mayores lesiones, siendo las más comunes heridas por cortes. La mayoría de los accidentes mortales fueron por caída de árboles o ramas durante el uso de la motosierra. Se concluyó que para reducir las lesiones se necesitaba formación, uso de equipos de protección individual y mantener una zona de seguridad alejada de la tala para los peatones.

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TEMÁTICA	Vehículos y Maquinaria Agrícola