



LANDSKAP TRÄDGÅRD JORDBRUK

Rapportserie



HEALTH AND SAFETY IN AGRICULTURE

Nordic and world-wide perspectives

Nordic Meeting on Agricultural Occupational Health and Safety

Ystad Saltsjöbaden, Ystad, Sweden, August 27 – 29, 2012

Arbetsvetenskap, Ekonomi och Miljöpsykologi (AEM), SLU Alnarp

Sveriges lantbruksuniversitet

Fakulteten för landskapsplanering, trädgårds- och jordbruksvetenskap

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Nordic Meeting on Agricultural Occupational Health & Safety 2012
August 27-29, 2012 Ystad, Sweden

Editor: Peter Lundqvist

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Welcome to Ystad, Sweden and the 2012 Nordic Meeting

We are delighted to welcome you to the 2012 Nordic Meeting on Agricultural Occupational Health and Safety which is held at Ystad Saltjöbaden, Ystad, in the very south of Sweden.

This Nordic meeting is organized every second year in one of the Nordic countries and this year it is hosted by the Swedish Committee on Working Environment in Agriculture and the Swedish University of Agricultural Sciences in Alnarp.

The theme of the meeting this year is “*Health and Safety in Agriculture – Nordic and world-wide perspectives*” (with a focus on the modern type of agriculture) – to underline the importance of working together across the borders of organizations, authorities, countries and continents. We all need to collaborate and learn from each other to improve and further develop the working conditions in agriculture and close-related sectors.

Wishing you great days here in Ystad & Skåne – the very south of Sweden!

Peter Lundqvist

Chair of the 2012 Nordic Meeting

Professor in Work Science at SLU Alnarp

Chair of the Swedish Committee on Working Environment in Agriculture (LAMK)



Sponsors

- The Royal Swedish Academy of Agriculture of Agriculture and Forestry (www.ksla.se)
- The Swedish Committee on Working Environment in Agriculture (LAMK) (<http://lantbruketsarbetsmiljo.slu.se/>)
- The Swedish University of Agricultural Sciences, Faculty of Landscape Planning, Horticulture and Agricultural Sciences, Alnarp (www.slu.se/en/faculties/ljt/)
- The Swedish University of Agricultural Sciences, Department of Work Science, Business Economics and Environmental Psychology, Alnarp (<http://www.slu.se/aem>)
- DeLaval (<http://www.delaval.com/>)

Practical information

Location & transports

Hotel Ystad Saltsjöbad, Saltsjöbadsvägen 15, 271 39 Ystad, Sweden
Phone: +46 (0)411-136 30, Fax: +46 (0)411-555 835, e-mail: info@ysb.se,
Home page: <http://www.ysb.se/>

With car you can reach Ystad from anywhere in South Sweden within 2,5 hours. The train station, terminals for continental ferries and ferries to Bornholm is only 5 minutes away from Ystads Saltsjöbad. Info with map: http://www.ysb.se/om_oss/vagbeskrivning/

By plane: Stockholm – Sturup airport 1 hour

By ferry: Swinoujscie, Poland 9 hours, Bornholm 80 minutes

By train: Gothenburg 4 hours, Malmö 50 minutes, Copenhagen 1,5 hour,
Kastrup/Copenhagen Airport 1 hour

By car/taxi: Malmö/Lund 45-50 min, Copenhagen airport 1 hour, Sturup airport 25 minutes

Taxi companies in Ystad: a) Taxi Ystad, phone: 0411-72000, b) Taxi Kurir, phone: 0411-17090
or c) Sydbuss, phone: 0411-17090 (all of these are good and reliable)

Walking distance from the center of Ystad (& railway station) to the Conference hotel is about 2 km (20-25 minutes).

The conference fee

An invoice of the conference fee should have reached your office before the start of the meeting.

The hotel costs

You are responsible of paying for your room and your stay at the hotel when you are checking out.

Contact with the conference organizers

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Proceedings

Proceedings are available, both in print and in digital form.

Program of the Nordic Meeting 2012

Monday, August 27

09.00-12.00 **Registration**

09.30-12.00 **Dairy Consortium meeting (Room: Picnic)**

12.00-13.00 **Lunch**

13.00-14.15 **Official Opening Session (Room: Bolsa Beach – all day)**

- Swedish University of Agricultural Sciences, **Håkan Schroeder**
- Ministry for Rural Affairs, **Ulrika Rinman**
- Swedish Work Environment Authority, **Håkan Olsson**
- Federation of Swedish Farmers, **Åsa Odell**
- Swedish Committee on Working Environment in Agriculture, **Peter Lundqvist**

14.15 **Break with coffee, refreshments & poster viewing**

14.45 **Key note speaker**

Development of an action plan to improve health and safety outcomes in the New Zealand agriculture sector, **Kelly Hanson-White**, Senior Policy Advisor, Department of Labour, New Zealand

15.30 **Nordic perspectives**

- Safe Farmers Common Sense - a Swedish campaign to reduce accidents , **Anders Danielson**, Sweden
- Landbrukets HMS-tjeneste in Norway –what’s new?, **Anne Marie Heiberg**, Norway
- Farmers Occupational Health Services (FOHS) in 2010 in Finland, **Birgitta Kinnunen**, Finland
- Fatal accidents in Danish agriculture for the last 10 years and a short presentation of some initiatives directed at the farmers, **Helle Birk Domino**, Denmark

16.50 **Short break**

17.00-18.20 **Migrant workers in Nordic agriculture**

- Knowledge compilation on migrant workers in the green sector, **Måns Svensson**, Sweden
- Factors affecting occupational safety and health of Nordic foreign farm workers, **Anne Marie Heiberg**, Norway
- Eastern European migrant workers in agriculture and construction, minimizing the risk of accidents, **Elsebet Frydendal Pedersen**, Denmark
- Migrant workers in Swedish agriculture - attitudes, possibilities and challenges, **Catharina Alwall Svennefelt**, Sweden

19.00 **Busses leaves at the entrance of the hotel**

19.15 - **Evening at the “Bryggeriet Restaurant & Pub” in Ystad (<http://www.restaurangbryggeriet.nu>)**

Tuesday, August 28

07.30-08.30 **Registration**

08.00-09.30 **World-wide perspectives (Room: Bolsa Beach)**

- The ILO "Code of Practice on Safety & Health in Agriculture" - what is it?
Paul Gunderson, USA
- The ILO "Code of Practice on Safety & Health in Agriculture" – farm worker perspectives, **Anja Westberg**, Sweden
- Tracing new occupational diseases in agriculture, **Gert van der Laan**, The Netherlands
- Recent trends in farm injuries in Ireland, **John McNamara**, Ireland
- Occupational exposures of fishermen in North Atlantic fisheries, **Ann Backus**, USA

09.30 **Break with coffee, refreshments & poster viewing**

10.00-12.00 **Concurrent Sessions (Rooms to be announced)**

Session	Ergonomics & musculoskeletal disorders	Age, gender & management	Air quality & health	Injuries & injury prevention
10.00	The Dutch chain approach - Ergonomics for young agricultural workers A.A.C.J. de Rooij , Netherlands	Why work farmers beyond 65?, Kerstin Nilsson , Sweden	Mould and farming, the past, the present and recent advances Wijnand Eduard , Norway	Licensing quad bike riders on New Zealand farms, Grant Hadfield , New Zealand
10.20	Ergonomic exposures of posture and muscle activity among US large herd dairy parlor workers, David Douphrate , USA	Older farmers and machinery exposure – Cause for concern? Don Voaklander , Canada	Exposures to organic aerosols and effects on pulmonary function among western US dairy workers, Stephen J Reynolds , USA	Rollover protection for quad bikes, David Robertson , Australia
10.40	Evaluation of the optimal arm-udder distance for milking cows in comparison to current practice, Martina Jakob , Germany	Reasons of shortened working careers among farmers in Finland Risto Rautiainen , Finland/USA	Similar exposure group (task) based analysis of bioaerosol exposures in dairies, Margaret Davidson , USA	Tractor incidents on Swedish roads, Stefan Pinzke , Sweden

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11.00	Long shafted tools used in horse stables, Lotta Löfqvist , Sweden	Gender relations and the organisation of farm labour, Elias Andersson , Sweden	Symptoms related to air contaminants in persons working with dairy cows and cattle, Sven Nimmermark , Sweden	Farm and construction accidents in Finland, Erkki Eskola , Finland
11.20	Identification of potential plasma biomarkers of inflammation in farmers with musculoskeletal disorders; a proteomic study, Anders Thelin , Sweden	Human resource management in agricultural sector, Mozhgan Zachrisson Sweden	An evaluation of urinary clara cell proteins (CC16) in agricultural workers exposed to respirable dust, Chandran Achutan , USA	Different risk sources in Mediterranean greenhouses, Domenico Longo , Italy
11.40	Routines at insemination in piglet herds for increased efficiency, productivity and attractiveness as a workplace- a field study, Anne-Charlotte Olsson , Sweden	Survey among farmer employers: labour management and safety on farms , Jarkko Leppälä , Finland	Sugar beets – exposure, allergy and respiratory symptoms, Margareta Littorin , Sweden	Accidents on Polish family farms, Anna Groborz , Poland

12.00-13.00 **Lunch**

13.00 **Nordic health & safety in agriculture (Room: Bolsa Beach)**

- The psychosocial pulse of Swedish farming, **Christina Lunner Kolstrup**, Sweden
- Exposure to dust and endotoxin among Danish farmers, **Ioannis Basinas**, Denmark
- Occupational injuries, diseases, and disability in the Finnish farming population, **Janne Karttunen**, Finland
- Risk factors for occupational injuries among full-time farmers in Finland, **Kirsti Taattola**, Finland
- Work related injuries among farmers in central Norway, **Oddfrid Aas**, Norway

14.45-18.30 **Farm tour (Busses leaves at the entrance of the hotel)**

Farm no 1: Högestad, Ystad (Fredric Piper) – winner of the Contest 2012 “Best workplace in Swedish agriculture 2012” (<http://www.hogesta.se/>)

Farm no 2: – Solkällan Lantbruk, Hörby (Per Persson) – milk producer with automatic milking

19.30-..... **Conference Dinner at Ystad Saltsjöbaden**

Wednesday, August 29

07.30-08.30 **Registration**

08.10-09.50 **Concurrent Sessions (*Rooms to be announced*)**

Session	Education & information	Pesticides & Ag medicine	Air quality & health	Injury prevention & Animal handling
08.10	Contributing factors to agricultural accidents in New Zealand, Neil Percival , New Zealand	Exposure to retarding agents in horticultural workers, Margareta Littorin , Sweden	Air quality in horse stables and human respiratory health, Lena Elfman , Sweden	Changes in the US dairy industry require development of comprehensive employee training and safety programs, Robert Hagevoort , USA
08.30	Two approaches to masters education in agricultural safety & health: Lessons from Kentucky, USA, Robert McKnight & Mark Purschwitz , USA	Exposure to fungicides in vineyard cultivation: results from three ongoing Italian studies, Federico Rubino , Italy	Evaluation of working environment in piggery with and without automatic straw distribution, Quiqing Geng , Sweden	Animal-related injury risks in dairy farming, Cecilia Lindahl , Sweden
08.50	Promoting safety and health in U.S. agritourism, Marsha Salzwedel , USA	How to avoid operator exposure to pesticides – and how to sell a message, Maria Dalin , Sweden	Design of manure gas exhaustion in loose-housing systems for laying hens, Gösta Gustafsson , Sweden	Animal handling with improved safety, Stefan Wistrand , Sweden
09.10	Work situation of control officers - with a special focus on health and food officers, Katarina Horn , Sweden	Type 2 diabetes among farmers and rural non-farmers – prevalence and risk factors in a prospective cohort study, Anders Thelin , Sweden	Exposure and risk profile of cow milkers in the region of Lombardy, Italy Chiara Somaruga , Italy	Animal welfare, work safety and animal handling when using mobile or fixed handling systems for beef cattle – a field study, Anders Herlin , Sweden

09.30 **Break with coffee, refreshments & poster viewing**

- 10.00 **Final session - Ways of improving working conditions in agriculture (Room: Bolsa Beach)**
- Zero accident at my farm - the farmers mental HES-challenge?
Inger Johanne Sikkeland, Norway
 - Regional health & safety experts – a farmyard success, **Lars-Olov Söderberg**, Sweden
 - Promoting principles of health and safety rules on the farm by the Agricultural Social Insurance Fund (KRUS Poland), **Piotr Glowka**, Poland
 - A hundred years of health & safety representation, **Anja Westberg**, Sweden
 - Media campaign implemented by the Health and Safety Authority to create awareness among farmers of the dangers in the agriculture sector in Ireland, **Pat Griffin**, Ireland
 - Critical success factors for improved safety outcomes in Irish agriculture,
Andrew Reilly, Ireland
 - Prevention strategies for injury prevention, **Peter Lundqvist**, Sweden
- 12.20 **Closing of Nordic Meeting 2012 & Welcome to the Nordic Meeting 2014– in Finland!**
- 12.30 **Lunch & farewell -and a safe journey back home!**

List of participants

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Abstracts, Extended abstracts & Papers
- for oral or poster presentation

Work related injuries among farmers in central Norway

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Keywords: agriculture, injury, risk, prevention

Objectives

Agriculture is one of the most hazardous industries and it has higher rates of occupational accidents than most other industries in Norway. This study aimed to gain more knowledge about accidents in farming and to assess farmers' attitudes towards health, safety and environment in order to contribute to prevention of injuries in farming.

Methods

The project was carried out in two phases. The first phase was a survey of farmers from two counties in central Norway. In a questionnaire we asked for background information about the farm, work related injuries on the farm during the last 12 months, and, in case of injuries, about the circumstances regarding the accident. In the second phase, some of the farmers who had answered the questionnaire were visited. Both farms with and without injuries were chosen, and they were visited by a group of experts on health, safety and environment (HSE). The HSE culture on the farm was assessed.

Results

Of the 2699 responders, 249 (9.2 %) reported one or more work related injuries during the last 12 months. Young farmers reported injuries more often than elder. There were no gender differences in injury rate. Handling of animals was the most frequently reported work task related to the injuries, followed by using tractors and other machine equipment. The injuries related to machines were however more often serious. Altogether 63 % of the reported injuries had led to medical consultation and/or hospitalization, and around 25 % had led to sick leave for more than one week. Most injuries had happened during spring and autumn. Nearly 50 % of the injuries had happened inside the barn or other outbuilding.

During the second phase of the project we visited 58 farms. During these visits we gained insight into the farmers' HSE attitudes and how they dealt with this issue. Most farmers are aware of the dangers/risks related to farming, but many of them apparently look at it as a natural part of life. They think accidents and injuries are unavoidable.

An evaluation of Clara cell proteins (CC16) in agricultural workers exposed to respirable dust

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Keywords: agriculture, respirable dust, Clara cell proteins

Objectives

Agricultural workers who are exposed to organic or inorganic dusts in the farm environment may experience inflammation of the lung. Depending on the inflammation, exposure to organic dusts can lead to diseases that are both acute and chronic in nature. These diseases include mucous membrane irritation, occupational asthma or bronchitis, organic dust toxic syndrome, hypersensitivity pneumonitis, and silo filler's disease. For a number of outcomes related to obstructive airways disease, such as symptoms, lung function, morbidity, and mortality, an association with farming has been described [Schencker et al., 1998].

Early diagnosis of injury from dust inhalation relies essentially on symptoms and on pulmonary function tests. Beginning in the late 1990s, researchers in Europe began to evaluate a new lung biomarker in human serum as a marker of lung disease. This biomarker is a 16 kilo Dalton (kD) microprotein (CC16) secreted by the Clara cells, which are nonciliated epithelial cells predominantly occurring in the terminal and respiratory bronchioles (Singh et al., 1988; Broers et al., 1992). The exact physiological function of CC16 is not known, but there is suggestive evidence that points to an immunosuppressive or anti-inflammatory protein protecting the airways from undue activations of the immune system that could cause tissue injury (Jackson et al., 1988; Wolf et al., 1992; Mantile et al., 1993).

Since CC16 is eliminated by renal excretion, it is plausible that urine can be used instead of serum. Timonen et al. (2004) studied the relationship between ultra-fine particles and CC16, and found that there was no correlation. This study is the first to use urinary CC16 instead of human serum. Andersson et al. (2007) optimized a sampling method to collect urinary CC16 and compare the urine and serum CC16 levels. Apart from these studies, there have not been any that have looked at urinary CC16 levels, and none have evaluated this marker in an agricultural setting. The purpose of our study was to test the hypothesis that agricultural workers' exposure to dust during harvest will result in a decreased level of CC16 levels.

Methods

Six male employees from two sites participated in our study. Each employee was sampled 3 or 4 times for respirable dust in his personal breathing zone and for CC16 in his urine. Personal breathing zone air samples for respirable particulate matter were collected and analyzed according to established methods. Each employee provided two urine samples on each day of the sampling. A pre-shift urine sample taken before the employee started work and a post-shift sample at the end of the work day. The urine samples were analyzed in-house using an ELISA immunoassay (BioVendor LLC, Candler, NC). Human Clara Cell Protein ELISA is a sandwich enzyme immunoassay for the quantitative measurement of human clara

cell protein. All analyses were done in duplicate. Samples were run at 1:10, 1:20 or 1:25 dilution depending on the urine concentration. The pre-shift sample was collected at work, and did not represent the first urine excretion of the day.

Results

Overall, the respirable dust levels ranged from 0.03 to 0.21 $\mu\text{g}/\text{m}^3$, with a geometric mean of 0.06 $\mu\text{g}/\text{m}^3$. None of these samples exceeded any recommended or regulatory health standards. The Occupational Safety and Health Administration (OSHA) Permissible Exposure Level (PEL) for respirable dust is 5 mg/m^3 (29 CFR 1910) and the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) is 3 mg/m^3 (ACGIH 2011). There is no National Institute for Occupational Safety and Health (NIOSH) Recommended Exposure Limit (REL) for respirable dust.

We expected to see a decrease in CC16 levels between the pre- and post-shift urine samples. Fifteen of the 22 urine samples showed a decrease, suggesting an increased leakage of the protein from the respiratory tract where most Clara cells are produced. The decrease between the pre- and post-shift samples was statistically significant ($p < 0.05$) The decreases ranged from 8-74%, with an average of 39.3%. The average decreases in sites 1 and 2 were 20.0% and 46.2% respectively. Six of the 7 samples that did not show a decrease in CC16 levels were at Site 1. Employee A, who showed no decrease in CC16 levels was a maintenance worker, and his exposure to dust was low during the days we sampled.

We found a moderate, negative association ($r=0.72$) between respirable dust levels and CC16 levels, meaning as respirable dust levels increased, the levels of CC16 in urine decreased.

Migrant workers in Swedish agriculture - attitudes, possibilities and challenges

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Keywords: seasonal workers, working conditions, labour market

Objectives

Finding competent work force is a challenge for many farmers and owners of companies within agriculture and horticulture. This is even more a great issue when it's a matter of finding seasonal workers. During a number of years there has been an increasing share of the work force with a non-Swedish background. But they are not immigrants which are becoming integrated in rural areas – they are migrant workers from other countries. The working conditions for these migrant workers are not well documented and their own experiences and attitudes are not yet studied. There is also lacking knowledge about the perspectives of the Swedish co-workers and the owners / managers on farms with migrant workers. With economical support from the Swedish Farmers Foundation for Agricultural Research (SLF) these issues are studied during 2012-2013.

Methods

The project has started with a short up-date on other relevant studies, published reports and papers as well as connections with other researchers in this area – both national and international. A web-based survey among employers has been done in the first part of this project. In the on-going part there are work-place studies with in-depth interviews involving migrant workers as well as Swedish co-workers and employers in order to get a base-line of knowledge for further actions.

Results

The initial web-based survey to employers was responded by almost 4000 farm employers. About 20% of the responders said that they used migrant workers during 2011, the majority from a country within the European Union (EU). The main reason for using migrant workers was lack of Swedish workers and financial reasons. The migrant workers were used for in many different work operations such as: animal production, weeding, planting and harvesting of field crops, forestry work, construction and maintenance of farm buildings. The major problems were related to language issues, such as: communication, information, misunderstandings etc. The employers wanted further support with information about regulations, information material on different languages and other issues on a web-page or as a practical “hand-book”.

The final results will be presented and discussed at a work-shop with involved stakeholders, organizations, authorities, researchers and other in order to create an action plan, a webpage or a “hand-book” for employers and managers as well as a research plan for further research. Further international collaboration including EU-funded projects is important to establish a sustainable labor market.

Gender relations and the organisation of farm labour – intersectional perspective on occupational safety and policymaking

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Keywords: agriculture, division of labour, family farming, occupational safety, policy

Objectives

Despite the comprehensive concept of family farming, the Swedish farms and farmers constitutes a heterogenic group on the basis of production, geography, tradition, age, gender etc. Work in the agricultural sector are valued and acknowledged differently. Similar to the general labour market, the agricultural labour process and the division of labour are gendered and racialised. Within the temporal turn of social science, the organisation and valuation of time are understood as an instrument of social control that reproduces social relations and power structures. Women's unpaid work has by feminist scholars' been criticized on basis of the organization of time within capitalist production. However, this debate underlines an extensive analysis outside of the relation to the capitalist modes of production, including various social relations. In previous research, work has been identified as a central factor in the reproduction of the farm and its social and material relations. These relations are also generated through the unequal distribution of resources, ascendancy and technological developments, something that are reflected in the occupational safety.

Methods

This theoretical discussion takes its point of departure in the Swedish material in the European Farms Accountancy Data Network. The material contains detailed information on the businesses of 1050 farms in Sweden. Since work, time and the division of labour are central themes in this discussion, the analyses are concentrated to the parts of the material that deals with these issues. The analyses are made from a feminist standpoint with the focus on the relations in the production. The aim of this study is to raise the issue of social relations and division of labour in order to develop a more complex and extensive understanding of the agricultural occupational safety and the processes of policymaking.

Results

The statistics on work related injuries deaths within Swedish agriculture indicates that the gendered division of labour highly reflect the level of technological development. In order to move forward in the work of improving occupational safety and health in the agricultural sector it's vital to increase the understanding of its social relations in order to develop policymaking and societal interventions. In order to do this, the question; how are the inequalities in occupational safety and health, that policies and regulations aim to overcome, produced and reproduced, has to be investigated further.

Occupational exposures of fishermen in North Atlantic fisheries

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Keywords: fishing safety, lobster industry, drum winch, entanglement, entrapment, workshop exposures, outreach

Objectives

To improve fishing safety in the North Atlantic fishing industries;
To raise awareness regarding safety and compliance with federal commercial fishing safety regulations; and
To provide education and outreach to fishermen along the New England coast (USA).

Methods

In two separate projects, studies were undertaken on entanglement in trap rope and workshop exposures in the lobster industry in the state of Maine. In a separate study of safety and compliance with federal regulations, a representative sample of captains was surveyed on their boats while fishing off the coast of Maine. A pre-post study of diesel exhaust emissions was undertaken among lobstermen in Maine who signed-up to exchange their old diesel engines for clean-burning engines, and finally a small dockside pilot study of trawler captains in Massachusetts, Rhode Island and New Jersey was undertaken to determine if additional study regarding the improvement of drum winch safety were warranted.

During the same period represented by these studies, the commercial fishing safety task force in the state of Maine sponsored and passed new state regulations for the licensing of commercial lobstermen and dive tenders.

Results

The results of entanglement studies showed that 70% of lobstermen surveyed had been entangled in their trap rope; the the lobstermen's workshops study revealed PM_{2.5}, polycyclic aromatic hydrocarbons, volatile organic compounds, and endotoxin exposures. In the safety and compliance study, survival-related equipment was found to be in compliance with federal regulations, but instruction and training in survival skills such as first aid/CPR, cold water and life raft training showed serious deficits. The pre-post study of diesel emissions showed marked reduction in elemental carbon after diesel repowering (replacement of old diesel engines with new engines).

Regarding drum winch safety, the winch shut-off mechanism on 42% of the boats surveyed was not within an arm's length of the winch operator, and on 46% of the boats the crew stood in front of the winch to ensure level-winding of the cable on the drum.

New licensure regulations for lobstering in Maine set up an apprenticeship program that includes 1000 supervised hours of fishing including gear maintenance and successful completion of the US Coast Guard Drill Conductor Course. Similarly, dive tenders have to present unexpired FirstAid and CPR certificates and a passing grade on an on-line dive tender training module. Ongoing outreach and education efforts include collaboration with the US Coast Guard and Maine marine patrol, presentations, and articles under the FISH SAFE and Voice of Safety by-lines in two local fishing trade journals.

Exposure to dust and endotoxin among Danish farmers - results from the Danish SUS12 cohort

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Introduction

Exposure assessment in farming populations is difficult and costly. As a result, studies on personal dust and endotoxin exposure among animal farmers have been either small in size, or limited in numbers of sectors investigated.

Objectives

To provide comparable information on the level and determinants of dust and endotoxin exposure in different sectors of the Danish primary animal production.

Methods

A comprehensive exposure assessment study including personal monitoring of 327 farmers employed in 56 pig, 26 dairy, 3 poultry, and 4 mink farms in Denmark was performed in the framework of the 15 year follow-up of a cohort study (SUS) among young Danish farmers. 507 inhalable dust samples were collected throughout seasons among pig and dairy farmers and different production stages among mink and poultry farmers. Information on potential exposure determinants for pig and cattle farmers was collected through detailed activity diaries and walk-through surveys. Concentrations of dust were determined gravimetrically and of endotoxin by the Limulus amoebocyte lysate assay. Simple statistics were used to describe the levels of exposure and linear-mixed effect models to describe variability and identify determinants for exposure.

Results

Overall, measured personal inhalable dust concentrations averaged (geometric mean) at 2.5 mg/m³ (range <LOD-47.8) and endotoxin at 992.3 EU/m³ (range <LOD-374,000). Pig and poultry farmers were highest exposed, but levels above the currently available occupational exposure limits for dust (3 mg/m³) and endotoxin (90 EU/m³) were common also among dairy and mink farmers. Exposure among pig and cattle farmers was characterised by a predominant day-to-day variability that increased from indoors-to-outdoors. Important exposure predictors included both working tasks and farming characteristics with an influence mainly on the day-to-day variability.

Discussion

The findings stretch the need for optimization of the exposure assessment strategies for farming populations and open possibilities for evidence based prevention for lung diseases among farmers. The current overall results of the study will be discussed along with an overview of those from earlier studies.

How to avoid operator exposure to pesticides – and how to sell a message

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The use of personal protection must be improved when working with pesticides. What personal protective equipment is most suitable for different kinds of handling? The Swedish Work Environment Protection Authority has the answer! But – how can we reach the users and be successful in spreading the results? Here comes a description of what we do.

Safe Farmers Common Sense- a Swedish campaign to reduce accidents

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Safe Farmers Common Sense is the most comprehensive campaign in Sweden to reduce accidents in agriculture, ever. The campaign works through information and education to reduce injury accidents on the farm, and will continue until 2013. **Safe Farmers Common Sense** has trained 180 supervisors, most of whom are farmers themselves. The supervisors offer courses to other farmers along with individual farm visits and farm walks to review safety issues on the farm with the farmer.

Background

Accident statistics show that agriculture and forestry are Sweden's most accident-prone industries. With this background, LRF - The Federation of Swedish Farmers, JTI - Swedish Institute of Agricultural and Environmental Engineering and SLU - The Swedish University of Agricultural Sciences started in 2009 on behalf of the government, a nationwide campaign to reduce accidents in agriculture. The project is financed mainly with funds from the EU and from the Swedish Rural Development Programme.

Objectives

The goal of **Safe Farmers Common Sense** is through information and education to cut the number of accidents in Sweden in half by 2013. The project aims to change attitudes in the industry concerning safety issues. To support this process, we have produced an award-winning film which helps create discussion among farmers and increases their level of concern. Our supervisors also use an education method that relies on the farmer to generate solutions for their own problems. We have, in this campaign, specifically focused on the most common accidents areas such as working with machinery, cattle, buildings, forest and wood.

An action plan for each farm

The basic tool for starting this process is a simplified form of the systematic work model. It is an accepted model used throughout the Agriculture or industry, and is regulated by law, by allowing business employees must have a systematic work. The model works equally well for businesses without employees. Farmers are assisted in making an action plan for their own farm. We have developed a new simple tool to aid with this process.

Presentation of the current situation

This lecture will describe how we worked on this project and about our experiences of what worked well and less well. We will present recent agricultural accident statistics for Sweden and how they have evolved since the project began. The lecture will also include a summary of what the farmers, as well as our supervisors, think about the campaign and its various activities. Finally, we will also discuss what needs to be done to continue reducing accidents in agriculture in the future.

Similar exposure group (Task) based analysis of bioaerosol exposures in dairies

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Keywords: dairy, agriculture, bioaerosol, exposure, worker, task, ergosterol, muramic acid, endotoxin, dust, 3-OHFA

Objectives

The objective of this research was to evaluate variability in bioaerosol exposures among *similar exposure groups* (SEGs) based on dairy workers' tasks. This analysis is an important step in a broader effort to develop effective interventions to reduce exposures and health effects.

Methods

Bioaerosol samples were collected in workers' breathing zones (n=116) over entire work shifts (10 – 12 hours) using Button samplers (inhalable) with PVC filters to measure organic dust, endotoxin (recombinant Factor C assay), and 3-hydroxy fatty acids (3-OHFA), ergosterol and muramic acid (GC/MSMS). Ammonia was measured using direct-reading ToxiRae samplers. To our knowledge this is the first study to include combined analysis of 3-OHFA, muramic acid and ergosterol in dairy operations.

Results

SEGs were defined based on work tasks including: milking (30% of population), breeding (3%), birthing/rearing (9%), medical care (12%), feeding (4%), moving stock (4%), re-bedding stalls (9%), milking parlor maintenance (3%), facility maintenance/repairs (2%), other tasks [administration] (6%) and mixed [two or more tasks] (18%). Participants were predominantly male (88%), Hispanics (91%), 25 to 40 years old. Exposures to endotoxin (p<0.001), 3-OHFA (p=0.010), and organic dust (p=0.015) differed significantly by SEG. Workers undertaking mixed tasks had the greatest dust exposures with a geometric mean (geometric standard deviation) of 1.14 (2.0) mg/m³. Those moving animals had the highest 3-OHFA [677 (2.3) ng/m³] and muramic acid [28.5 (2.5) ng/m³] exposures. Milkers had greater exposure to endotoxin [1037 (2.7) EU/m³]. Medical workers had the highest ergosterol exposures 23.1 (9.5) ng/m³ with one worker recording 536.9 ng/m³. A mixed task worker (feeding, milking and other) had the second highest ergosterol reading of 57.8 ng/m³, and the highest average ammonia result of 20.1 ppm.

Workers performing milking, mixed tasks, and moving animals had higher exposures than the overall cohort for a number of bioaerosols, indicating that these groups could be at greater risk of adverse health effects. Geometric mean endotoxin concentrations for all SEGs exceeded the recommended exposure limit of 90 EU/m³. Mean ammonia and inhalable dust concentrations did not exceed recommended limits. However, there were individual

exposures of concern of up to 20.1 ppm for ammonia (moving, feeding, milking , other and birthing) and up to 6.81 mg/m³ for dust (other, rebedding stalls, feeding and medical) that exceed recommended exposure limits. Characterizing the variability within and between SEGs is important for identifying at risk populations, and for developing effective interventions to reduce exposures and their associated health effects.

Fatal accidents in Danish agriculture for the last 10 years and a short presentation of some initiatives directed at the farmers

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During the last 10 years there have been 74 fatal accidents in Danish agriculture distributed over the ages 0-10 years: 5; 11-20 years: 6; 21-30 years: 0, 31-40 years: 4; 41-50 years: 10; 51-60 years: 19; 61-70 years: 13; 71-80 years: 7. As expected, the fatal accidents primarily occur when operating machinery, while the second most frequent cause of death is working at heights and the third most frequent cause is big bales.

The numbers above are not in accordance with the numbers from the Danish Working Environment Authority, because the latter are based solely on the accidents among employers and employees. Our numbers include all the accidents that to our knowledge have occurred on farms – that means that accidents among visitors, helpers without engagement and children are included.

To present a few of our on-going initiatives directed at the farmer:

Safety events on farms

Meet an injured farmer and get a practical safety tour. The safety events take place all over the country. It is an opportunity for the farmers to visit other farms and, at the same time, learn how to increase safety on their own farms. There is great satisfaction with the events; however, it has proved difficult to make the farmers gather in. In a busy day-to-day life, safety events are not at the top of the agenda.

Children and agriculture – a dangerous cocktail

Every year approximately 300 children are injured on farms to such an extent that the injuries require emergency treatment. Accidents involving horses prove to be the greatest cause of injuries, while the fatal accidents typically occur in contact with large machinery. Material targeted at children and agriculture for handing out at cattle shows is produced (Pixi book, Colouring book, Posters and Website)

Handling of bales

Every year animal producers gather in 1.2 million tons of straw for bedding, fodder and covering material. In addition to this, farmers gather in 1.4 million tons of straw for thermal power stations and their own automatic stokers.

A fact sheet (4 pages) about safe handling of the different types of large bales will be made. The fact sheet will be mainly visual and with short texts to make the most important safety rules appear clearly.

Statutory inspection of machinery

A summary of which machines need to be inspected and what needs to be inspected is produced. The technical appliances and machines which typically require statutory inspections or have special inspection requirements for farming are listed.

Ergonomic exposures of posture and muscle activity among US large herd dairy parlor workers

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Keywords: dairy, agriculture, electromyography, posture

Objectives

The US dairy industry has experienced a relatively rapid transformation from small herd farms to the industrialization of milking operations. During the last 30 years the number of US dairies decreased while herd sizes and milk production increased. This transformation has led to significant changes in work tasks and in ergonomic challenges due to the highly repetitive work nature of the milking process. Minimal research has addressed ergonomic issues in these mass-production environments. Field-based direct measures of physical exposures have been limited in these challenging work environments. The purpose of this study was to evaluate the usefulness of full-shift quantitative exposure assessment tools for assessing posture and muscle activity among large herd parlor workers.

Methods

Study participants were recruited from large herd dairy operations in the states of Colorado, New Mexico and Texas. Each participant was Hispanic, worked full-time in a dairy parlor, and was free from pain or pathology in the upper extremity. Shoulder elevation and trunk inclination angles were estimated using triaxial accelerometers. Accelerometers were wireless, battery-powered, and packaged in a small pager-sized portable casing with 2 megabytes of built-in datalogging memory. Surface electromyography (EMG) was sampled continuously during an entire work shift while workers performed milking tasks. EMG samples were composed of continuous recordings of the upper trapezius, finger flexors, finger extensors and anterior deltoid (shoulder flexor). These muscles were chosen for their relevance when performing milking tasks as well as the ability of researchers to position surface electrodes over muscle bellies.

Results

Results suggest parlor workers are exposed to extreme exposures (awkward postures, high movement velocities, high repetition, high muscle forces, and inadequate rest). These physical exposures are often associated with the development of upper limb pathology. These findings warrant the need for continued research to investigate these working environments to facilitate the development of cost-effective intervention strategies. Several ergonomic strategies to reduce the physical exposures have been developed and are currently being evaluated for effectiveness.

Vibration and occupational diseases between conductors of working transport techniques

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Keywords: working transport techniques, vibration, posture, occupational diseases

Objectives

Every person's rights to healthy and safe working conditions, which ensure well-rounded social and economic life, are emphasized in various international documents of United Nations Organization (UNO), World Health Organization (WHO), and International Work Organization (IWO). In last ten years, the number of newly registered occupational diseases is decreasing in many European countries as a result of improvement in work conditions. On the other hand, since the restoration of independence, increase in the number of occupational diseases can be observed in all economic sectors in Latvia, though it has stabilized in last three years. In 2005, Latvia had the second highest number of newly registered occupational diseases among transport industry employers in European Union per 100 000 employed people. Conductors of Working Transport Techniques (operators of work vehicles) are exposed to a number of physical (e.g., noise), chemical (e.g., engine exhaust fumes), ergonomic (e.g., forced work position), psychoemotional (e.g., raised tension of the Central Nervous System) and organizational (e.g., work with no fixed hours or work in night shift) occupational risk factors, which deteriorate their health and cause occupational diseases. The occupational diseases characteristic to the employed in transport industry have not been sufficiently studied and analysed.

Purpose of the research was to aggregate information on registered occupational diseases incidental to conductors of working transport techniques and to explore correlation between types of working transport techniques used and prevalence of registered occupational diseases in Latvia. The occupational diseases in vehicle operators employed in the transport industry in Latvia were analysed according to sex, age, work experience in the field and the vehicle they operate.

Methods

The data on occupational diseases was obtained from the State Labour Inspectorate in compliance with LR Cabinet of Ministers Regulation 2006, No 908, "Procedures for the Investigation and Registration of Occupational Diseases". Occupational diseases are diagnosed and coded in accordance with the International Classification of Diseases (ICD-10). From 2007-2010 there were registered 598 new patients (121 (20.2%) women and 477 (79.8%) men) suffering from occupational diseases among the operators of various work vehicles.

All the patients with occupational diseases were divided into five age groups and in six groups according to their work experience as vehicle operators. It was discovered that the most substantial number of people suffer from occupational diseases in the age group 50-60 (44.6%) and with the work experience in profession from 20 till 30 years (44.1%), besides that, taking into account percentage, the number of occupational disease patients is approximately equal in those groups. The majority of women (88, 4%) worked as trolleybus

or tram drivers, while the largest proportion of men (29,4%)- were employed as tractor drivers.

Results

In total there were identified 1360 confirmed cases of occupational diseases in 598 patients suffering from 17 different occupational diseases, (the greatest number of occupational diseases diagnosed in one patient –three) because till 2009, the State Labour Inspectorate registered not only the uppermost but all diagnosed and confirmed diseases. There are three the most frequently confirmed occupational diseases – vibration disease – 26.6%, carpal tunnel syndrome -13.4%, and wrist deteriorate osteoarthritis - 12.5%.

Vibration disease is characteristic to employees operating all types of vehicles, exceeding a tenth or even a third (tractors, bulldozers, excavators, lorries, cranes) of the total number of occupational diseases patients. Carpal tunnel syndrome and wrist deteriorate osteoarthritis are more commonly observed in buss, tram, and trolleybus drivers as well as lorry loader and power truck operators. [Table 1.]

Vehicle operators with work experience less than 10 years most frequently suffer from wrist deteriorate osteoarthritis Vibration disease is most common in employees whose work experience exceeds 10 years. The most substantial number of registered occupational diseases can be identified in the age group of 50-60 (612) and 60-70 (374), where the proportion shows that vibration disease constitutes approximately a quarter of all newly registered occupational diseases in all age groups. Vibration disease is the most common in both female (40.5%) and male (65.6%) groups. Carpal tunnel syndrome is the most frequent occupational disease in vehicle operators already before the age of 40. [Table 2.]

The Latvian State Registry of the patients with occupational diseases and persons who have received ionizing radiation after Chernobyl NPP accident (further Registry) identifies that the most significant work environment risk factors which contribute to the developemet of this disease are vibration, forced sitting posture at work and overload of different muscle groups. These risk factors, as well as noise are also mentioned in studies caaried out in other countries. The latest unpublished data of the Registry (2011) indicate that, ingeneral, the annual number of newly registred vibration disease is still increasing in all fields of economy and the disease is even more common in men in comparison to women than it is in the transport industry.

In Latvia, the diseases caused by vibration are classified acoording to international code ICD T752 without detaching hand-arm and whole-body health disturbances caused by vibration, as one patient is frequently diagnosed with both types of vibration pathologies which are hardly distinguishable. Commonly, in work environment, the latent period of both vibration caused hand-arm and whole body diseases, depending on the level of vibrtion, duration of expousure and frequency, is several years. Therefore preventive measures are of utmost importance.

One of the key measures is modernization of vehicles as well as regular technical service and maintenance, as well as use of individual work safety equipment, efficient organization of working hours.

Table 1.
Percentage distribution of occupational diseases according to transport technique %

Occupational disease	Transport technique					
	Bus	Tram/ Trolleybus	Tractor/ Bulldozer / Excavator	Lorry	Crane	Lorry loader/ Power truck
Arm angiospamodic syndrome	4,3	5,9	5,8	5,4	6,1	7,7
Wrist deformed arthrosis	1,9	4,3	2,7	2,2	3,0	-
Wrist deteriorate osteoarthrosis	14,9	15,2	11,1	10,8	9,1	15,4
Chronic dust bronhitis	-	-	-	-	-	7,7
Carpal tunnel syndrome	16,4	17,1	9,0	10,5	11,1	23,0
Lumbalgia	1,4	1,3	0,9	1,1	-	-
Osteohondrytis	4,8	5,6	2,4	1,1	-	-
Palm bone cistic deterioration	0,5	3,3	0,8	2,2	-	-
Radikulopathy	4,7	4,3	1,8	6,5	3,0	-
Radikulopathy with pain syndrome	1,9	1,3	2,4	5,5	3,0	7,7
Sensuous-motor polyneuropathy	3,3	6,6	7,6	7,7	6,1	-
Sensoneiral hearing loss	4,3	1,3	12,2	6,5	9,1	15,4
Stenosis of spinal tunnel	1,4	1,0	1,0	-	-	-
Spondylosis	9,6	11,0	5,6	3,2	9,1	-
Spondylosis with radiculopathy	2,3	3,3	0,6	2,0	3,0	-
Spondylosis with pain syndrome	4,32	2,0	1,4	3,2	4,1	7,7
Vibration disease	24,1	16,5	34,7	32,1	33,3	15,4

In order to timely identify possible health disturbances caused by occupational risk factors, there is required monitoring of operators' health status through regular mandatory health examinations in accordance with the existing legislation. Currently, the requirements for the given health examinations are defined by the latest Cabinet of Ministers regulation 2009, No 219 "Procedures for Performance of Mandatory Health Examinations".

Table 2.
Percentage distribution of occupational diseases by age, %

Occupational Diseases	Age, years				
	30-40	40-50	50-60	60-70	>70
Arm angiospamodic syndrome	-	5,5	5,2	5,1	4,2
Wrist deformed arthrosis	2,6	3,2	2,5	3,3	-
Wrist deteriorate osteoarthritis	13,6	9,6	13,4	13,3	12,5
Chronic dust bronhitis	-	-	-	0,3	-
Carpal tunnel syndrome	22,7	14,7	11,8	13,3	12,5
Lumbalgia	2,6	0,3	1,0	0,8	-
Osteohondrytis	-	3,2	2,5	3,5	4,2
Palm bone cistic deterioration	-	2,2	2,0	2,4	-
Radikulopathy	1,6	3,2	3,6	2,7	4,2
Radikulopathy with pain syndrome	5,3	2,6	1,8	1,1	4,2
Sensuous-motor polyneuropathy	5,3	7,7	7,8	6,8	8,3
Sensoneiral hearing loss	2,6	2,9	6,9	7,9	8,3
Stenosis of spinal tunnel	2,6	-	1,3	0,5	-
Spondylosis	10,5	13,5	9,5	6,8	-
Spondylosis with radiculopathy	7,9	2,6	2,5	1,6	-
Spondylosis with pain syndrome	-	4,8	2,3	1,1	-
Vibration disease	22,7	24,0	26,0	29,5	41,6

Unfortunately, these procedures are frequently amended or completely changed, which is cumbersome for the employers. It is essential to carry out regular measuring and assessment of occupational risk factors in order to constantly monitor the level of risk to operators' health. Currently, there are no extensive studies and thus there is no data and sufficient knowledge to prove a quantitative correlation between the health risks and the influence of vibration. As the proportional impact of different levels of vibration, its frequency and duration of exposure is unknown, international vibration standards which are also approved in Latvia (whole body vibration: LVS EN ISO 2631 - 1:2003; hand-arm vibration: LVS EN ISO 5349- 1:2005), recommend different methods to assess and measure vibration.

The fourth power method is sensitive and accurate in respect of peak values of measured vibration. As it is identified in the current study [Dundurs J. Whole-body vibration at work of urban traffic drivers//Acta medica Lituanica, 2001; 4(8): 240-243.] it is more effective in assessing the impact of vibration on public transport drivers than the second power method which forms the basis for the assessment of vibration risks according to current Cabinet of Ministers Regulation 2004, No 284 "Labour Protection Requirements for the Protection of Employees from the Risk Caused by Vibration in the Work Environment".

In future, it would be advisable to expand the vibration measurements and calculations of vibration dosage according to different recommended methods, which have been developed basing on practical experience related to effect of vibration on biomechanical reactions of a human body, physiological reactions of the organism in work environment. This would provide a possibility to more precisely detect the level of vibration hazard and thus to optimize the working hours (duration of exposure) for operators of different types of work vehicles.

Mould and farming, the past, the present and recent advances

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Respiratory diseases among grain farmers has already been described in the Middle Ages. In 1932 Campbell reported farmers' lung disease occurring in British farmers handling mouldy hay. Pepys identified in 1962 the causal agents of this form of hypersensitivity pneumonitis as spores from thermophilic actinomycetes. These microorganisms are not moulds, but Gram-negative bacteria that resemble moulds by filamentous growth and production of large numbers of spores. Later studies have shown that numerous fungal species can induce attacks of hypersensitivity in farmers as well as other occupations with exposure to fungal spores. Farmers are exposed to multiple agents originating from microbial, plant and animal sources. In spite of this, most epidemiological studies of farmers have only measured exposure a limited number of agents, typically endotoxins, dust and ammonia. Thus the role of other agents is mainly unclear.

In an epidemiological study of Norwegian farmers exposure to a number of bioaerosol agents was estimated and exposure-response modeling demonstrated that fungal spores were most strongly associated with acute mucous irritation symptoms and non-allergic asthma, while atopic asthma showed the strongest negative associations with fungal spores. Further modeling of long term respiratory outcomes as chronic bronchitis, lung function and COPD was complicated by correlated exposure estimates prohibiting identification of the most important agents. However, farmers are exposed to fungal spores and endotoxins at levels that vastly exceed proposed guidelines, indicating that these agents are likely to play a role in respiratory diseases in farmers.

Recent developments in the field of fungal aerosols include the significance of hyphal fragments which have been demonstrated in indoor and outdoor air as well as in personal air samples from grain handling, and submicronic fungal fragments which have been shown to be liberated from fungal cultures by air jets.

In conclusion: Exposure fungal spores are likely to play a role in respiratory diseases among farmers in addition to endotoxins and other bioaerosol agents. The role of hyphal and submicronic fungal fragments is subject for further study.

Air quality in horse stables and human respiratory health

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Keywords: air quality, horse stable, inflammatory biomarker, respiratory health

Objectives

A large number of people are highly engaged in the equine industry around the world, especially in industrialised countries. For example, in Sweden the equine industry provides over 30 000 full-time employment. Horse riding is the second biggest sport in Sweden after football, engaging approximately 6% of the population, and is by far the biggest sport for girls. The air of farm buildings housing horses contains a wide variety of gases and organic dusts from microbial, plant, and animal sources, which can affect the respiratory system of both horses and people spending considerable time therein.

The aim of this study was, first to investigate if selected pollution components of horse stable air were correlated to markers of respiratory health in stable personnel in general. Secondly, does installation of a mechanical ventilation system at a riding-school stable lead to better air quality, which may be related to improved respiratory health.

Methods

Hygienic measurements were performed both in a conventional race-horse stable, and in a riding school stable. In the latter measurements were carried out both before and after introduction of mechanical ventilation. Sampling included carbon dioxide (CO₂), ammonia, particles, horse allergen, microorganisms and endotoxin. The stable-workers and riding-students completed a questionnaire, lung function tests, and underwent nasal lavage with analysis of inflammation biomarkers.

Results

In a conventionally-managed race-horse stable, 3 / 13 stable workers had increased PEF-variability, indicating bronchial obstruction. They also had increased levels of ECP in nasal lavage, indicating allergic asthma. Only two of the personnel reported work-related airway symptoms. In the riding school stable, after installation of mechanical ventilation, there was a decrease (non significant) in PEF-variability in both stable personnel and riding-students. Levels of CO₂ were nearly halved. Other parameters that improved with mechanical ventilation included levels of ammonia, horse allergen, ultrafine particles and microorganisms in surface samples, whereas airborne microorganisms and endotoxin increased.

Conclusions The most striking effect of installing mechanical ventilation in a stable was an approximately 50% reduction of the CO₂-level. Many factors affect the levels of particles, including horse and human activities, type of feed and bedding material. There were no significant changes in human symptoms, PEF-variability, exhaled NO or inflammatory biomarkers in nasal lavage after installation of a ventilation system in the riding school stable. The absence of measurable improvement to respiratory health after intervention may be due to a low statistical power because of a small study-population, a healthy-worker effect in this stable, or both.

Farm and construction accidents in Finland

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In the end of 2011 there were 60 000 farms in Finland, according to Information Centre of the Ministry of Agriculture and Forestry (Tike). Statistics also shows that 20 000 farms had animals.

Ministry of Agriculture has subsidized investments in agricultural buildings during the last ten years in 30 000 cases (new, renovation, enlargement)

in 2000's this subsidized investments in agricultural buildings has been app. 10% of all granted building permissions and of the building space (m³)

In larger projects farmer acts as a subscriber and the construction contract is responsible for the project and also about the safety issues.

In spite of that, usually the farmer also participates to the construction work, especially in renovation and maintenance.

Both the agriculture and the construction have high rates of occupational accidents and certain types of occupational diseases.

Farmers' Social Insurance Institution (Mela) has collected data within its claims records that include occupational injuries and diseases related to farm building construction. The objective of this presentation is to describe the injuries and diseases related to farm building construction in Finland based upon these data.

During the 5-year period from 2006 through 2010, 39 diseases and 1488 injury included 4 fatal accidents, represented 5,6 % of all injury and disease claims among 60 000 farmers. Results also indicated that 7 % and 93% of claims were made for females and males

As to the type of activity associated with each claim, building maintenance represented the highest incidence (630), followed by new construction (424), renovation (257), demolition (64), and making other structures such as fences and corrals (78). The three principle causes of injuries were scaffolds or temporary ladders, circular saws and woodworking machines or uneven or slippery terrain.

The principle parts of body injuries included the fingers and hand (605) the leg and foot (416), and back and spine (124) Also eye injuries were common.

Evaluation of working environment in piggery with and without automatic straw distribution

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Keywords: agricultural working environment, dust exposure, endotoxin,

Objectives

Organic dust generated by animals, straw and foods in swine building is a serious and constant problem in agricultural working environment. Straw handling in the piggery is one of the most dangerous daily tasks for the farmers due to the harmful dust exposure.

The objectives of this study were to reduce the risk for work-related diseases for farmers working in pig production, and to evaluate qualitative differences in working time and dust exposure for manual straw distribution as compared to automatic straw distribution in pig production. The hypothesis was that introduction of automatic equipment for straw distribution contributes to an improved working environment.

Methods

The study included measurement of working time requirement and dust exposure at pig barns in two phases of field studies.

During the first phase, the measurements were carried out in 11 Swedish conventional pig barns. The working tasks that were investigated at daily straw handling included: i) manure scraping in pigpen, ii) preparing (loading straw into handcart in storeroom and moving strawing handcart to pigpen), iii) litter (distributing straw and littering into pigpen), and iv) others (non daily and unexpected work, e.g. answer a phone).

In order to evaluate the automatic litter, two different sizes of an automatic straw distributing system were installed in two different sizes of piggeries in the second phase. The system was based on a modified feed conveying system for dry feeding of pigs that was set up in the stables at a high level of 2 meters above the pen. The chopped straw was transported in the pipes with a wire, provided with carrier discs system and distributed down into each pen by small outlet portions. Straw was distributed for 3 times per day and about 1 kg per pen and day. The small barn with 12 pens has a dry feeding system and the bigger one with 42 pens has a wet feeding system. The measurements were repeated for three times in different days at both farms for the experimental evaluation.

Exposure to dust was investigated *via* the measurement of the concentration of airborne dust as well as the analysis of endotoxins and microorganisms sampled from personal sampling in the breathing zone. The measurement of real-time concentration of airborne dust was carried out with farmers by using an instrument named personal pDataRAM. A portable air pump that was connected with two sampling filters was utilized for the personal sampling. After each measurement, the sampled filters were immediately transferred to the chemical laboratory for the analyses of the endotoxins and microorganisms.

Results

The time consumed for the straw distribution was from 7 to 21 minutes per farm, and the time for the litter preparation was from 2 to 14 minutes per farm. There was a great difference between farms for the total daily straw handling, from 31 to 919 minutes per farm. This is because different sizes of the barns and different working routines among the farms.

The results of daily working time studied during the second phase show that the average time consumed for tasks ii (preparing) and iii (litter) of manual straw distribution was 6,0 minutes for smaller barn with 10 pens and 9,7 minutes for bigger barn (41 pens/boxes, 410 pigs), respectively. The working time for the task ii (preparing) is still required to load straw into a container of the automatic straw distributing system. The average time for preparing was 3 minutes per day for this task at the smaller barn, and only 1 minute per day at the bigger barn. The results demonstrated that the farmers could save 2,8 minutes (47 %) for the barn with 12 pens (120 pigs) respectively to 8,6 minutes (89 %) for the barn with 42 pens (420 pigs) per day through using the automatic straw distributing system, as compared to litter manually. Actually, the loading of straw container could be easily avoided or reduced as the automatic straw container could be placed with a connection to a mechanic loading equipment.

The results show that the concentration of airborne dust varies with both in various activities and in different pig barns. The concentrations of endotoxin measured in all of the pig barns exceeded 9 ng/m^3 , which is the exposure limit value of risk for inflammation of respiratory tract. Among the eleven measurements of endotoxin, eight exceeded a risk level of 200 ng/m^3 (an exposure limit value for toxic pneumonia). An extremely high content ($>5700 \text{ ng/m}^3$) of endotoxin in airborne dust was measured with a farmer when he was manually littering oat straw in one of the pig farms, while an automatic dry feeding was in progress. The results of microbiologic analysis also show that the total aerobic bacterial and mould spores in the airborne dust are high (up to $2,8 \cdot 10^8$ bacterial spore/ m^3 and up to $3,2 \cdot 10^7$ fungal spore/ m^3). It was observed that the quality of straw used were not good at some of the farms investigated. This is because the straw have been stored for more than 2-3 years. The old straw could generate mould and toxic dust. Handling of mouldy straw should be avoided as far as possible. Also, the results show that the airborne dust contained a large amount of toxic producers (alternarium, eurotium, fusarium, trichoderma and wallemia) that caused the high concentration of the endotoxin. Exposure to such a harmful dust would be prevented via the automatic straw distributing system as the litter manually could be replaced (the farmers don't need to litter anymore).

The use of the automatic straw distributing system in swine barns instead of daily manual straw handling can save labour cost and reduce the farmer's dust exposure. Therefore, it is valuable to invest from both economic and ergonomic points of view. A further research is needed to investigate the economic effect of the system in full-scale in different sizes of piggeries, for instance, some calculations to demonstrate how much costs for man hours will be saved in the piggeries for comparing this with the cost of investing in the automatic system.

Promoting principles of health and safety rules on the farm by the Agricultural Social Insurance Fund (KRUS Poland)

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Keywords: health, safety rules, farm, prevention, education, accident, diseases

Objectives

1. Presentation of accident rate in Poland's agriculture.
2. Guidelines for preventive activities carried out by the Agricultural Social Insurance Fund for the prevention of accidents and occupational diseases among farmers.
3. Preventive measures implemented by the Agricultural Social Insurance Fund.
4. The effectiveness of preventive measures carried out by KRUS

Methods

Study is based on data gathered by KRUS's Department of Prevention and Rehabilitation in 2011

Results

There was 25 772 accidents reported by KRUS regional branches and local offices in 2011. KRUS made payout of 16 574 one-off indemnities due to permanent or long-term detriment to health or death. KRUS notified 81 fatalities. Accident rate at individual farms was 10,9 total of 1000 insured by KRUS.

183 sicknesses ended with payout of one-off indemnities due to permanent detriment or death due to occupational diseases. Most of the occupational diseases was contagious illness (159 ill) and respiratory diseases (12 ill).

Activity on prevention of the Agricultural Social Insurance Fund is limited by act on the social insurance for famers and is aimed at prevention of accidents at work and farmers' occupational diseases. Prevention activity of KRUS affects imagination and habits of farmers and their family members.

In creation of right behaviour, great importance are played by different types of courses, contests and competitions on knowledge of OSH rules, local and nation-wide contest for the safest farm and many exhibitions and shows on safety at work conducted by all KRUS's unit on every level.

Safety at work are introduced among farmers, they are encouraged to implement changes on farms, what affects adjustment of conditions of safety and health at work among people working/being on farm, and also it helps to remove cause and source of disease's infections and accidents.

Preventive activity of KRUS's units is planned and realized in accordance with law and President of KRUS ordinances.

In 2011 was arranged:

- 4 486 courses and meetings from the area of occupational safety and health at work on farm and conversations for children about threats and accidents, which may happened during helping parents or playing on farm; in above activity took part 153 400 farmers and their children and people active at rural area.

- 2 318 contests and competitions of different types about occupational safety and health at work knowledge, which were organized by KRUS or in cooperation with other institutions, in which took part 84 200 participants – farmers and members of their families;
- local and nation-wide contest for the safest farm in Poland, in which participate 1553 farms; in the IX Nation-wide Contest for the Safest Farm in Poland in 2011 took part 1097 farms from whole country.

Employees of KRUS organized 854 information points and exhibitions from the area of prevention during agricultural fairs, festivals, galas and picnics and other meeting with people from the country. There were also 1 385 shows of safety at work in which KRUS's units participate, which gathers above 60,7 thousand people.

Knowledge of threats at work and prevention on accidents at farms was popularised also thru newspapers articles, television and radio programmes and content on web pages and portals.

The success of this multilevel “campaign” is confirmed by numbers. During last twenty years number of accidents at work reported to KRUS decreased by two and a half times – from 65 936 to 25 772 and fatalities from 334 to 81. Accident rate (accidents on 1000 insured farmers in KRUS) decreased from 24,6 to 10,9 accidents.

Media campaign implemented by the Health and Safety Authority to create awareness among farmers of the dangers in the agriculture sector in Ireland

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Objective; To outline the various elements of a media campaign used, their general outcomes and reach to help improve farmer awareness of health and safety risk and reduce fatal and serious accidents in the sector.

Background; The agriculture sector is currently by far the most dangerous major economic sector in Ireland in which to work. There were 26 deaths in 2010, followed by 22 deaths in 2011 which meant someone was having a fatal farm accident almost every 2 weeks on an Irish farm with almost 50% of fatal accidents occurring in that sector. This is a shocking statistic in any circumstances, but even more so when one considers that the agriculture sector accounts for fewer than 7% of the total Irish workforce.

Action and Approaches

There was such concern at the high levels of farm deaths in 2010 that there was direct Ministerial involvement along with key farming groups and stakeholders with a view to driving activities that can influence attitudes to health and safety in the farming community.

A major media campaign was designed in 2011 and implemented in the first quarter of 2012 which included;

- A series of six hard-hitting video clips were developed suitable for web broadcast and DVD reproduction titled “Survivor Stories” focusing on the after effects of serious farm accidents. View and send to friends www.hsa.ie/farmaccidents or on You Tube www.youtube.com/user/farmaccidents
- Social media campaign using You Tube, Facebook, Twitter and web advertising
- A shocking advertising campaign titled “I’m The Lucky One” using a real farmer who had suffered an arm amputation.
- A shocking radio advertising campaign which described the effects of being caught in a PTO

Accidents on Polish family farms

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Keywords: accidents, agriculture, family farms

Objectives

Agriculture is one of the most accidental economy sector. There were over 26 thousands accidents reported on Polish farms in 2010 year. The statistical analysis of accidents reported to the Agricultural Social Insurance Fund in 2010 shows that the majority of accidents were caused by organizational reasons and occurred in mixed production farms as well as male gender was the most exposed on accident risk.

The aim of this study was to prepare the questionnaire to find the more than one reason of the accidents.

Methods

The questionnaire was developed and carried out on 250 persons. Study participants were recruited among farmers, who experienced an accident on their family farm in 2011. The questionnaire contained the general questions on farm, as well as accident issues.

Results

Results suggest that the most frequently reason of occurred accidents on Polish family farms were caused by human and organizational reasons.

The conclusion is the need to improve the education on accident prevention of farmers as well as safety organisation of work in agriculture.

The ILO "*Code of Practice on Safety & Health in Agriculture*" - What is it?

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Since the creation of the World League of Nations in 1919, attention has been devoted to developing a code of practice for workers in production agriculture. Given successive waves of world-wide and economic sector growth, bust, and decline, the idea never materialized. After the Second World War, interest was ignited again, however all development stopped given the emergence of the Cold War. Recurrent conversation among producers and workers occurred from time to time; meanwhile the Iron Curtain collapsed. In 1998, at the conclusion of the 4th International Symposium – “Rural Health and Safety in a Changing World” in Saskatoon, CA, conference attendees ratified a proclamation that included a call for such a code. Staff from the ILO returned to Geneva and gradually groundwork was laid for the effort which commenced in 2007, using ‘social dialogue’ as the key component of workplace improvement. To facilitate such dialogue, papers were commissioned in 2008 that, when written by recognized experts, became key chapters of the proposed *Code*. In 2009 and 2010 experts representing governments, agricultural employers, and agricultural workers were convened in Geneva for two separate tripartite venues in which “all address shared concerns, and {sought) solutions to problems they jointly faced in the world of work” – Mr. George Dragnich, Executive Director, Social Dialogue, ILO, speaking in Geneva on 23 November, 2009.

Numerous ILO and WHO declarations, conventions, recommendations, and concept papers provided background for the proposed effort. Ultimately, a document emerged that addressed working conditions in commercial agriculture, though many of its recommendations also fit subsistence agriculture which produces approximately half of the food currently consumed by the world’s population. The *Code* is organized around a consistent convention...hazard description, control strategies (hazard elimination, engineering controls, use of safe working systems and procedures, and use of personal protective equipment), and where appropriate, worker health surveillance, atmospheric and environmental control, and resort to emergency procedures. The *Code* addresses development of a national framework for occupational safety and health in production agriculture, design of safety and health management systems, the role of worker competence, education and training, provision for contingency and emergency preparedness, types of personal protective equipment, provision for worker welfare facilities and wellness programmes, and recommendations for outreach among the world’s rural populations. Useful appendices were also developed, including the first world-wide fluid intake requirements for human workers, and temperature, humidity, and wind chill and heat stress indexes structured in Imperial Units, Metric Units, and U.S. Units.

Design of manure gas exhaustion in loose-housing systems for laying hens

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Abstract: Uniformity of air flow in extraction openings in exhaust air channels for manure gas exhaustion is determined by the distribution of pressure.

The areas required in extraction openings and in extraction channels are determined by the uniformity of air flow desired along a channel and by the loss of pressure that can be accepted. The area ratio between the exhaust openings and the cross section of an exhaust air channel will have a strong influence on both uniformity of flow and loss of pressure. The following ventilation properties have been studied:

- Uniformity of exhaust air flow in exhaust openings along an air channel
- Variations in static pressure along an exhaust air channel
- Air velocity at different distances from the openings.

The area ratio should be about 1 for uniform exhaustion. The studies showed that the relative variation in air velocity is independent of the level of the ventilation rate.

The uniformity of the exhaust distance is influenced in about the same way by the area ratio as the air velocity in the exhaust openings. Thus, is it important that the area ratio is not too high if a good exhaust function should be guaranteed. The studies also demonstrated that the uniformity of the exhaust distance is independent of the ventilation flow rate. The exhaust ventilation range is, maximally 0.3 m from the openings.

The static friction coefficient was on average 0.80.

Keywords: ventilation, ammonia, exhaust, air channel, pressure, hen

Introduction

Regarding laying hens, loose-housing systems are being re-established in Sweden since animal welfare legislation stipulates that systems for laying hens must include laying nests and perches and provide access to litter.

In both Swedish [1, 2, 3] and foreign studies [4, 5, 6, 7, 8] loose-housing of laying hens has been found to cause higher concentrations of ammonia in comparison with those in cage systems with regular cleaning-out of manure. Measurements at commercial Swedish operations with low density floor systems for laying hens have shown that ammonia concentrations exceeded the legislated maximum of 25 ppm [9, 10] in a majority of 18 randomly selected houses and concentrations up to 80 ppm were measured [11].

The reason for the increased concentrations of ammonia is the larger amount of manure that becomes accumulated inside the buildings when the hens are kept in loose-housing systems [1, 4, 6]. The increased concentrations of ammonia may cause not only a working environment problem [12, 13, 14, 15], specially regarding respiratory illness, but may also affect the animal environment. High ammonia concentrations have been found to affect production efficiency, feed conversion and performance on poultry [16, 17, 18].

One way of preventing the spread of gases is to encapsulate the source and to extract a certain volume of air in direct conjunction with the pollution. The amount removed in this way is determined by the ability to capture the gas at manure surfaces. To obtain the best possible function in manure gas exhaustion is it necessary to achieve the best possible uniformity when extracting exhaust air from manure surfaces in long animal buildings.

Uniformity of flow in extraction openings is determined by the distribution of pressure in exhaust air ducts. Further, the loss of static pressure in the ventilation system must not be so large that it will affect the dimensioning of the entire fan system.

The main objective of this study was, thus, to obtain data on the dimensioning and function of extraction air ducts for manure gas exhaustion.

The areas required in extraction openings A_V and cross section in an extraction duct A_D are determined by the uniformity of flow desired along the channel and by the loss of pressure that can be accepted. The area ratio A_V/A_D will have a strong influence on both uniformity of flow and loss of pressure. Fan systems for animal buildings in Sweden are normally dimensioned for a maximum total loss of pressure of 60 Pa. Of this loss of pressure, maximally 15-20 Pa should originate from the extraction channels.

Materials and Methods

The following ventilation properties were studied in a test duct during extraction of air:

- Uniformity of flow in the exhaust openings along the duct
- The change in static pressure along the duct
- Air velocity at different distances from the openings in the test duct.

These properties were evaluated at different area ratios A_V/A_D and air flow rates.

The test duct had a cross section A_V/A_D of 0.2* 0.2 m and was equipped with a continuous adjustable slot as exhaust opening.

For each adjustment, the air flow was measured twice in a grid located in a circular exhaust ventilation channel attached to a fan. The air flow was measured with a newly calibrated hot wire anemometer. Air velocities in the exhaust openings were measured in five different parts of the duct with the same hot wire anemometer.

The difference in static pressure to that of the ambient pressure was measured at five different locations in the duct with pressure heads attached by a plastic tube to an electronic micromanometer.

The length of suction at right angles to the duct was determined using smoke with air flow indicator tubes and a measuring tape. Suction length was defined as the distance from the opening where there was no visible air movement.

Results and Discussion

Uniformity of flow in the exhaust openings

The variations in the air flow along the duct were studied with regard to:

- Absolute change in air velocity along the duct
- Relative change of air velocity v_{min}/v_{max} in the openings along the duct
- Variation in exhaust distance along the duct.

These properties were studied both at different area ratios between total area of the openings and the cross section area of the duct, A_V/A_D , and at different ventilation rates. Analyses were made of how the relative variation of air velocity, v_{min}/v_{max} , in the exhaust openings was influenced by the area ratio, as shown in Fig. 1. It is clearly seen that the area ratio A_V/A_D must be less than about 1 if the exhaust ventilation should not be too uneven along the duct. The studies also showed that the relative variation in air velocity v_{min}/v_{max} is independent of the level of the ventilation rate.

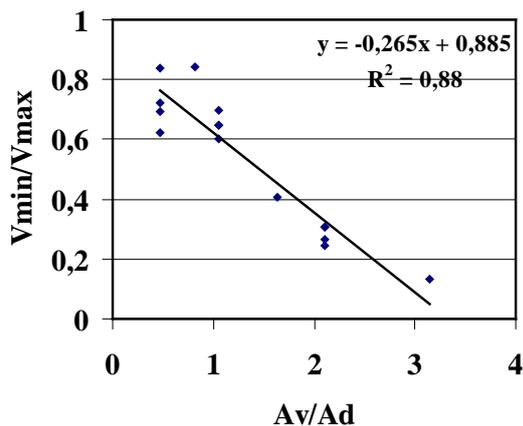


Fig.1 Relation between minimum and maximum air velocities, v_{min}/v_{max} , in the exhaust openings as a function of the area ratio, A_v/A_d

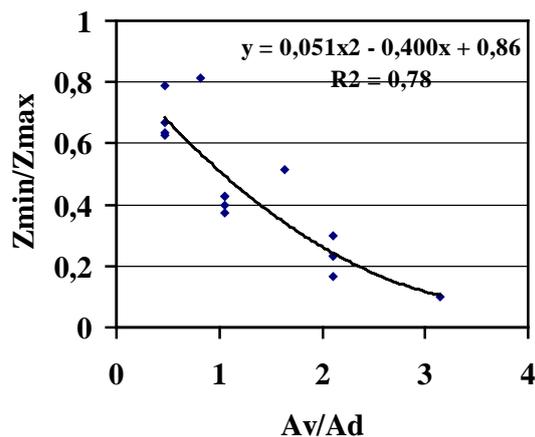


Fig.2 Relation between minimum and maximum lengths of exhaustion, Z_{min}/Z_{max} , as a function of the area ratio, A_v/A_d .

How the relative variation in the length of the exhaust distance, Z_{min}/Z_{max} , is affected by the area ratio A_v/A_d , was also studied, Fig. 2. The uniformity of the exhaust distance is influenced in about the same way by the area ratio as the air velocity in the exhaust openings. Thus, also here is it important that the area ratio is not too high if a even exhaust function should be guaranteed from manure-covered surfaces. The studies also demonstrated that the uniformity of the exhaust distance, Z_{min}/Z_{max} is independent of the ventilation flow.

The length of the exhaust range is affected by the air velocity and thus also by the ventilation rate. The exhaust range is affected linearly by the level of the ventilation rate. However, it should be observed that the exhaust ventilation has a limited range, maximally 0.3 m from the openings.

Static pressure drop

The static pressure drop can be described by the formula:

$$\Delta P = a \cdot \rho \cdot v^2$$

Where

- ΔP = static pressure drop, Pa
- a = total friction coefficient for an air duct
- ρ = air density, kg/m^3
- v = air velocity, m/s

The coefficient a will depend on the design of the duct and the openings. The value of the coefficient a was determined. The coefficient a was, in principle, unaffected by the area ratios A_v/A_d and has assumed values within the interval 0.69 -0.92. On average, the value of the coefficient was 0.80.

Conclusions

Both theoretical analysis and model experiments demonstrated that there are good possibilities to achieve relatively uniform extraction of air from ducts if the ratio between the openings and the cross-section of the exhaust duct, A_v/A_d , is not too large. Measurements have shown that this area ratio should not be larger than 1 if acceptable uniformity should be achieved. The size of the loss in pressure in the exhaust duct depends both on the friction resistance of the duct and on the air velocities.

When designing ventilation systems for loose-housed laying hens in Sweden the following guidelines could be followed:

- The design of the fan system should be done in accordance with current methods, i.e., a doubling of the ventilation rate for each fan step higher.
- It is an advantage if the exhaust air is removed from places where manure is accumulated by means of an exhaust duct along the length of the building. For example, in some cases, the space below nest-boxes can be used as an exhaust duct for manure bins.
- Exhaust ducts should have exhaust openings placed at least at 0.5 m intervals.
- Preferably, the exhaust ventilation should be done through a continuous slit in the longitudinal direction of the duct.
- The total area of the exhaust openings should be of approximately the same size as the cross-section of the exhaust duct in order to obtain uniform exhaust levels along the duct.
- Air velocity in an exhaust duct should not exceed 3 - 4 m/s if the loss of pressure in the duct should be kept at an acceptable level.
- When designing entire duct systems consideration must also be taken to loss of pressure in other fittings (bends, joining ducts, etc.).
- It must be possible to open exhaust ducts to clean them.

Discussion

Both theoretical analysis and measurements in a test duct have shown good possibilities to create even exhaustion of ventilation air along an exhaust air channel

References

- [1] Gustafsson G and Mårtensson L. (1990). Gaser och damm i fjäderfästallar [Gases and dust in poultry houses]. Swedish University of Agricultural Sciences, Department of Farm Buildings, Lund, Sweden, Report 68, 88 pp.
- [2] Von Wachenfelt E. (1993). Air contamination in poultry production systems. Proceedings: 4:th European Symposium on Poultry. Edinborough, September 18-24, 1993. Edinborough.
- [3] Nimmermark S, Eduard W, Gustafsson G and Lund V. (2007). Luftkvalite i norske hus for verpehons. Report. National Veterinary Institute. Norway.
- [4] Mannebeck H and Oldenburg J. (1990). Comparison of different systems on ammonia emissions. In: Odour and emissions from livestock farming (Eds.: Nielsen, Voorburg & Hermite), pp 42 - 49. London: Elsevier Applied Science.
- [5] Hillig J. (1992). Ammoniakemissionen aus Aufzucht- und Legehennenställen bei unterschiedlichen Haltungsverfahren. In: Geruchs- und Schadgasemissionen aus der Tierhaltung, pp 74 - 79. Arbeitspapier 174. Darmstadt: KTBL.
- [6] Hauser R H and Folsch D W (1993). The quality of poultry house air in alternative systems for farming laying hens. In: Livestock Environment IV, pp 671 - 677. S:t. Joseph. Michigan : American Society of Agricultural Engineers.
- [7] Koerkamp P W G, Keen A, Van Niekerk T G C M and Smith S. (1995). The effect of manure and litter handling and indoor climatic conditions on ammonia emissions from a battery cage and an aviary housing system for laying hens. Netherlands Journal of Agricultural Science 1995, 43: 351-373.

Nordic Meeting on Agricultural Occupational Health & Safety 2012
August 27-29, 2012 Ystad, Sweden

- [8] Koerkamp P W G. (1996). Concentrations and emissions of ammonia in livestock houses in Northern European countries. Proceedings: Seminar no 268, NJF-Teknik- 96, 30 October - 2 November, Aarhus. Nordiska Jordbruksforskarens Förening.
- [9] Swedish National Board of Occupational Safety and Health. 2000. AFS 2000:3. Hygieniska gränsvärden och åtgärder mot luftföroreningar (Occupational exposure limit values and measures against air contaminants). Statue book of the Swedish National Board of Occupational Safety and Health. Solna, Sweden: Swedish Work Environment Authority. (In Swedish).
- [10] Swedish Board of Agriculture. 2003. SJVFS 2003:6. Statens jordbruksverks föreskrifter om djurhållning m.m. (Directions from the Swedish Board of Agriculture about animal management in agriculture etc.). Jönköping, Sweden: Swedish Board of Agriculture. (In Swedish).
- [11] Von Wachenfelt H, Odén K and Gunnarsson S. 2002. Värphöns i lågbeläggningssystem (Laying hens in low density systems). Sveriges Lantbruksuniversitet, inst. för jordbrukets biosystem och teknologi. Specialmeddelande 237. Alnarp.
- [12] Drost H and van den Drift D W. (1992). Working conditions in an aviary system for laying hens. Proceedings: World's Poultry Congress, Amsterdam, the Netherlands 20 - 24 September 1992, 2: 734 – 738.
- [13] Drost H and van den Drift D W. (1993). Health effects in relation to exposure to aerial components in aviary systems for layers. Proceedings: XXV CIOSTA CIGR Congress, May 10 - 13, 1993; Wageningen, the Netherlands, pp 198 – 204.
- [14] Whyte R T, Williamsson P A M and Lacey J. (1993). Air pollutant burdens and respiratory impairment of poultry house stockmen. In: Livestock Environment IV, pp 709-716. S:t. Joseph. Michigan : American Society of Agricultural Engineers.
- [15] Schlenker E H, Parry R R and Hellickson M A. (1987). Respiratory characteristics of poultry labourers. Proceedings: CIGR-seminar on Latest Development in Livestock Housing, June 22- 26 1987, Urbana-Champaign, Illinois, pp 127- 136. S:t. Joseph. Michigan : American Society of Agricultural Engineers.
- [16] Reece F N and Lott D B. (1954). The effect of ammonia and carbon dioxide during brooding on the performance of broiler chickens. Poultry Science 59.
- [17] Canveny D D and Quarles C L. (1978). The effect of atmospheric ammonia stress on broiler performance and carcass quality. Poultry Science 1978, 57: 1124 – 1125.
- [18] Charles D R and Payne C G. (1966). The influence of graded levels of atmospheric ammonia on chickens. British Poultry Science 1966, 7 :

Licensing quad bike riders on New Zealand farms

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Keywords: quad bike, ATV, license, farms, safety

Abstract

There are still large numbers of quad bike (also known as ATV's) accidents on New Zealand farms, resulting in about 850 serious injuries and 5-8 fatalities per year. In addition there are a vast number of minor injuries that are not recorded in official statistics. The accidents with quad bikes are of great concern to the industry, their families and their insurers. Hence many initiatives are being made to reduce these accidents. In 2011, FarmSafe introduced the "Quad Bike Farm License" to ensure the riders reached a high standard of safe use. The license has introduced a series of nationally approved standards that must be achieved. These involve:

- An understanding of the official "Guidelines for the Safe Use of Quad Bikes".
- Be clear on your personal responsibilities for safe use of quad bikes.
- Have demonstrated the required level of practical riding skills and have at least three months on-farm and 30 hours injury-free use of a quad bike.
- Have clear knowledge of the specific riding hazards on the farm where you work.
- Employers are to have a clear method to check on the training and practical quad bike skills of their employees.

The license is being introduced throughout New Zealand by the network of FarmSafe Regional Managers, and also the Field Advisors of the Agriculture Industry Training Organisation. The license will only be awarded to persons who are 16 years old or over and it has a life of three years. It is expected that this initiative will have widespread acceptance and will significantly contribute to reducing the personal and financial cost of quad bike accidents in New Zealand.

Changes in the US dairy industry require development of comprehensive employee training and safety programs

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Keywords: dairy, safety, training program

Abstract

Since WWII the US dairy industry has changed to more efficiently produce dairy products to meet higher domestic and international demands. In 1944 the US dairy Industry produced 53 billion kg of milk with 25.6 million cows while in 2007 37% more milk was produced with 64% fewer cows. The number of dairy farms has declined while herd sizes continue to increase. Because of shrinking margins and consequential advantages of economies of scale, it is not an entirely unlikely scenario to see a new US model where economic equilibrium is reached with 9 million dairy cows consisting of 900 dairies with 10,000 cows each; as opposed to 9,000 dairies with 1,000 cows each.

As the number of large-herd operations continues to rise these dairies will continue to employ more workers. Currently it is common on dairies in the Western US to see one employee per 80-100 milking cows. Having larger numbers of employed workers presents new challenges for dairy owners and managers of ensuring safe working environments and complying with state or federal occupational safety and health regulations. Many dairy owners and managers are now responsible for managing human resources and safety programs, yet most have not had formal training in employee management or occupational safety.

The increased size of many of the southwestern dairies actually presents a unique opportunity for the development of tailored training programs since daily duties and tasks on the dairy have become highly specific and specialized. Historically, the task of training and supervision of employees typically was that of upper-management. With increasing employee numbers, this task is often delegated to employees with seniority (mid-level management). Formal training, including basic and theoretical study explaining the rationale or the science behind particular work related activities, is not common. Often employees will know “what” to do but may lack the understanding “why”. Super-imposed on this, the large majority of workers on dairies in the US are from different geographical and cultural origins; it is therefore imperative and appropriate that any training and safety program be based on understanding of linguistic and cultural barriers and attitudes towards working with animals and/or equipment.

It is imperative that insufficient understanding of the task can impact the outcome of the task in many ways: job motivation and hence job performance, thoroughness, expedience, accuracy, and finally but not any less important job safety. The organizational support to implement a successful training program has to be developed, and operational and managerial commitment to such a program is required.

Development of an action plan to improve health and safety outcomes in the New Zealand agriculture sector.

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Keywords: agriculture, health and safety, machinery, vehicles, animals, mental health, wellbeing, farmer, slips, trips, falls, strategy, action plan

Objectives

In 2011 the New Zealand government released a National Action Agenda to focus workplace health and safety activity over the next three years. The Action Agenda marked a shift in NZ's strategy to reduce the work toll - by sharpening the focus on action and bridging the gap between the country's ten year Workplace Health and Safety Strategy, and the activities of workers and employers on the frontline.

The Action Agenda set the framework of identifying priority sectors (those with the highest rates of injury, disease and death) and developing action plans for each of these sectors. These sectors are: Agriculture, Construction, Forestry, Fishing, and Manufacturing. There is also an action plan that spans across all industry that focuses on Occupational Health.

The Action Plans are intended to provide a rallying point for all key players to:

- build shared leadership and ownership of the problems and solutions
- agree on key priorities for action, and
- co-ordinate and integrate activity.

This presentation will focus in particular on the Agriculture Sector Action Plan. It will:

- provide a description of the development process
- describe the content of the Plan itself
- outline highlights and lessons learned to date, and
- present next steps and future challenges in the implementation phase.

Methods

The Department of Labour is the main regulatory agency for workplace health and safety in New Zealand, and as such has taken a leading role in co-ordinating the development of the Sector Action Plans. However, the Department is mindful that the ultimate success of these plans depends on each sector 'owning' their Sector Action Plan and working collaboratively with each other and with government to effect change. Development of the Agriculture Sector Action Plan therefore involved representatives from all the main industry and government stakeholders working together. Stakeholders first agreed on the priority areas of the plan, and then contributed a range of actions that were intended to help achieve the goals of the plan.

Results

The Agriculture Sector Action Plan targets four areas that account for at least 50 per cent of all injuries and deaths in the sector, including:

- use of agricultural vehicles and machinery
- the physical and mental health/wellbeing of agricultural workers
- slips, trips and falls, and
- animal handling.

The plan, launched in April this year at Parliament, sets out how the agriculture sector and the government will work together over the next two years to reduce the work toll and outlines specific actions.

These include actions to: reduce harm from the use of quad bikes on farms; provide high quality information and training to the farming community; reduce falls on farms; provide suicide prevention support; and to promote health and safety in particular areas such as wool harvesting and the beef and lamb industries.

The National Action Agenda and its associated Action Plans are intended to help achieve a significant reduction in workplace fatality and injury rates. In relation to its quad bike safety work, the Department of Labour has set a target of reducing serious injury on farms by 30% by 2013. Further targets (relating to all workplaces) are likely to be set in the future. A monitoring and evaluation framework to help track progress of the Agenda and Action Plans towards achieving their aims is being developed.

Factors affecting occupational safety and health of Nordic foreign farm workers

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Purpose

The purpose of this project was to identify factors affecting the occupational safety and health of foreign farm and greenhouse workers in the Nordic countries.

Methods

We reviewed literature on occupational safety and health of foreign agricultural workers in Europe and the Nordic countries. We conducted cultural probes and interviews of 14 foreign farm workers documenting their experiences and factors affecting their safety and health when working on farms and greenhouses in the Nordic countries. The cultural probes method involves keeping a structured diary and documenting thoughts and events over a one week period. The research team collects and summarizes findings from the diaries and meets with the workers, discussing their diary entries in more detail in a group discussion.

Results

Our results supported conclusions of earlier studies that communication can be challenging because of insufficient language skills, short employment periods, unfamiliarity with agricultural work and health and safety rules, new production methods, different attitudes towards safety, different management cultures and social stress. Shyness and cultural differences can lead to misunderstandings and underreporting of incidents. Homesickness was reported by many as a stress factor. The desire to work as long workdays as possible to maximize earnings may compromise safety. Lack of knowledge of hazards in the work environment was also observed. Supporting the well-being of workers in general, like efforts to ease homesickness, may have positive effects on safety as well. Workers and employers expressed a need for tools and aids to activate discussion of health and safety in the workplace.

Application to Field

Some of the identified risk factors are common to all workers, but migrants are more likely to have more than one of these risk factors, which increase their risk for occupational injuries. When working conditions are similar, injury risks also tend to be similar among foreign and native workers. Based on our findings, communication is a central problem and tools and methods to improve information exchange between workers and supervisors is critical for improving the health and safety of foreign workers.

Landbrukets HMS-tjeneste (LHMS) – What's new?

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The Norwegian Ag. Occupational Health and Safety Service offer service to about 10 000 members. The members pay an annual fee for the service and get a three year cycle program with farm visit, health check and education in groups. It also includes one consultation with OHS personnel annually and assistance in the event of a crisis.

LHMS has developed and sell a course about “Practical health and safety work” to farmers. About 15 000 has participated so far.

In 2012 LHMS was founded 1 million NOK from government to start a campaign. A condition for receiving the money was that private stakeholders contributed with the same amount. The campaign will focus on:

- Safe use of tractor (included use of safety belt)
- Safe handling of big animals
- Fire safety
- Preventing dust exposure
- Prevention of fall risk
- Safety in forest work

It is planned to arrange about 700 arrangements all over the country during 2012 and 2013. The campaign had its kick off July 5th on Habberstad farm.

Animal welfare, work safety and animal handling when using mobile or fixed handling systems for beef cattle – a field study

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Appropriate handling facilities in beef production are of greatest importance for rational handling, animal welfare and work safety. However, most herds with beef cattle are small which makes farmers reluctant to invest in such facilities. But still, handling large cattle is risky and improving animal handling facilities, with respect to work safety has got more attention because the relatively large number of farm workers that are injured by cattle. In order to investigate the use of handling facilities for cattle and risks of injury, a questionnaire was sent to 129 beef cattle farmers in southern Sweden of which 70 (54%) responded. There are three factors concerning the risks of handling cattle: the animals, the people and the equipment. All these factors were addressed in this study by the questions put forward in this study.

The most common size of the responding herds had 30-90 heads of cattle (43 %), and 23 % had 90-150 animals. Herds with less than 30 animals were 14 % of the respondents. Most herds had mobile handling facilities 49/70 where 19 combined a mobile facility with a fixed handling facility while 30 had only mobile handling facilities. The fixed handling facilities were built of wood (23) and 16 were built by metal. The mobile facilities of all investigated farmers were built on spot by metal hurdles and gates.

Farmers used the handling facilities for a variety of handling situations. The most common in the fixed facilities were fixation of adult cows, weighing and at calving including identification marking. Mobile facilities were mainly used for general management, separation of animals and treatments. Accidents had occurred in 38 farms while 22 farms reported no accidents, (no response from 10). A variety of injuries on personnel included kicking, butting, crushing, work load/position and other injuries. Animals were also at some risk although only few incidents were stated including slipping and skin injuries as the major events. But, serious injuries could happen to both personnel and animals. Farmers reported e.g. fractures, slipping, crushing of hand and foot damage. Animals were reported to have hip injuries, being trapped in the equipment, leg fractures at loading and crushing of calves.

The study shows that there is still need for more knowledge and better animal handling facilities and practices. Beef cattle farmers in Sweden can improve and create safer and more efficient work environments with cattle by use of better know how.

Work situation of control officers - with a special focus on health and food officers

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Keywords:

Legislation supervision control, municipal environmental health organizations, food control officers, health and food officers, professional communication

Objectives

The professional role of public control officers is complex and not always easy to handle for the individual. In this project we will focus on food control officers that sometimes are much debated in Swedish media. Headlines in the papers sometimes say the authority officers not have enough competence in meeting and communicate the owners of restaurants and other food companies. We will study this situation from different perspective trying to understand if it can be better. Work situation sometimes can be rough for the control officers. At the same time the health and food officers are important quality parts of the national food supply chain. Earlier studies (Horn af Rantzien 2010, 2012) indicate there is a lack of developing possibilities for environmental health officers (including food control officers), there are soon nearly only women working at this type of job (male employee decrease), leadership situation is weak, recruitment and authorization circumstances are underdeveloped.

Research questions are:

- How do health and food officers think about their working conditions?
- What experiences have food companies from public food control?
- Which possibilities are there to develop the professional role of public health and food officers in a better way?
- Which are the obstacles for good developing?

There is a reference group of different parts (consultative group) attached to the project.

Methods

The research project includes different parts with qualitative and quantitative studies. Planned methods are web questionnaire, interviews and focus groups. We will work with Grounded Theory.

Results

There are no results yet. The project is in the very beginning of a PhD work.

Founder

AFA Insurance (AFA Försäkring) is an organisation owned by Swedish labour market parties. AFA Insurance insure employees within the private sector, municipalities and county councils. More than four million people are covered by a insurance from AFA Försäkring.

Evaluation of the optimal arm-udder distance for milking cows in comparison to current practice

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Keywords: dairy, agriculture, MSD, posture

Objectives

A survey regarding the work place design and the health status of milking parlour operatives carried out on 20 German dairy farms revealed that a large proportion of workers were suffering from muscular-skeletal-disorders (MSD). Females were more often affected than men. There is evidence that MSD may be caused by high-force demands, awkward postures or repetitive work tasks. All of those causes are characteristic for manual udder preparation and attaching the cluster. A work place layout check was carried out on each participating farm to find out the specific setting for each worker.

Methods

Participating farms were recruited by e-mail contact. Each farm was visited once during a random milking period. The horizontal distance between the claw bowl and the edge of the pit was measured when the cluster was attached. It was measured for all cows on all farms and at the same time each parlour worker filled in the Standardised Nordic Questionnaire by Kuorinka (1987). Based on the stated body height of each person the arm reach was calculated and compared with the distance between claw bowl and pit edge.

Results

The comparison of the horizontal gap between the cow and the milker and the effective arm length of the persons showed that about 50% of the measured distances exceeded the effective arm length. This means to be able to reach the udder the worker has to bend or twist the upper body in addition to elevating and fully stretching the arm. There were significant differences between parlour configurations shown in figure 1. An average of 35 cm was measured in side-by-side parlours. Apart from the lower average the maximum values were also lower.

The average arm reach of males in the 50th percentile is 74 cm and 69 cm for females disregard less of age. To calculate the effective reach the body depth has to be subtracted. The body depth of the 50th percentile is 29 cm and nearly equal for men and woman (all values are based on DIN 33402-2 from 2005).

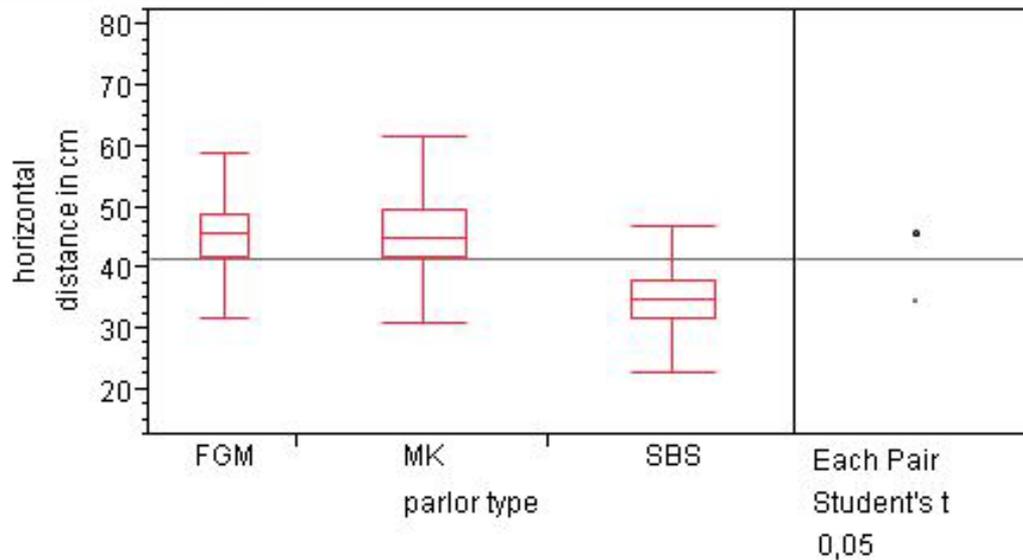


Figure: Average horizontal distance between centre of claw bowl and pit edge for different parlour configurations (FGM = herringbone, MK = carousel, SBS = side by side)

Conclusions

Excessive stretching to reach the udder may be one of the reasons for the high rates of MSD among parlour workers. On the other hand a significant correlation between the rate of MSD and the parlour type was not supported by the results. In order to reduce the incidence of MSD several actions seem to be necessary. The study results show clearly that milking parlours have to be redesigned. Reducing the distance between the person and the object being handled horizontally as well as vertically could be one effective measure.

Literature

DIN 33402-2. 2005. Ergonomics. Human body dimensions. Part 2: Values. Beuth Verlag GmbH, Berlin

Kuorinka I., Jonsson B., Kilbom A. 1987. Standardized Nordic questionnaire for the analysis of musculoskeletal symptoms. Applied Ergonomics 18; 233-237.

Occupational injuries, diseases, and disability in the Finnish farming population

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Introduction

Agriculture ranks among the most hazardous industries based on the rates of occupational injuries and diseases globally. Farm work, particularly with livestock, exposes farmers to disabling health conditions, which may result in loss of quality of life and early retirement. Preventive efforts have been implemented to reduce injuries in agriculture, but there is little evidence that these efforts have made a significant impact. Better understanding of the types of disabling health conditions and specific populations at risk may be an important step in targeting preventive measures and improving their efficiency.

Objectives

The main objective of this research was to provide information on the distribution and characteristics of, and risk factors for occupational injuries, diseases, and disability in the Finnish farming population.

Materials and methods

Finnish agriculture is mostly based on traditional family farming. However, the structural change in agriculture has been rapid since the early 1960's. Self-employed owner-operators of the farm, their spouses, and salaried family members from a farm with at least five hectares of farmland are covered by mandatory accident insurance against occupational injuries and diseases. This workers' compensation scheme, administered by the Farmers' Social Insurance Institution, covers both full-time and part-time farmers and it includes a no-claim discount (bonus) system. Statutory substitute worker services and voluntary farmers' occupational health services (FOHS) are available. FOHS include a regular physical examination and a farm walkthrough. FOHS members are entitled to a 20% discount on their accident insurance premiums.

Our research included three major parts: 1) a postal survey conducted among a stratified random sample of dairy farmers including males and females, 2) two longitudinal retrospective analyses of the compensated claims among cohorts of insured farmers, and 3) a combined postal/telephone survey among matched case and control dairy farm couples. These data were augmented with up-to-date data regarding the structural changes in Finnish agriculture, and both the number and severity of the compensated claims of the Finnish farming population.

Results

The two separate surveys indicated occupational injuries and particularly diseases (occupational or other) were associated with declined work ability measured both by the standard Work Ability Index and a single-item question on work ability. However, the temporal order of these health conditions requires further study. Identified risk factors for declined work ability among dairy farmers included older age, female gender, and inadequacy of rest, leisure time, and mental breaks as counterbalance to the daily workload. Small-scale farming with laborious working environment and methods were risk factors for declined work ability and repetitive compensated claims as well. Experiential knowledge, gained through farmers' own experiences or hearing or reading of other farmers' experiences, was regarded as the most important source of safety and health-related information.

Retrospective analysis of insurance data over a 5-year period showed the proportion of those with occupational injuries and diseases requiring medical care increased considerably compared to annual incident rates. While representing half of the farming population, livestock farmers accounted for over two-thirds of all claimants and over three-fourths of all compensated claims. Furthermore, they represented the majority of those with repetitive injuries and diseases. Work activities related to animal husbandry resulted in less serious injuries but more serious diseases than crop production work. Longitudinal data enabled accurate identification of several individual and work-related risk factors for both injuries and diseases including cattle-intensive geographic regions, FOHS membership, Finnish as native language, several types of livestock farming, and farming alone.

According to another analysis of insurance data, covering a 26-year ("career-long") period, compensated occupational injuries and diseases clustered strongly in the farming population. Nearly half of the population had no compensated claims while some of them had one or more rejected claims. Half of the injuries occurred to one-tenth of the population, and half of the diseases occurred to three percent of the population. Injury and disease characteristics (work activity, cause, ICD-10 code) differed between individuals with high and low personal incident rates. Repetitive outcomes included injuries and diseases of the musculoskeletal system related to strenuous working motions and postures especially in livestock work. All in all, work activities related to livestock work in general and cattle work in particular, and repair and maintenance of farm machinery, accounted for the largest share of injuries.

Supplemental data indicated structural change in Finnish agriculture has decreased the number of small and mid-sized farms in general and livestock farms in particular, whereas larger farms have continued to expand their cultivated area or livestock operation or both. Simultaneously, the annual incident rate of the occupational injury and disease in the farming population has declined. The relative proportions of serious injury and disease claims causing at least 31 disability days have declined as well representing currently approximately one-fifth of all claims.

Conclusions and recommendations

In conclusion, the burden of occupational injuries, diseases, and disability is particularly high among small-scale livestock farmers with long work history in arduous working conditions. Development of working environments and methods, typical for full-time livestock farmers that have expanded their production during the past decade, repays as better protection against adverse health outcomes. Current structural change in agriculture indicates the downward trend in the incident rate of compensated claims is likely to continue in the future. Structural change may contribute positively to the work ability of the remaining farming population as well. Further studies are recommended regarding this specific issue.

To increase the cost-effectiveness of preventive efforts, specific segments of the

farming population, based on the identified risk and protective factors, could be targeted. This is similar to traditional marketing of products and services. Various combinations of education, incentives, engineering, enforcement, and other measures are suggested to prevent disabling working conditions, adverse health outcomes, and premature retirement from farming among the Finnish farming population.

Particularly farmers with repetitive or serious claims or both could be approached by the insurance authorities. No-claim bonus could remain unchanged if the claimant is willing to report detailed information regarding his/her injury to other farmers. Similarly, young farmers taking over a farm which has a history of repetitive claims indicating potentially high risk working conditions could be approached as well. Incentives conditional on defined improvements on the working conditions could be offered to farmers in general and specifically to young livestock farmers.

Occupational health, safety, and well-being could be included more thoroughly to both vocational and extension education of the current and future farmers, substitute workers, and paid employees in the agricultural sector. A national safety certification system could be created for farms, including, e.g., practical general topics for all and optional topics for different production sectors. Incentives for completing the safety certification could be offered.

Voluntary FOHS system is most commonly utilized by full-time livestock farmers. Periodic FOHS health screenings provide an opportunity to detect health concerns early, and to intervene at a younger age. Current automatic discount on insurance premiums for FOHS members could be partially conditional on improvements of the identified deficiencies in the working conditions.

Since experiential knowledge is highly valued among farmers, they could be encouraged to openly inform their family members and acquaintance farmers of all injury and near-injury events as well. Learning from one's own and other farmers' experiences should be utilized as valuable lessons.

Current structural change lessens especially the number of small-scale livestock farms with outdated facilities. Livestock farms with poor working conditions involve high risks not only for the farm families but for substitute workers, veterinarians, artificial inseminators, livestock truck drivers, and other occasional workers and visitors as well. Similarly, outdated production facilities and methods may cause risks for animal welfare, environment, and the quality of products.

Human factors engineering, i.e., ergonomics, has a key role in the design of safer agricultural machinery, equipment, and structures used both in livestock and crop production. Modernized production processes such as automated feeding, milking, and cattle handling, or crop processing systems, are likely to prevent various adverse health outcomes and should therefore be promoted.

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Farmers occupational health services (FOHS) in 2010 in Finland

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Objectives

The aim of this study was to clarify FOHSs function among different occupational health service producers. In Finland occupational health care services are in transient state. The amount of clients in the public sector is decreasing but in the private sector the amount of clients is extending. To farmers and self-employers it is voluntary to join occupational health services. There are about 76 000 insured farmers in Finland. At the end of 2011, 39% are covered by Farmers' Occupational Health Services (FOHS).

Methods

To study FOHS in Finland 2010 we used data from questionnaire addressed to occupational health service units. Additional statistics, concerning year 2011, from the Farmers' Social Insurance Institution (FSII) of FOHS are included.

Results

61% of FOHS clients bought their occupational services from municipal health care centres and 24% of them also signed up for curative services. 32% bought their occupational health care from municipal public companies. Seven per cent were clients of private occupational health care units, and about half of the clients had arranged curative services to themselves.

Half of the farm walk-throughs were done by an occupational health nurse and agricultural advisor together, 18% were done by occupational health nurse alone. Three experts participated in 12% of the farm walk-throughs. Participation of experts and occupational health personnel in farm walk-throughs varied between different occupational health service producers.

Analysis of accidents with wood splitters in Bavaria

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Abstract

For the last four decades, wood splitters have considerably facilitated the production of firewood. Heating with firewood is an important contribution to environmental and climate protection, helps reduce the dependence on fossil energy sources, and strengthens the local economy in rural areas. However, the risk of severe injuries has increased with the usage of this technique. The aim of the present study was to analyze wood splitter-related accidents in order to identify potential risk factors of the production of firewood. Based on the analysis's results, existing measures for preventing accidents should be revised. In total, 140 moderately severe, severe, and lethal wood splitter accidents, as well as the results of interviews with 23 injured users were analyzed descriptively and dependencies tested applying the chi-square test. In addition, novel wood splitters were evaluated in terms of safety gaps, guidelines, and norms. Three quarters of all accidents (72.6%) occurred during usual movement sequences of the splitters. Two-thirds (65.3%) were caused by disregard of instructions, carelessness, and inattention. The contracted injuries included halfway amputations (2005–2007: 53.3%; 2008: 50%) and partial amputations. The reasons and progress of the accidents in which people were hurt, could not be identified by the data analysis. By interviewing accident victims, it was found that those who were not working in agricultural jobs (10/12; 83.3%) tend to collaborate with an assistant. Reasons given were faster and safer progress of work (10/13; 77%). The most common accident cause was being hurt at the wood splitter itself while mounting the wood pieces (8/23; 35%), accidents during assembling and servicing wood splitters (5/23; 22%), and reaching past safety devices, grabbing firewood, and clamping between already split firewood (each time 3/23; 13%). The evaluation of novel wood splitters showed that they conform to the European standard (EN 609-1) and machine norm (2006/42/EG). Nevertheless, these standards could be reviewed for further optimizing wood splitters, as accidents still happen. New technologies that could improve this machinery include technology based on lasers, thermal imaging camera, RFID (Radio Frequency Identification), and video sensors. Preventive steps will have to be considered when using machines and new devices or wood splitters that are under construction. Producers of novel wood splitters could be provided with information on preventive measures, especially construction-related ones.

Introduction

Constantly rising prices for fossil fuels ensure that private households have a growing demand for firewood. Heating with firewood is an important contribution to environmental and climate protection, helps reduce the dependence on fossil energy sources, and strengthens the local economy in rural areas (Uth, 2010, 5). Single furnaces like tiled stoves or small fireplaces for heating separate rooms are heated with firewood. Households that do not produce their own firewood but buy it from firewood supplies have to expect costs ranging from €45.00 to €90.00 per stere depending on the type of wood and the quality and length of the logs. Work that used to be done with the ax in the past is performed nowadays with a wood splitter. Wood splitting is characterized by highly repetitive tasks that are simple on the

one hand, but carry a high risk on the other hand (Lindroos et al., 2008, 878). Hands and fingers especially are exposed to danger. A great number of amputations that result from the use of wood splitters are noticeable. To avoid these injuries, a new feature of a two-handed safety circuit has been launched (Machinery Directive 2006/42/EG) and the work with old machines like cone splitters and single-hand operated wood splitters has been banned in some countries (German Information on Labor Policy 98/655/EWG). These measures should guarantee that workers are no more able to reach the wood or into the operating range of the machines after activating the splitting process. The aim of this work is to identify accident causes, work safety, and information gaps.

Material and Methods

Material

The basis of the accident analysis were documented accidents involving wood splitters between the years of 2005 and 2007 provided by the Landwirtschaftliche Berufsgenossenschaften (LBG) Franken and Oberbayern, as well as Niederbayern, Oberpfalz, and Schwaben. The data of 2008 came from anonymized accident reports, also provided by the LBG, which was recorded in a separate database. Immediate accident costs of more than €2,500.00 and absences from work of more than three days constituted the selection criteria. In total, 140 moderately severe, severe, and lethal accidents with wood splitters were documented in the databases from 2005 to 2008. In addition, 23 injured persons were interviewed about their accidents via a questionnaire in January 2010. Furthermore, an evaluation of novel wood splitters was carried out to review safety gaps, in compliance with regulations and the current state of development.

Method

The databases of the period 2005 to 2007 and 2008 were analyzed by describing accident frequencies and dependencies were identified using chi-square tests with SAS 9.2. The results of the questionnaire were treated in the same way. The findings of the evaluation of novel wood splitters were listed in tabular form and compared with the European Standard 609-1 and the requirements of the machinery directive.

Results and Discussion

Over the years of 2005 to 2007, 112 accidents occurred; in the year 2008, 28 accidents occurred with wood splitters. Information on personal characteristics of the accident victims is provided in Table 1.

Table 1: Information on personal characteristics (n=140)

Personal characteristics	2005 - 2007		2008	
	%	n	%	N
<i>Age</i>				
> 20 years	7.1	7	14.3	4
20 - 30 years	5.4	6	14.3	4
30 - 40 years	8.9	10	3.6	1
40 - 50 years	20.6	21	10.7	3
50 - 60 years	20.5	22	21.4	6
< 60 years	37.4	46	35.7	10
<i>Sex</i>				
Male	94.6	106	82.1	23
Female	5.4	6	17.9	5
<i>Position in the company</i>				
Farm manager	42.9	21	28.6	6
Others, including family members	57.1	28	71.4	15

For the year 2008, information about the injured body parts exists in 28 cases. Arms were injured in 81.5% (22/28) of the documented accidents. The affected body parts were most of the time upper limbs, hands, and fingers (Lindroos, 2010, 1731). Furthermore, a greater number of accidents that caused minor injuries that were cured at home can be expected. In the years of 2005 to 2007, the kind of injury was given in 49 cases (Table 2).

Table 2: Kinds of injury (n=49)

Kind of injury	2005 – 2007	
	%	N
Amputation	39	19
Partial amputation	14.3	7
Contusion	12.2	6
Open fracture	10.2	5
Simple fracture	6.1	3
Open comminuted fracture	4.1	2
Simple comminuted fracture	4.1	2
Eruption of teeth	2	1
Impacted fracture	2	1
Chip fracture	2	1
Foreign object fracture	2	1
Incised wound	2	1

More than half of the injured people were affected by amputation injuries, including partial amputations. Contusions were the most common injuries when working with wood splitters in the study of Lindroos (2006, 24). Almost two-thirds (32/49, 65.3%) of the accidents occurring between 2005 and 2007 were caused by people-related reasons like the disregard of instructions, carelessness, and inattention.

The movement of the object was mentioned in 109 cases reported for the period 2005 to 2007. It could be noted that 71.6% (78/109) of the injuries occurred during the normal movement sequences, followed by 11.9% (13/109) of the accidents in which the object was moved by hand. The accident reports of the year 2008 showed that 63.6% (14/22) of the casualties were injured in the presence of at least one witness, while 36.4% (8/22) of the injuries occurred during work without an assistant. This indicates that the majority of injured people were working with another person on the wood splitter or a second person was nearby. The fact that the majority of injured persons were not working alone when the accident occurred was also found in other studies (Lindroos, 2006, 25; Lindroos et al., 2008, 884). If the second person played an active part in operating the wood splitter by raising or removing wood, or if the witness was around the work area outside the danger zone, could not be ascertained from the information included in the databases (Lindroos et al., 2008, 884). Therefore, it cannot be concluded that working in pairs can be considered as being more dangerous than working alone. According to the Machinery Directive 2006/42/EG Annex 1.1.1, the danger zone is the area of a machine and/or its environment in which the safety or health of a person is at risk. Since the ban of two men working in the danger zone is avoided in many cases, the usefulness of designating such a danger zone may be called into question.

To obtain more detailed information about accident circumstances, safety, and information gaps, which did not emerge from the databases, 23 people injured by wood splitters were interviewed in Bavaria. Everyone who is insured with the LBG is registered as a farm manager. They pay taxes into the agricultural social insurance program because of their ownership of agricultural or silvicultural property. To divide the interviewees into groups by their occupations, they were classified into agricultural and non-agricultural workers. Thus, 52% (12/23) of the respondents worked in non-agricultural occupations and 48% (12/23) worked as farmers. Respondents who were not employed in agricultural jobs showed a higher tendency to work with an assistant. Ten of these respondents (10/12, 83.3%) were working with one or more helpers during wood splitting. In comparison, it could be observed that 81.8% (9/11) of people working in agricultural professions worked alone with the wood splitter. Working with an auxiliary force offered a quicker and safer splitting progress which operators appreciated.

Mainly people who were not involved in agricultural work stated that they rather work in pairs on the wood splitter. Possible reasons are feeling safer in the presence of another person and little experience with the splitting machinery. The activity of the second person ranged from raising wood to storing split firewood. The ban on two people working together can be called into question (Lindroos, 2006) because in case of an accident help can be given quickly.

The accident causes mentioned by the interviewees included injuries on the wood splitter itself while mounting wood pieces, accidents during assembling and servicing wood splitters, reaching past safety devices, grabbing firewood, and being trapped in split firewood. The percentage distribution of these cases is given in Table 3.

Table 3: Accident causes (n=23)

Accident causes	2010	
	%	n
Injuries on the wood splitter	35	8
Assembling/Serviceing	22	5
Being trapped in split wood	13	3
Reaching past safety devices	13	3
Grabbing tumbling firewood	13	3
Hit by split firewood	4	1

Unexpectedly, the majority of these accidents (8/23, 35%) did not occur during the splitting process, but during mounting the wood. The respondents hurt themselves on the wedge if the guiding hand was on top of the wood. The riving knife was set too low and unprotected or the piece of wood was too long. Clear warning signs did not exist on the machine, which could communicate that the machine or the situation is not dangerous (Wogalter et al., 1999). Warning signs in the form of icons directly in sight of the operating persons could inform about the existing risk. The European Standard 609-1, section 6.2 stipulates that dangers of unprotected moving tools must be stated.

A problem of wood splitters that can split short and long wood was that the riving knife was not able to completely cut through long wood. Thus, the wood fold after the wedge moved back. At this point the users had already grabbed the wood and their fingers were trapped in the incomplete split wood. There is no solution to this machine fault. However, a (technological) solution to solving this problem of combined wood splitters needs to be developed.

The wood splitters used by the interviewees often had control levers that were too short. Some of them had fenders that were too short or had no fenders at all. This often meant that the operators had to reach past the two-hand control with their elbows or their upper body if the wood pieces stuck in an awkward position. Meanwhile, all major manufacturers of wood splitters have increased the size of the fenders and installed shift levers, so that reaching past safety devices or a reconstruction of wood splitters is almost impossible. The European Standard 609-1, section 4.5.1 "Area of Support" stipulates that a holding device must be designed so that the piece of wood can be split without holding it with hands or feet.

Grabbing a tumbling piece of wood by the operator itself or by an assistant could be avoided by changing the design of wood splitters. Wood pieces could be leaned against an angular wall. Thus, there is little danger of wood pieces falling over and no need for fixing them onto the machinery. One manufacturer has been producing wood splitters in this way for several years. To support this development, 64% (14/23) of the respondents said that design changes on wood splitters are required. Half of them (7/14, 50%) noted that the splitters should be changed in their entire structure and stability.

The evaluation of new wood splitters was done for manufacturers who were mentioned by the interviewees. Wood splitters are dangerous tools causing immediate hazards. A direct threat to the user or the assistant is often discovered too late. Each of the 15 machines that were evaluated had a two-handed safety circuit. A wood splitter with an interlocking guard does not exist yet. According to the European Standard, the current design is safe enough. In practice, this turns out to be dangerous when splitting hardwood, as the wood can come off abruptly and cause severe injuries to the operator. In addition, the open design of wood splitters makes

it possible for users and assistants to reach into the dangerous zone. Although the evaluated wood splitters comply with the requirements of the European Standard and the Machinery Directive, in practice they are often still inadequately safe and can lead to severe injuries to the users. Therefore, the current regulations should be revised.

Technologies such as laser, thermography, RFID or video sensors that could increase the safety of these machines could be implemented in newly adapted wood splitters. Preventive steps will have to consider the presence of old machines in use and new wood splitters that are under construction. Producers of novel wood splitters could be provided with information about accident causes and possible prevention strategies, mainly construction related. Further research, interviews with manufacturers, a motion analysis, and a body of experts for discussing these research results and prevention measures are recommended.

References

European Standard (1999): Safety of Log Splitters – Part 1: Wedge Splitters (EN 609-1)

Lindroos O. (2006). Efficiency and Safety in Self-Employed Family Forestry. Doctorial thesis, Swedish University of Agricultural Sciences, Umea.

Lindroos O., Wilhelmson E., Lidestav G., Neely G. (2008). Accidents in Family Forestry's Firewood Production. *Accident Analysis and Prevention*, 40, 877–886.

Lindroos O., Burström L. (2010). Accident Rates and Types among Self-Employed Private Forest Owners. *Accident Analysis and Prevention* 42, 1729–1735.

Richtlinie 2006/42/EG des Europäischen Parlaments und des Rates vom 17. Mai 2006 über Maschinen und zur Änderung der Richtlinie 95/16/EG, Amtsblatt der Europäischen Gemeinschaften, L 157/24, 9. 6. 2006. <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006157:0024:0086:DE:PDF> (as of 9 December 2010).

Richtlinie des Rates vom 30. November 1989 über Mindestvorschriften für Sicherheit und Gesundheitsschutz bei Benutzung von Arbeitsmitteln durch Arbeitnehmer bei der Arbeit, 89/655/EWG, Amtsblatt der Europäischen Gemeinschaften, L 393/13, 30 December 1989.

Uth J. (2010). Scheitholzvergaser-/Kombikessel Marktübersicht. Fachagentur Nachwachsende Rohstoffe e. V. Güzlow.

Wogalter M. S., Young S. L., Brelsford, J. W., Barlow, T. (1999). The Relative Contributions of Injury Severity and Likelihood Information on Hazard-Risk Judgments and Warning Compliance. *Journal of Safety Research*, Vol. 30, No. 3, 151–162.

Tracing new occupational diseases in agriculture

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Keywords: agriculture, occupational diseases, OHS-vigilance

Continuous changes in work and working conditions give rise to new occupational health risks and new occupational diseases. The health consequences of new technologies, as well as the currently unknown effects of existing technologies, create reasons for concern among the working population, people professionally involved in work and health, policymakers and insurers. Detection of new occupational consequences of work on health and ways towards better OHS-vigilance is of utmost importance.

New occupational or work-related diseases can be detected and categorized in various ways: incident notifications of cases or clusters of possible occupational diseases that are assessed, weighted and translated into preventive actions, the 'Disease First approach' and by epidemiological studies. This OHS-vigilance approach is comparable with analyzing and learning from occupational accidents and pharmacovigilance methodology. Some examples of new occupational diseases in agriculture will be presented:

New syndromes caused by changes in work and working conditions: Progressive Inflammatory Neuropathy (PIN) in swine slaughterhouse workers, Allergy to biological pesticides

New risks from known forms of stress: Cardiovascular diseases caused by fine dust

New: old and re-emerging: Several zoonoses (Q-fever)

Consequences of parents' occupational exposure on their offspring: Delayed neuropsychological development, cancer in children, congenital abnormalities

Better awareness of possible health risks in farming can be achieved by incorporating occupational health in primary health care. The Basic Occupational Health structure (BOHS)-approach, enabling general practitioner's in rural areas to address specific workers health issues has shown promising results in different countries. The ICOH Scientific Committee in rural health will stimulate the accessibility of targeted information and knowledge (reviews, guidelines, protocols, learning materials, key documents) in connection with the Occupational Health[e]Foundation (www.healthfoundation.eu)

International knowledge exchange in this field is essential for a rapid response. A European consortium is already established: MODERNET: Monitoring trends in Occupational Diseases and New and Emerging Risks Net work and supported by the European Union within the COST Program. This will make the best possible use of nationally of existing expert groups, as well as promoting internationally the cooperation between the institutes in the various countries that are charged with the detection and evaluation of new health risks.

References: http://www.occupationaldiseases.nl/sites/default/files/documents/Theme-publication-on-signals-of-new-occupational-health-risks-130309_0.pdf

Survey among farmer employers: labour management and safety on farms

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Keywords: farm, labour, safety, management, survey

Objectives

As the farms, machinery and herd sizes are growing management of farm labour force is becoming more challenging. Labour management on farms involves many tasks that employers need to master: recruiting workers, work organization, employees' job satisfaction and motivation, wage management, and managing safety and health training on the farm. Dealing with foreign labour emphasizes some of these challenges. It is not well known, how farm employers arrange worker safety management and orientation and what kind of challenges they have. The aim in this study was to learn about labour management and farm employers' perceptions of their management skills and needs.

Methods

Farm labour management survey was conducted in Finland in the spring 2011. The survey was mailed to 930 farm employers, and 230 farmers responded (response rate 25 %). We analysed differences in the management practices and challenges among farms with and without foreign workers. The survey questionnaire had 36 pre-selected practical labour management tasks and use of management tools. Issues were ranked on a likert scale indicating importance and difficulty. The safety management variables involved risk identification, identifying of worker mental stress, developing worker skills, reliability evaluation, motivation, maintaining of good working culture, conflict handling with workers, arranging occupational health services for workers, arranging recreation activities and rescue planning for the farm. The results of the farm employer perceptions were compared using regression analyses.

Results

The results show that farm employers with foreign labour are more likely to provide occupational health service to workers (Table 1). They also perceive occupational safety risk monitoring more important than those farms, where there is no foreign labour. Maintaining rules and good working culture and providing recreation activities was also ranked important on farms with foreign labour. The most difficult tasks for those farms with foreign labour included recruiting foreign labour, task delegation, developing worker skills and maintaining good work atmosphere. It should be noted that most farm employers found also domestic worker recruiting difficult.

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Table 1. Association of farm employers who have foreign workers (vs. not) and basic variables					
Unadjusted					
Variable	Foreign workers		OR	95% Confidence Limits	
	% yes	% No		LL	UL
Quality management training (vs. no training)	48,78	39,73	1,45	0,84	2,49
Production type: animal (vs. plant)	23,17	30,82	0,68	0,36	1,26
Rescue plan on farm	51,22	35,62	1,90	1,10	3,29
OHS provided to family members (vs. not)	60,98	69,18	0,70	0,40	1,23
OHS provided to workers (vs. not)	78,05	60,96	2,28	1,23	4,23
Farm have salary workers < 3 (vs. ≥ 3)	35,37	70,55	0,23	0,13	0,41
Farm have family workers ≤1 (vs. >1)	34,15	49,32	0,53	0,30	0,93
Important farm manager tasks in worker orientation (vs. not important)					
Recruiting domestic workers	53,66	63,70	0,66	0,38	1,14
Recruiting foreign workers	59,76	8,22	16,58	7,93	34,65
Arranging residency for workers	84,15	47,26	5,92	3,01	11,64
Monitoring occupational safety risks	95,12	86,30	3,10	1,02	9,39
Identification of worker welfare	87,80	81,51	1,60	0,75	3,57
Task delegation	90,24	80,82	2,20	0,95	5,07
Developing worker skills	89,00	79,45	2,10	0,94	4,67
Conflict mediation with workers	86,90	78,77	1,74	0,82	3,68
Farm rules and good working culture	86,59	71,23	2,61	1,26	5,40
Arranging recreation activities	58,54	36,99	2,41	1,38	4,18
Difficult farm management tasks in worker management (vs. not difficult)					
Recruiting domestic workers	71,95	58,90	1,79	1,00	3,21
Recruiting foreign workers	57,32	42,47	1,82	1,05	3,14
Arranging residency for workers	48,78	36,99	1,62	0,94	2,81
Monitoring occupational safety risks	67,07	57,53	1,50	0,85	2,65
Task delegation	64,63	49,32	1,88	1,08	3,28
Developing worker skills	74,39	58,22	2,08	1,15	3,78
Maintaining good work atmosphere	74,39	60,96	1,86	1,02	3,38
<i>Note: Percentages indicate the farms with foreign workers (Yes) and not (No) having this characteristic</i>					
<i>Note: Percentages indicate the proportion of having this characteristic vs. not having.</i>					
<i>Odds ratio indicates the probability of farms with foreign workers, when the given character is present</i>					
<i>Note: farms with foreign workers n = 82 and not foreign workers n = 146</i>					

Animal-related injury risks in dairy farming

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Keywords: agriculture, cattle, cows, behaviour, animal handling

Background and aim

Animal-related occupational injuries in agriculture are common and potentially severe and costly. In Sweden, animal-related injuries represents about ¼ of all injuries in agriculture. A majority of animal-related injuries involve cattle, and especially dairy cattle seem to be frequently involved. The fatal injuries related to animals were caused by attacks from cows or bulls. Despite the large number of documented animal-related injuries in dairy farming, the issue has received relatively limited attention in the scientific literature.

This study is part of a PhD project with focus on prevention of occupational accidents in dairy farming. The aim was to get a deeper understanding of when and why hazardous situations occur during animal handling and to identify factors affecting risk and safety during animal handling.

Methods

On 12 commercial dairy farms, the collection of cows to milking and claw trimming was studied from the perspective of the handler, the animals and the facilities.

The collection of data was carried out during spring 2012 and will continue in autumn.

Data collection includes:

- Behavioural observations of handler and cows
- Heart rate measurements of handler and cows
- Questionnaire on handler's risk perception, attitudes to risk, safety locus of control, perceived stress, attitudes to cows and to handling of cows
- Design of the facility: checklist and short interview

Results

Data will be analysed during autumn 2012. The results are expected to give some insight to how the handler's risk and stress perception, attitudes and behavioural intentions are related to behaviour towards cows and risk potential during animal handling. The results will be used to identify underlying causes of injury risks during animal handling in dairy farms and to suggest possible prevention strategies.

Exposure to retarding agents in horticultural workers.

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Keywords: chlormequat chloride, pesticide, greenhouse, biomarker of exposure

Objectives

The plant growth regulator chlormequat chloride (2-chloro-*N,N,N*-trimethylethanaminium chloride=CCC), a gibberellin synthesis inhibitor, is used to retard ornamental plants in greenhouses. It is often applied together with daminozide.

In mammals, CCC is excreted mainly unmetabolized in urine and causes cholinergic effects by binding to nicotinic and muscarinic receptors. Exposure should be avoided. ADI for CCC is 0.04 mg/kg bw/day and ARfD 0.09 mg/kg bw.

The aim was to monitor and minimize exposure to pesticides in greenhouse workers cultivating ornamentals.

Methods

CCC was chosen as an index of pesticide exposure because it was known to be regularly and repeatedly applied. Also, a suitable LC-MS-MS method for analysis in urine could be adopted. CCC as a biomarker of human exposure was validated in an experiment, where two healthy volunteers received a single oral dose of 25 µg/kg bw of CCC (corresponding to about 50% of ADI). The limit of detection was determined to 0,1 ng/mL. The excretion in urine followed a first order kinetic and a two compartment model with an elimination half-life of 2-3 h and 10-14 h, respectively. Over 90% of the doses were excreted within 48 h.

In 2010-11, seven companies were contacted and 51 employees cultivating ornamentals in greenhouses participated in the exposure examinations. Urine samples were collected at several occasions before and after work. An occupational hygienist observed work, workers and environment. A specialist in occupational and environmental medicine obtained occupational and medical histories by structured interviews. The participants kept diaries on food consumption during the examinations.

In addition, CCC was determined in urine from the general population living in cities (N=100) or in the countryside (N=79)

Results

All samples from horticultural workers and the general population contained residues of (unmetabolized) CCC. There was a marked increase of CCC levels in some of the workers after work; the increase was associated with certain manual jobs (*other than application*) and way of performing them, use of protective devices like gloves, and, in particular, to moment of CCC application in relation to moment of urinary sampling.

Conclusions: The widespread presence of CCC biomarkers indicates the main source to be of a general origin, such as from residues in food. In Sweden, CCC is used in rye, in other countries also in cultivation of other cereals, vegetables and fruit. In addition, for some workers, occupational exposure contributes to the exposure. We will finish the greenhouse project by conveying our results and its implications to the participants and new exposure measurements will be performed.

Acknowledgement: Swedish Council for Working Life and Social Research, Swedish Environmental Protection Agency, County of Skåne.

Sugar beets – exposure, allergy and respiratory symptoms

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Keywords: organic dust, agriculture, allergy, pollen

Objectives

Sugar beet pollen can cause allergy and two occupational allergens have been identified. A sugar beet seed production plant contacted our clinic because of problems with allergies among its employees. During the year, most employees have several work tasks (office, laboratory, administrative as well as direct practical work with plants and seeds), which change over the seasons.

Aim: To investigate the exposure, *i.a.*, to sugar beet pollen and the prevalence of specific allergy and symptoms among the employees and to suggest measures to minimize exposure.

Methods

An examination was performed in 2007-08. Exposure to organic dust was assessed by personal air measurements and to beet pollen by ocular inspection. Ergosterol reflecting exposure to molds and endotoxin reflecting bacteria were analysed by GC-MS. Then, the current exposure to pollen and other agents was estimated for each task and work place and each job was categorized as having no/little, medium or high exposure to these agents. Additionally, an attempt was made to estimate the individual cumulative exposure. Occupational and medical histories were obtained from questionnaires distributed to all 210 employees. More than 90% agreed to participate. Blood samples were collected for analysis of IgE antibodies against pollen and seed of sugar beet and other allergenic agents.

Results

The exposure to organic dust was high, particularly at threshing outdoors. Beet pollen levels were estimated to be high at fanning or performing other seasonal tasks in greenhouses, at threshing or at other work tasks on the fields. Ergosterol and endotoxin were also very high at threshing. As many as 63% (41% work-related according to history) of *all* examined employees reported symptoms from eyes and nose during the 12 preceding months and 26% (17% work-related) had symptoms from the lower airways. Among those highly exposed, even higher fractions had symptoms. Out of *all* employees, 28% were tested atopic and 15% were sensitized to sugar beet pollen. Among employees with current high exposure, and among atopics, the sensitisation rates were higher. Work-related symptoms were more common among employees sensitised to beet pollen but for some employees other explanations were plausible.

Conclusions: Exposure to beet pollen and organic dust was very high at certain work places and tasks. The prevalence of eye and nose symptoms was excessive (and higher than in surveys of the general population) and a substantial fraction of employees in this cross-sectional examination was sensitised to beet pollen. Both symptoms and sensitisation were more frequent among employees with higher exposure to organic dust and beet pollen. However, the sensitising power of beet pollen was probably underestimated due to a pronounced healthy worker selection. Other agents in the organic dusts are probably partly responsible for causing symptoms. Measures to reduce exposures were suggested.

Acknowledgement: County of Skåne.

Different risk sources in Mediterranean greenhouses

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Keywords: greenhouse, safety, plastic film, automatic stretching, spraying

Objectives

The “Mediterranean greenhouse” is widely used for food and ornamental crops. In south-eastern Sicily, greenhouses covers 7000 ha - 7500 ha, for 13200 working days per years and with a gross saleable production of 255 M€ (Regione Siciliana, 2009). During 2009, latest available data, the SPreSAL (Servizio Prevenzione Sicurezza Ambienti di Lavoro, Ragusa - Italy) examined a number of 594 accidents occurred to farm workers in the Ragusa county. These reports, which the data are extracted from, show only a percentage of about 85-90% of the real total number of accidents occurred in the Ragusa area, because accidents are not always reported by workers and/or employer. Most common accidents are due to wrong/not safe or old techniques, to operator ageing, to obsolete machines or not suitable used tools. The objective of this analysis, as well in order to know where, how and who is a victim of the accidents in workplaces, is to highlight the works and equipment where to focus prevention initiatives. Finally, a short description of machines developed at DiGeSA and DIEEI department of University of Catania, with the aim of solving that critical points, will be shown.

Methods

In order to analyse the different risk sources, data from the 2009 SPreSAL report have been investigated. It is found out that the highest number of accidents occurs in greenhouses (49%) (Fig. 1). Considering this percentage, the 11% is caused by the use of equipment or material (Fig. 2a) while (Fig. 2b) operation related to plastic film laying and spraying operation cover the most common accident causes.



Figure 1: Accident workplace in agriculture – Ragusa area - 2009

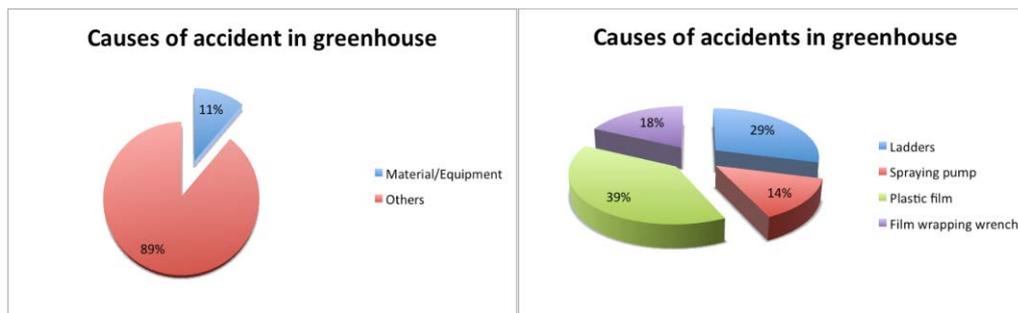


Figure 2a
Figure 2b
Cause of accident in greenhouse: main causes (2a) and details (2b)
Ragusa area - 2009

The operation responsible for the most number of the accidents caused by using material or equipment, is related to the manipulations of the big and heavy coils of plastic film used for the greenhouses covering activity (39%) followed by those resulting from the use of ladders (29%) - often used for film laying/stretching operations - and the use of wrench used in the film wrapping system (18%). Therefore, it is clear that the covering operation on the greenhouse structures is, at various stages, a dangerous activity (86% of accidents as mentioned happened because of using material or any other stuff used for laying/stretching plastic film) and the consequences of these injuries could be, very often, quite severe and even fatal (Miceli et al., 2010).

Another risk source is related to spraying operation. From Fig. 2b, it can be seen that this kind of accidents cover about 14%. Generally speaking, agricultural chemicals distribution has huge impact on social cost due to the high risk level for operators and to possible environmental pollutions. In order to reduce risk related to chemicals, operators must wear suitable PPE and use suitable spraying tools. Nevertheless, due to Mediterranean climate and in general due to very high temperature and humidity inside greenhouses, they often do not use any kind of protection. Special PPE with forced ventilation and the use of small guided sprayer, could reduce the rate and total amount of chemicals that operator receive over her/him during spraying operations and leakage on the environment (Nuytens et al., 2005; Balloni et al., 2008a; Balloni et al., 2008b; Cerruto et al., 2009; Schillaci et al., 2009).

From this data review, it comes out that the most dangerous greenhouses operations are related to plastic film laying and spraying operations.

Regarding the first issue, from different on-field observation in the Ragusa area (Camillieri et al., 2010), it has been observed that common accidents causes are due to fall from a height, home-made tools, short time slot available to laying the film, high temperature and so on. For this problem, till now only operators good training level and good practice can help preventing accidents (Caruso et al., 2011; Longo et al., 2011).

As concerns fall from a height and in reference to a subset of greenhouses operation (i.e. tomatoes binding), a very simple but innovative self-propelled electric engine vehicle provided with an elevator, named "Vanco", was built from a small local entrepreneur in cooperation with our Department (Schillaci et al., 2009a). Moreover, (Carreño et al., 2009) have described a new greenhouse design that allows to build all the main structure and covering while they are standing on the ground, eliminating risk of fall during that phases of the work.

Regarding the second issue and in order to mitigate the problem, recently, different solutions have been proposed. Some semi-automatic distribution methodologies, based on some fixed facilities build inside each greenhouse, have been developed. These can operate without human intervention inside the greenhouse and are composed by sliding rods with nozzles. Due to their high cost and huge impact on the greenhouse, they are not so common. Similarly, spraying devices regularly displaced on a pipeline net hanging from the ceiling, are not spread because of uneven chemicals distribution. Instead, because of greenhouses environments are highly structured and regular with respect to the open field, they are well suited to be operated by some automatic machines that do not implies much fixed cost for each greenhouse. Moreover, automatic machines can be re-used in different place and can solve tasks other than spraying. In the last decade, different research group have been interested on these issues. The Aurora robot (Spain) is able to perform different tasks in an autonomous way with remote supervision (Mandow et al., 1996). In order to solve navigation problem, some visual feedback have been used (Dario et al., 1994). At University of Genova a project named "Mobile robots in greenhouse cultivation: inspection and treatment of plants" (Acaccia et al., 2003) has been developed. In this work chemical hazard for operators and the usefulness of unmanned or human assisted operation by means of a support machine, powered by means of an internal combustion engine, is highlighted. A mobile platform for greenhouse chemicals spraying has been developed at University of Almeria (Sanchez et al., 2010) In this work, specifications for a greenhouses robot are first identified then the complete machine (named FitoRobot) has been built with ultrasonic sensors for the motion between plants rows. The machine is driven by an internal combustion engine. A commercial machine, named Fumimatic (from IDM Agrometal, Almeria), is available in Spain. It is not autonomous nor teleoperated but it is a complete spraying machine with a powerful Diesel engine and a 400 l tank for chemicals. In the area of Vittoria (RG), Italy, a local SME build and sold a small tracked vehicle with thermal engine. On board is mounted a complete spraying system; the machine is named "Vanco Spray" (Schillaci et al., 2009a; Schillaci et al., 2009a; Schillaci et al., 2010).

Perspectives and results

After have investigated some of the common accident causes that can occur during standard greenhouses operations, different solution have been proposed. As regard the plastic film stretching operations, an automatic wrapper is under development. This machine is mainly composed by a couple of removable electrical motor and gearbox/limiting clutch able to stretch the film by applying the correct torque to film supporting rod (Fig. 3 and Fig. 4). Moreover a new self-locking device (to be mounted on each side of the film supporting rod) is under design (Fig. 5b) instead of the traditional home-made one (Fig. 5a).



Figure 3a



Figure 3b

Some mechanical elements to be used for the automatic wrapper: a torque limiter clutch (3a) and misalignment joint (3b)



Figure 4a



Figure 4b

Possible solution and possible electrical motor positioning



Figure 5a



Figure 5b

The self-locking device: traditional home-made one (5a); the proposed new one (5b)

As regard accidents related to chemical spraying, a small multifunctional electrical vehicle (U-Go) is under development in cooperation with DIEEI Robotic Laboratory of University of Catania within a research project co-founded by MIPAAF. U-Go is an acronym that means “Unmanned Ground Outdoor Robot” (Fig. 6). This robot mainly solve problems like transportation, navigation and inspection in very harsh outdoor environments. Currently, U-Go is able to operate inside greenhouses for precision farming applications, by using new GNSS (Global Navigation Satellite System) localization technologies and vision based

navigation. The mechanical structure has been designed in order to be compliant to different agriculture requirements. First of all, the robot must be able to move inside greenhouse corridors; moreover it must be able to move on different uneven terrains and must not generate too high pressure on the terrain (in order to meet agricultural requirements). The on-board control electronics have been designed to provide different choices for control modalities. For example, in autonomous mode, the robot, using information coming from different sensors, can find its way through the environment. Typical on-board sensors are DGPS system, 2D laser scanner, stereocam, Inertial Measurement Unit, webcam, ultrasound ranger and so on. In most cases, only subsets of these sensors are simultaneously mounted on-board. In order to perform automatic spraying, on-board the robot a small tank has been mounted with a suitable electrical pump and sensors (Fig. 7).

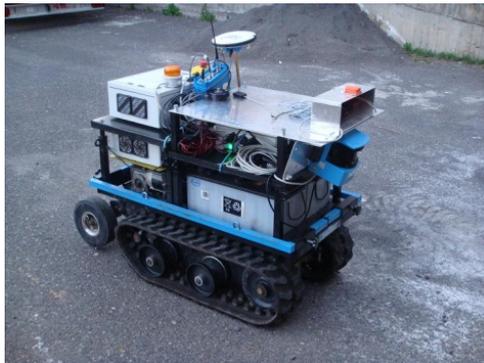


Figure 6a



Figure 6b

The U-go robot during a test at laboratory (6a) and inside a greenhouses (6b)



Figure 7: The U-go robot with the prototype of the automatic electrical sprayer

Conclusion

In this work Mediterranean greenhouses have been taken into account and investigation for most common accident and related causes have been performed. Different on-field observation of the different phases of the works have been done with the aim of find out critical point of the used procedures and to find out improvement and solution. Among the other, two critical operation have been pointed out. These are related to laying of the covering plastic film and spraying operation. For the first issue, an automatic stretcher is under development. This machine, can avoid operator to work at height using tools to apply the

high-torque required for film tightening. Moreover the machine can be used over different greenhouses because it is removable. As regard the second issue, a small electrical automatic sprayers is under development. The machine is actually a robot and it is able to autonomously navigate along greenhouses corridor. The operator can supervise the machine from the outside of the greenhouses, while it is spraying, reducing virtually to zero the total quantity of chemicals the operator will receive during operations.

References

- Acaccia G.M., Michelini R.C., Molfino R.M., Razzoli R.P., 2003. "Mobile robots in greenhouse cultivation: inspection and treatment of plants", in Proc. of ASER 2003, 1st International Workshop on Advances in Service Robotics, 13-15 March, Bardolino, Italy, ISBN 3-8167-6268-9.
- Balloni, S., Caruso, L., Conti, A., Schillaci, G., Valentino, M., Loreto, C., Fenga, C., Rapisarda, V.(2008). Use of a Helmet Endowed with Forced Ventilation and Air Filtration Devices in Greenhouse Application of Agrochemical Treatments Using an Innovative Prototype of Self-Propelled Sprayer Vehicle. International Conference "Innovation Technology to Empower Safety, Health and Welfare in Agriculture and Agro-food Systems". September 15-17, 2008 Ragusa (Italy).
- Balloni, S., Caruso, L., Cerruto, E., Emma, G., Schillaci, G. "A prototype of self-propelled sprayer to reduce operator exposure in greenhouse treatment". International Conference "Innovation Technology to Empower Safety, Health and Welfare in Agriculture and Agro-food Systems, Ragusa (Italy), September 15-17, 2008.
- Camillieri D., Rapisarda V., Balloni S., Schillaci G. (2010). "The effect of task frequency on the risk of Efficient and safe production processes in sustainable agriculture and forestry biomechanical overloading of the upper limb during tomato binding". Proceedings on CD-rom. International Conference "II RAGUSASHWA", Ragusa, Italy, 16-18 September. ISBN: 978-88-903151-6-9.
- A. Carreño, J. Pérez, J. Vázquez, A. Callejón-Ferré, L. Galera Sánchez; "Design and sizing of a new Capital for Multispan Greenhouses"; Proceedings of the XXXIII CIOSTA - CIGR V Conference 2009, pp 379-383, Vol 1, June 17-19 2009, Reggio Calabria, Italy. ISBN 978-88-7583-031-2.
- Conti A., Balloni S., Tirrò G., Emma G., Caruso L., Schillaci G. (2010). "Equipment and Installations for the Distribution of Pesticides in Greenhouses: Aspects Connected with Testing and Bringing Into Compliance with Standing Regulations", Proceedings on CD-rom. International Conference "II RAGUSASHWA", Ragusa, Italy, 16-18 September. ISBN: 978-88-903151-6-9
- L. Caruso, S. Balloni, D. Longo, A. Pennisi, A. Conti, D. Camillieri, G. Schillaci; "Safety issues in greenhouse film covering operations, applicable regulations and on-field test". Proceedings on CD-Rom of XXXIV CIOSTA CIGR V Conference 2011; June, 29th - July, 1st 2011, Vienna, Austria; ISBN 978-3-200-02204-1, Quendler E. Kössler K. Editors.
- Cerruto, E., Balloni, S., Conti, A., Emma, G., Caruso, L. "Vertical Spray Boom Profiles for Greenhouse Applications". Proceedings of the XXXIII CIOSTA - CIGR V Conference. Reggio Calabria (Italy), 2009.
- Dario, P., Sandini, G., Allotta, B., Bucci, A., Buemi, F., Massa, M., Ferrari, F., Magrassi, M., Bosio, L., Valleggi, R., Gallo, E., Bologna, A., Cantatore, F., Torrielli, G. and Mannucci, A. 1994. "The Agrobot project for greenhouses automation", Acta Hort. (ISHS) 361:85-92.
- Fumimatic, <http://www.idm-agrometal.com/espanol/fumimatic.aspx>
- D. Longo, A. Pennisi, L. Caruso, A. Conti, D. Camillieri, S. Balloni, G. Schillaci, E. Romano; "Preliminary study about a safe automatic system for stretching plastic film used for greenhouses covering". Proceedings on CD-Rom of XXXIV CIOSTA CIGR V Conference 2011; June, 29th - July, 1st 2011, Vienna, Austria; ISBN 978-3-200-02204-1, Quendler E. Kössler K. Editors.

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August 27-29, 2012 Ystad, Sweden*

Mandow, A. Gomez-de-Gabriel, J.M. Martinez, J.L. Munoz, V.F. Ollero, A. Garcia-Cerezo, A., "The autonomous mobile robot AURORA for greenhouse operation", IEEE Robotics and Automation Magazine, Vol. 3, pp 18-28, 1996, DOI 10.1109/100.556479.

Miceli G., Conticello M., Bongiovanni L., Ravalli G. (2010): "Analisi degli infortuni in agricoltura in Provincia di Ragusa – 2009". Regione Siciliana ASP Ragusa S.Pre.S.A.L.

Nuyttens, D., Windey, S., Sonck, B. "Comparison of operator exposure for five different greenhouse spraying applications". Proceedings of the XXXI CIOSTA-CIGR V Congress "Increasing Work Efficiency in Agriculture, Horticulture and Forestry". University of Hohenheim, Stuttgart, Germany, ISBN 3-00-016346-8, 98-105, September 19-21, 2005.

Regione Siciliana Ass. Reg. Risorse Agricole e Alimentari. 2009. Programma di Sviluppo Rurale Sicilia 2007-2013.

Sanchez-Hermosilla J., Rodriguez F., Gonzalez R., Guzman J. L. and Berenguel M. (2010). "A mechatronic description of an autonomous mobile robot for agricultural tasks in greenhouses", Mobile Robots Navigation, Alejandra Barrera (Ed.), ISBN: 978-953-307-076-6, INTECH

Schillaci G., Cerruto E., Balloni S., Conti A., Caruso L. (2009): "Prove di ottimizzazione di una barra verticale installata su un veicolo semovente per la distribuzione di agrofarmaci in serra". Proceedings of the IX National Congress AIIA: Ricerca e innovazione nell'ingegneria dei biosistemi agro-territoriali. September 12 – 16 2009 Ischia Porto. pp. 1-10 ISBN: 978-88-89972-13-7

Schillaci G., Balloni S., Caruso L., Conti A., Pennisi A., Longo D., Muscato G. "Prove di funzionamento telecomandato e autonomo di un veicolo elettrico multifunzionale destinato alle colture in serra", Proceedings of the IX Convegno Nazionale dell'Associazione Italiana di Ingegneria Agraria AIIA 2009, Memoria n. 7-37, 12-16 september 2009, Ischia Porto, Italy

Schillaci G., Bonsignore R., Pennisi A., Longo D., Muscato G., "A multifunctional remote controlled and/or autonomous electrical vehicle able to operate in slope vineyard", Proceedings of the Third International Congress on Mountain Steep Slope Viticulture, Castiglione di Sicilia (CT), Italy, 12-14 May 2010.

Prevention strategies for injury prevention in agriculture

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Keywords: literature survey, injuries, strategy, prevention,

Objectives

Agriculture is an industry with a number of challenges regarding safety and health issues. The high levels of fatal and non-fatal injuries are the major problem that needs a solution. It is still dominated by small family-operated farms in Sweden, but is so much differentiated which makes every farm unique.

This sectors structure needs special type of strategies for injury prevention and in order to get an overview of recent methods being used world-wide a project was initiated and financed by the Swedish Work Environment Authority.

Methods

A literature survey was done on studies involving interventions and other strategies in order to reduce the frequency of injuries in agriculture.

Results

The results show that:

- The use of machinery and tractors, animal handling and falls are the major issues world-wide
- There is no single solution that gives a major solution on the injuries in agriculture
- A combination of solution in coordinated programs seems to be the most efficient way of reducing injuries in the sector – interesting programs are running in Sweden, New Zealand and USA

The psychosocial pulse of Swedish farming – Screening of the psychosocial work conditions, mental health and social network of farmers and rural entrepreneurs in Sweden

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Keywords: dairy, pig, crop, agriculture, entrepreneurs, psychosocial, mental health, questionnaire

Background

The expansion of small family farms often implies increased financial responsibility, risk taking, employee responsibility and long working hours. Agriculture represents a profession whose success is highly dependent on uncontrollable external conditions such as weather, legislation, disease outbreak, environmental changes and negative societal attitudes. Moreover, farmers' face normative and market pressures and are expected to maintain high production standards, a stable economy and to act in socially conscious and environmentally responsible ways. The combination of uncontrollable external factors, heightened expectations and a weak social support network can cause a poor psychosocial work conditions and ultimately a worsening of mental health.

Objectives

The objectives were to study the psychosocial work conditions and mental health of farmers' operating small sized Swedish farms and to compare them with a group of non-farming entrepreneurs.

Methods

The study was conducted in 2011 among 470 farmers and 166 non-farming entrepreneurs. The General Nordic Questionnaire for Psychological and Social Factors at Work (QPSNordic) was administered to assess subjective perceptions of the psychosocial work conditions and mental health.

Results

The two groups reported general well-being in their psychosocial work conditions and health, however, non-farming entrepreneurs perceived their psychosocial work conditions and mental health as better than farmers. Minor differences occurred among the farmers and it was mainly the dairy and beef producers who rated their psychosocial work conditions and mental health poorer than crop and pig producers. The farmers' experienced EU legislation, government action, increased requirements from society and consumers, weather conditions, animal welfare legislation, varying market prices, increased crime, agro-terrorism, disease outbreaks among plants and animals and concern for the future as the most stressful external factors. An action plan for improving the psychosocial work conditions, mental health, and social networks in rural areas will be developed based on the results.

Long shafted tools used in horse stables

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Keywords: biomechanics, Jack human simulation system, equine, physical work load, mucking out, manure handling

Abstract

Long-shafted hand tools are often used when performing manual chores in agriculture, e.g. in stables, gardening and yard work. Common tools used in horse stables are shavings forks, manure forks, brooms, shovels and rakes. The development of such tools has been limited, and therefore the tools used are often outdated and not always suited for their intended tasks.

This study examined the physical demands involved in manual manure handling in horse stables when using two different long-shafted work tools, a shavings fork and a manure fork, and investigated how variations in shaft length affected the physical workloads of the user.

The methods used were Generic Task Specification (GTS) and the Jack human simulation system (JACK). GTS was used to divide the work task ‘mucking out’ into sub-tasks and to describe the content of these sub-tasks in detail. Load measurements and simulations of the work task were then performed in the JACK system regarding the effects of varying tool shaft length and user work techniques on working postures and body loads.

In general, adding 10 cm to the 125 cm length of the existing manure fork shaft gave the highest reduction in load on the back, especially as regards compression forces, irrespective of body height, sub-task and work technique. Simulations with the shavings fork (length 150 cm) showed that correcting user work technique considerably reduced the load on the back.

Thus it is important to consider both the shaft length of a tool and the work technique when attempting to reduce the physical work load for users.

Two approaches to Masters education in agricultural safety & health: Lessons from Kentucky, USA

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We report on a novel educational project at the University of Kentucky that trains Masters degree students in agricultural safety and health. In 2006, we were funded by the U.S. National Institute for Occupational Safety and Health for a training grant to provide a “health of agricultural populations” emphasis to students in the College of Public Health seeking a Masters of Public Health Degree. More recently, we were funded in 2012 to offer a “graduate certificate in agricultural health and safety,” certificate program which can enroll students of any graduate program on the University of Kentucky campus, not just Public Health. We will describe the structure of these two programs; their similarities and differences; the courses that students take; and student research projects. More importantly we will discuss several of the lessons learned over past six years in creating, designing and implementing these two programs. Emphasis will be placed on ways other universities could use the lessons we have learned in crafting similar masters-level programs that emphasize agricultural health and safety, whether in colleges of agriculture, public health, engineering or other disciplines.

Recent trends in farm injuries in Ireland

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Keywords: agriculture, injury, survey.

Background:

Teagasc, the Agriculture and Food Development Authority in Ireland, has conducted a national survey of injuries related to farm work in year 2011. This is the fifth survey conducted at 5-yearly intervals since 1992. The rationale for conducting these surveys has been to estimate level injury levels for a range of farm and personal variables and indicate trends in injury levels over-time.

Methods:

The 2011 survey was conducted among a sample of 995 farms, which was weighted to nationally represent farms (99,448) by system and size, over 2 hectares. The representation of each farm used to obtain national estimates were those supplied by the Irish Central Statistics Office for year 2010. For each farm, the farm operator was interviewed and asked about farm injuries for the previous six years.

Results:

The 2011 survey indicates a farm injuries have increased by 35% with 2,459 per100k farms reported for year 2010 compared to the previous survey estimate of 1,815 for year 2006. Reported injuries over the six years were categorised as follows: trips and falls, 42.1%; livestock, 33.3%; vehicles and machinery, 11.1%, buildings, 2.7%, chainsaw and wood related, 2.7% and other, 8.1%. The injured person were categorised as follows: farm operator, 73.3%; worker, 8.9%; spouse, 8.6%; family member 7.5% and other 1.7%. Accident locations reported were: farmyard 71.5%; farm buildings 18.7% and fields 9.8%. Number of work days lost following injury were categorised as follows: 1-9, 29.1%; 10-19, 15.2%; 20-99, 41.1% and greater than 100 days 14.6%.

Farms with 'dairying' (11%), 'dairying and other livestock' (12.9%) and 'sheep' (10.9%) reported higher rates of injury over the 6 years than cattle - breeding (6.1%), cattle - non breeding (6.1%) and arable farms (6.7%), respectively. Farms categorised as 'full-time' requiring more than 0.75 standard labour units had a higher level of injuries (12.6%) than 'part-time' farms requiring less than 0.75 standard labour units (5.6%). The 2011 survey indicated that 55.1% had completed the Farm Health and Safety Risk Assessment document and 21.9% had attended a short health and safety training course.

Conclusions:

The national survey indicates that injury levels on Irish farms have increased in year 2010 compared to 2006. The injury rate was highest for dairying and sheep farms. Farms classified as 'full-time' have over twice the rate of injuries as 'part-time' farms. The national survey provides information on which to base future prevention programmes.

Development of a visual training aid (DVD) to assist farmers to improve safety with livestock in Ireland.

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Keywords: agriculture, livestock, injury.

Background:

In Ireland, working with livestock is a major cause of farm injury (McNamara et al 2011). Improving safety with livestock is complex and involves many components including: breeding; facilities and the Human Animal Relationship (HAR). Regarding HAR, the work of Professor Temple Grandin in the USA is regarded as authoritative (<http://www.grandin.com>). In Ireland research has been undertaken on aspects of livestock safety (McNamara et al, 2011) with support from the European Leonardo da Vinci CAFRAT livestock safety project. Following this research it was decided to prepare a DVD to support knowledge transfer to farmers on livestock safety because of the utility of visual media as an effective means of communication.

Methods:

An expert group was convened to consider the content of the Livestock Safety DVD. The group was representative of educators, farmer's health and safety specialists and inspectors. This group defined the contemporary issues to be included in the DVD. and then oversaw its production.

Results:

The DVD was finalised in September 2011 and it is currently being used at livestock markets and exhibits for farmers and training and advisory sessions for new-entrant and practicing farmers. The DVD is available on the social media 'YouTube' and its availability has received national media coverage. To date (31/03/12), YouTube has been viewed on 3726 occasions with sub-titles receiving the following views: Breeding for Docility (22.7%); Loading of Livestock (18.8%); Safety Issues with Bull Beef (17.1%); Flight Zone and Point of Balance (13.2%); Safety with a Stock Bull (11.7%); Livestock Facilities (8.4%) and Safe Handling at Calving (8.1%).

Conclusions:

The livestock safety DVD provides an enduring resource to assist farmers to improve safety with livestock, with a 'shelf life' of circa 10 years. Initial data from YouTube indicates that interest in the DVD content is variable with 'Breeding for Docility' getting the highest and 'Safety Handling at Calving' the lowest number of hits.

Reference:

McNamara J., Mazurek M. & Earley B. (2011) Safe Handling of Cattle on Farms. Teagasc TRResearch 6(4), 2011 available at <http://www.teagasc.ie/publications/>.

Work-related musculoskeletal disorders among Irish farm operators

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Keywords: musculoskeletal disorders, agriculture, electromyography, posture

Background:

Farmers are exposed to high physical workloads, which places them at risk of developing work-related musculoskeletal disorders (WMSDs). The aim of this study was to establish prevalence and risk factors of WMSDs among Irish farm operators and quantify the number of work days lost due to a WMSD.

Methods:

In 2009, a questionnaire was appended to the Teagasc (Irish Agricultural and Food Development Authority) National Farm Survey (n=1110) to obtain data on the prevalence, risk factors and impact of WMSDs amongst farm operators in Ireland. Data was analysed using chi-square tests, t-tests, Mann-Whitney tests and bivariate and multivariate logistic regression.

Results:

The prevalence of WMSDs in the previous year was 9.4% (n=103), with the most commonly affected body region being the low back 31% (n=32). Nearly 60% (n=57) of farmers reported missing at least a full day's work as a consequence of their WMSD. Personal factors evaluated using bivariate regression analysis, were found not to influence whether or not a farmer experienced a WMSD. However, work-related factors such as larger European Size Units (ESUs) (OR=1.007, CI=1.002-1.012), greater number of hectares farmed (OR=2.50, CI=1.208-4.920), higher income (OR=1.859, CI=1.088-3.177), dairy enterprise (OR=1.734, CI=1.081-2.781), and working on a fulltime farm (OR=2.156, CI=1.399-3.321) increased the likelihood of experiencing a WMSD. The variable 'fulltime farm' which was associated with a higher labour unit requirement to operate the farm, was the only factor found to independently predict WMSDs in the multivariate regression analyses.

Conclusions:

This study suggests that the prevalence of WMSDs can be reduced by the application of improved farm management practices. A more detailed examination of the risk factors associated with WMSDs is required to establish causality and hence, effective interventions.

Why work farmers beyond 65?

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Keywords: older workers, retirement decision

Objectives

The demographic change in the western world increase the number of older people in the society and the retirement age might be postponed in the future to meet up the increasing old age dependency ratio. But some people, particular farmers, already work beyond 65 years of age in Sweden, whereas some left their working life for early retirement. The objective of this study was to research why some people work beyond official retirement age and why some left working life early.

Methods

This qualitative study analyzed the discourse on work in relation to retirement among men working beyond 65 years of age and men who had left working life before 65,

Results

The interviewees seemed to have considered and weighed their own best life balance to finally result in their identity as (older) worker or early retiree. They included their work situation and social surroundings in descriptions of their planning and retirement decision making. The older workers had possibilities in their life situation to manage their work in relation to their functional aging and health situation; felt important to others and socially included in the work place; and did meaningful tasks and felt empowered in their working life. The most important themes in the interviewees' descriptions were personal health and well-being, personal finances, possibilities for social inclusion and possibilities for self-crediting by meaningful activities.

Symptoms related to air contaminants in persons working with dairy cows and cattle

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Keywords: dairy cows, air quality, work environment, respiratory health

Objectives

Air contaminants as well as other factors in dairy cow housing and management may affect the health of the animals as well as persons working with the animals. A study was made with the aim to find factors correlated to the health of the workers in dairy cow and cattle houses.

Methods

Data was collected by the help of a questionnaire sent to approximately 1000 farmers working with dairy cows or cattle, pigs or poultry. The overall response rate was 75% and the response rate for those handling dairy cows and cattle was 74%. Totally 676 answers were used in the evaluation. Of those, 281 answers were from persons working with dairy cows and cattle and 264 of them worked with dairy cows. Analyses were made by χ^2 -analysis and multiple logistic regressions.

Results

The prevalence of self reported asthma for persons working with cattle and dairy cows was 3.2% which was lower than for the group working with pigs (3.9%), but higher than for the group working with poultry (1.4%). Compared to all the respondents, a higher number of persons working with dairy cows and cattle were much annoyed to stuffy (bad) air, illumination and work positions. Persons working with cows and cattle spent more time in barns compared to those working with pigs and poultry. Long working days in barns, i.e. more than 30 hours work per week in barns, showed a positive correlation to a number of symptoms like dizziness, nose irritation and wheezing, and also to skin irritations and muscle ache. Persons working with dairy cows and cattle showed higher 12 month prevalence of stomach problems and diarrhoea ($p \leq 0.05$) compared to those working with other animal species. On average, those working with dairy cows and cattle also reported a higher prevalence of tiredness and weakness as well as a higher prevalence of muscle ache.

Correlation between reported symptoms and some factors in the barns (tied up cows, liquid manure handling, manual handling of course feed and supplement feed, use of wood shavings) were studied in multiple logistic regressions. Manual handling of course feed was correlated to a higher 7-day prevalence of cough with phlegm as well as cough without phlegm and also to a higher 7 day prevalence of scaling, itching hair bottom.

Routines at insemination in piglet herds for increased efficiency, productivity and attractiveness as a workplace- a field study

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Keywords: pig, insemination, housing system, work load, efficiency

Objectives

Insemination in a piglet herd is the basis for many produced pigs per litter and the overall production in the herd. Often only one or a few persons carry out the entire insemination work within the larger piglet herds, and the working environment during insemination is therefore important. For the stockman it is important that the work load and the risk of injury are as small as possible. At the same time, production economy requires increased efficiency and a reduction in working hours.

The objectives of this study was to compare two different insemination routines, used in Swedish pig herds, according to working hours, work load and risks of injury. The study was a comparative study between the "traditional" way of inseminating sows in Sweden, according to the approach that the sows are moved to the boar (= area for insemination), compared to the now increasingly common solution to inseminate sows in the combined eating and insemination stalls. The hypothesis was that the new way of inseminating would reduce the total work time with this operation.

Methods

In total, insemination routines in 12 piglet producing herds have been studied. In 6 of the herds, the sows were moved to the boar, while inseminations in the other 6 herds were done in the combined eating and insemination stalls. At the study visits the owner and/stockmen were interviewed with respect to herd size, animal flow and the procedures used when inseminating. The insemination unit and the insemination area/insemination stalls, passageways, gates etc. were measured and photographed. In addition, videotaping of inseminations in one sow group was carried out in each of all the visited herds. After the visits, the videos were decoded. For each insemination, the time for the actual insemination (from the time that the catheter was inserted until it was removed) and the time between inseminations (= "other time") was recorded for all workers who were involved in the process. Furthermore, the total number of inseminated sows and total number of checked and controlled sows was recorded from the videos. The videos have also been used as a basis for assessing the work load and the risk of injury at work.

Results

The time for insemination the sows was in average 2.3 minutes in both systems. The time before and after each insemination (moving animals, walking, etc.) was significantly shorter in the system with insemination stalls as compared to the system with insemination area (1.9 minutes vs 3.8 minutes per sow). In conclusion, the obtained results indicated that insemination in combined feeding- and insemination stalls was more labor-efficient as compared to insemination on a special area in front of the boar. However, there are a variety

of insemination stall models to choose between. Therefore, a good recommendation to producers who must make new investments in insemination stalls is to make careful comparisons before selecting. Details such as the design of the back gate, the construction of the partitions between the stalls, operation of opening and closing devices, stall width, etc. are important details that the individual producer must evaluate in relation to his or her own needs.

Contributing factors to agricultural accidents in New Zealand

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The occupational agricultural death statistics in New Zealand are heavily weighted to tractors and All Terrain Vehicles (ATV's). In contrast, the agricultural injury statistics are mainly related to contact with animals and musculoskeletal injuries arising from lifting or slips, and falls. Recent New Zealand research showed that there were a number of important contributing factors, including the time of day, fatigue and pressure of work. Nearly all preventative measures have focussed on the immediately obvious cause. Thus in the case of ATV's, there is a strong effort being made in New Zealand to ensure that riders always wear a helmet, are adequately trained and only use the machine for its designed purpose. A case can also be made to equally focus on these other factors, which tend to be generic for all agricultural accidents, and are more related to good decision making and personal behaviours. This paper discusses using a much wider approach to preventing agricultural injuries in New Zealand.

Diminishing the risks of accidents at work for migrant workers in the Danish agriculture and construction industries.

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Keywords: migrant workers, accident reduction, agriculture, cattle farms, construction industry.

Background

Since the EU enlargement in 2004, the number of migrant workers employed at Danish workplaces has increased, not least in the construction industry and in primary agriculture. Research shows that migrant workers often perform routine work, are engaged in less attractive/dangerous jobs, receive a lower pay, work long hours and often work in groups separated from native workers. Research also shows that migrant workers typically are young and have low seniority at the workplaces. This leads to a number of challenges in relation to occupational safety.

Our assumption is that migrant workers are at particular risk of work accidents, and that migrant workers cannot fully use the accident prevention initiatives taken in Denmark. In order to further reduce the risks of accidents, initiatives aimed at migrant workers' specific work situations are needed. One step in that direction is to develop initiatives to establish more knowledge about migrant workers' specific working conditions, their expertise and appropriate sources for dissemination of needed information.

Limited to Eastern European and Ukrainian migrant workers working at construction sites in the construction industry and on cattle farms in primary agriculture, the project aims to:

Objectives:

- 1) Establish knowledge about the migrant workers' working situation in the construction industry and in agriculture in Denmark.
- 2) Develop a catalogue of ideas, which can facilitate the implementation of work accident prevention initiatives directly targeting migrant workers from the two industries.

The two industries - construction and primary agriculture - were chosen because the rate of employment of migrant workers within these industries is high and because they are categorized as high-risk industries in terms of work accidents. The Danish Working Environment Authority's Research Fund has provided funding for the project, which is carried out from January 2011 to the end of December 2012 by COWI A/S (project management), FrydendalConsult and the Department of Sociology at the University of Copenhagen.

Methods

Definition

Migrant workers is defined differently throughout the world. UN defines a migrant worker as follows: "*The term "Migrant Worker" refers to a person, who is to be engaged, is engaged or*

has been engaged in a remunerated activity in the State of which he or she is not a national" /1/. UN recommends a distinction between long-term¹ and short-term migrants² /2/ and operates among other terms with the "Self-employed worker", the "Specified-employment worker", the "Project tied worker", the "Seasonal worker" and the "Frontier worker" /1/. Based on the UN's definition, we sought to establish a project definition of migrant workers which was most including in relation to work accident risks, e.g. a person residing in Denmark, but who has been in the country for such a short period that he or she still qualifies as 'new' at work and is still expected to be more influenced by his/her original language and cultural background than the Danish:

Definition - Migrant worker:

A migrant worker is a person with the nationality of Ukraine or one of the Eastern European countries that joined the EU in 2004 or 2007, temporarily living and employed/engaged/involved in employment in Denmark within the construction industry or in the agricultural industry working on a cattle farm.

'Temporarily' we defined as a period of less than 12 months and with no previous employment in Denmark, and 'employment' as employment other than student/trainee. However, we have had to renounce these delimitations as many of the migrant workers we were able to include in the project had been in Denmark for more than 12 months, or had been employed in Denmark prior to the project contact, and as many of the migrant workers employed in the cattle farms were in Denmark as trainees.

Data collection

Our main source of data is qualitative interviews supplemented with a literature study and a quantitative survey among companies employing migrant workers.

The literature study includes a comprehensive European study conducted in November 2007, primarily comprising European literature on migrant workers from the period 2002 to 2007 /3/, and five studies prepared in each of the Nordic Countries in May to September 2010 as preparation to an upcoming project carried out by the Nordic Council of Ministers on migrant workers in the Northern Countries, mentioned in /4/. The literature study included 13 other reports referred to in the Nordic studies or identified through searching the Internet.

The survey included a questionnaire mailed to 169 cattle farms and 244 construction firms which may or may not employ migrant workers.

The qualitative study included interviews with:

- 1) Migrant workers working in the construction industry or on cattle farms
- 2) People in the work sphere of migrant workers (gangers, construction managers/farmers and their spouses and colleagues)
- 3) Key persons in the migrant workers' social networks (friendship associations, churches, centres for migrant workers etc.)
- 4) Industry and OHS professionals with a professional contact to migrant workers.

¹ Moves to a country other than that of his or her usual residence for a period of at least a year, so that the country of destination effectively becomes his or her new country of usual residence.

² Moves to a country other than that of his or her usual residence for a period of at least three months but less than a year.

More than 50 interviews were conducted with a total of 62 informants. Specific semi-qualitative interview guidelines for the approximately 1½ hour-long interview were developed for each of the four types of informants.

24 migrant workers, equally divided between the two industries were interviewed. The interviews were conducted in the native language of the specific migrant worker, using interpreters. A combination of descriptive, structural and contrast questions was used to generate knowledge about the object of study. To get into contact with the migrant workers, flyers were put up at supermarkets; DIY centres, agricultural colleges, construction sites, Polish shops etc. and notices were posted on relevant websites. The flyers and the notices gave a short description of the project and argued for participation. The migrant worker was asked to send a text message indicating that he/she would participate. The goal was to reach the migrant workers directly. However, the text message response was very limited. Thus, the migrant workers working at cattle farms were contacted through their employers, and the migrant workers in the construction industry were primarily contacted through a student of Danish-Polish descent who had previously been employed by the union. The participating migrant workers on the farms were young (22-29 years old) and came from Poland, Ukraine and Romania and were directly employed on Danish cattle farms as trainees or as skilled farm-workers. The participating migrant workers in the construction industry were middle-aged (30-50 years old) and came from Poland and Lithuania and were primarily employed by sub-contractors as skilled demolition workers, skilled electricians, skilled and unskilled bricklayers or carpenters.

Analysis

All empirical data has been collected and the analysis of the empirical data is on going. The data from the interviews with the migrant workers is being analysed using NVivo software and is expected to be finalized by September 2012. For this reason, no results from the analysis of the interviews with the migrant workers themselves are included in this abstract. Themes from the empirical material will highlight potential work accident prevention initiatives directly targeting migrant workers in the two industries chosen.

Preliminary results

Questionnaire:

About 30 per cent of the contacted respondents at construction firms and the cattle farms stated that they have no migrant workers employed. A remarkably large proportion emphasizes that they have never employed Eastern Europeans, nor intend to do so in the future. For instance: *"Have never hired foreign labour, and certainly not want to in these times"*, *"We have not and have never had Eastern Europeans, which we are grateful for - if you can afford to say so "*. The reaction underlines the sensitivity of the topic. The very few responses - sixteen from cattle farms and seven from the construction industry (plus twelve partly filled-in responses) - offered interesting remarks and viewpoints useful in the design of guidelines for the semi-qualitative interviews, even though the number of responses is too low to draw any conclusions based exclusively on the questionnaire.

The remarks indicated that migrant workers working on the cattle farms are often offered language courses or the farmers make it possible for the migrant workers to attend language courses, whereas this is not the case within the construction industry. The farmer himself works closely with the migrant worker and thus is very aware of the difficulties that insufficient communication may lead to. At the construction sites, migrant workers work in

Eastern European gangs, maybe leading to less focus on language issues from the employer's side. This underscores the relevance of perusing language problems in the study and whether language courses should be a measure (also) within the construction industries.

Responses from the construction industry indicate that migrant workers are skilled and/or employed with tasks, tools and machines that they are experienced with from their homelands. In contrast to this, the respondents from the cattle farms describe the migrant workers' knowledge of the work as limited and that there are big differences in the technology used in Denmark and that used in the migrant workers' home countries. This underlines the appropriateness of asking what implications the migrant workers' qualifications have on safety, undertaking work in the construction and farming. If the migrant workers on cattle farms initially only have limited skills – in contrast to the migrant workers in the construction industry - will this require extensive task and safety instructions on-site, where the construction migrants can commence work without this instruction and training? And do this lack of prior knowledge and limited skills of the migrant workers in the cattle farms require in-depth on-site training and instruction to ensure that the work is performed safely? Do these conditions affect how safety measures in the two industries can be brought into play?

Respondents in both industries suggested that there is a need for introducing migrant workers to the Danish safety standards immediately when the migrant workers start work. Could special introductory courses for foreign workers be an option? And if so, how and in what context?

Interviews in relation to OHS professionals:

20 persons were interviewed on their understanding of what some call 'the influx of migrant workers in Denmark'. The group of interviewees represents public authorities; unions and employer organisations from both the construction industry and the agriculture industry; a temping agency serving the agriculture industry; a research centre of social market knowledge; an agriculture school; and interpreters with long experience working as translators and cultural communicators between the labourers in the industries and the Danish society. All informants have worked with issues related to the situation of the Eastern European migrants employed in Denmark.

Areas addressed in the interview were: experiences related to the migrant workers; issues related to employment and the working environment of the migrant workers; including risks of work accidents and current preventive measures; and the need for new initiatives related to the safety of the migrant workers in Denmark.

Generally, the characterization and the range of issues given by the OHS professionals were very identical, respectively, in the two industries. The professionals working in relation to the construction industry characterized the migrant workers as consisting of three profiles which need different approaches. One is a group of migrant workers that work on equal terms as the Danish workers. The second group primarily comes to Denmark as subcontractors. In this group, work, health and safety conditions greatly vary - from acceptable to critical conditions. The third group was described as a group of 'hidden' workers, whose working and accommodation conditions are characterized as very poor and highly critical. Stories of Danish workers' animosity toward the migrant workers were told, which concerned foul play, underpayment and the present high rate of unemployed Danish construction workers.

The OHS professionals in the agriculture industry on the other hand presented the influx of migrant workers to the farms as a welcome asset in a situation of shortage of manpower. The

group of migrant workers was presented as fairly uniform and the work contracts as dominated by educational contracts. These are well organised and has for a long time been dominated by a bilateral agreement which the Danish government has made with Ukraine. This consists of a basic education at an agricultural school in the homeland and an 18-month trainee period on a Danish cattle farm, often starting with a six-month stay at a Danish school of agriculture.

Representatives from both industries point to the problem that statistically the specific number of work accidents is not known. In the construction industry, the rate of unreported work accidents is estimated to be about 50 per cent, and the same goes for the agriculture industry. In addition, accidents in the agricultural industry are often characterized as just 'bad luck', which rarely leads to absence from work. Instead, other jobs to be done on the farm are found. In the construction industry, some very serious work accidents and tragic cases of deaths among migrant workers have been reported and through the media, attention was drawn to the work conditions of the migrant workers in the industry.

Among the suggestions made to improve the safety in relation to migrant workers was easier access to information and legal requirements when working in Denmark. One representative suggested 'a one-stop shop' instead of the current situation where migrant workers have to go to several places for information. Another suggestion addresses the bilateral lack of cultural and social knowledge, by some defined as the 'cultural ignorance'. This could be improved by exchange of cultural knowledge, targeted information etc. In relation to direct improvement of health and safety performance, suggestions were made addressing better management, better information, language courses and more.

Interviews related to social network:

About 20 institutions such as embassies, consulates, the immigration service, friendship associations, hospitals, language schools, churches etc. were contacted. However, almost half of them replied that they seldom are in close contact with migrant workers and therefore do not regard themselves as being part of the migrant workers' social network. Interviews were conducted with seven informants from six institutions. The areas addressed in the interview were the informants' experience with migrant workers, the social networking, employment and working conditions of migrant workers, including risks of work accidents and related suggestions for preventive measures.

The informants stated that the migrant workers for the most part have very sparse contact with Danes. The social life of the migrant workers to a great extent relies on the Internet to communicate with friends and family, and on migrant workers from the same country. The informants believe that especially the long working days, the focus on earning money plus the cultural and particularly language barriers hinder the migrant workers' search for socialization with Danes. For example: *"The migrant workers are not integrated because they do not speak Danish. They feel a 'glass wall' between themselves and their Danish colleagues, which they can not pull down". "The migrant worker employed on a farm is primarily in contact with the employer, who may only speak poor English or German. Often the migrant worker has no car and the public transportation near the farm may be limited. After some time, the migrant worker feels mentally burnt out". "The migrant workers have tradition for going to church, but they do not have tradition for staying for coffee afterwards and mingle with the other churchgoers".*

The informants experience that the migrant workers in general have difficulties navigating in the Danish system. Not until the migrant worker is in trouble are the informants contacted. In

such situations, the informants have helped in regard to understanding the employment contract, taxation, job application, problems if fired, handling accidents, housing etc. The informants regard themselves as the migrant workers' lifeline.

An important aspect related to the risk of work accidents is the fact that the migrant workers are more ready to accept authorities, in the informants' opinion. Usually, they will not refuse to do a job. The long working days affect their concentration. They often change jobs and are thus new in the job almost all the time. Work instructions may lack or be insufficient - often due to language problems. And finally, the collegial sharing of knowledge is sparse.

Interviews in relation to work sphere:

The areas addressed in these interviews were: Relationship to migrant workers; experiences working with migrant workers; the organisation of work; the recruitment and the competences of the migrant workers; risks of work accidents; actual accident prevention; and suggestions for preventive measures directly targeting migrant workers.

Cattle farms:

Four cattle farms that employ migrant workers were visited and the employers interviewed. Furthermore, four Danish trainees who in their traineeship have worked together with migrant workers at cattle farms were interviewed. At each of the four farms, one to two migrant workers were employed. At one farm, the migrant workers were the only employees, whereas other farms also employed a few Danish workers.

At all the cattle farms, the migrant workers work solely in the stables and their main duties are milking the cows. The farmers emphasize that the migrant workers do not have the competences to handle the large agricultural field machinery. Even though the farmers state that the migrant workers initially have no agricultural skills useful on a Danish farm, they praise the migrant workers' attitude toward work. For example: *"The migrant workers often have qualifications from other sectors and are more intelligent than the typical Danish workforce". "Often, the Danish trainees believe they are fully skilled in a short time. The migrant workers have a more humble attitude toward work and the tasks they must do and they are good at learning". "Migrant workers work for money and continue working until the job is done - even if the work is routine. They want to make a big effort".*

The Danish trainees say that they predominantly have positive experiences from the collegial contact with migrant workers.

Asked about dangerous situations and what constitutes a risk of work accidents for the migrant workers, the informants point to the following risk factors:

- A high willingness to work - possibly linked to the fear of being fired.
- Strong belief in authorities. Migrant workers do not like to say no or that they have not understood the message.
- Lack of knowledge about safety.
- Confounding of languages.
- Alcohol.

Farmers stress that it puts different demands on them as managers when the migrant worker are overly willing to work and have a strong belief in authorities. For example: *"The migrant workers say they have understood the task, without actually having understood it. And it is a huge problem! We are not used to employees pleasing us so much. It's a totally different*

situation to be the employer. They come from a poor situation and would like to earn some money. But they must first learn their work and it is essential to remember that they are afraid of being fired. They never say no! But they must learn to say no, when they cannot or do not understand. And they do not say 'I'm tired' or 'I cannot', they simply DO not. They can earn ten times as much here than they can at home so they do not run the risk of upsetting the boss. They will therefore take all risks because their lives might be 'worthless' without the job. And they may have struggled a long time to get the job. And that, I can easily imagine, can cause work accidents. As employers, we must be aware of this".

In general, a poor common language presents challenges and involves, according to several of the informants, a risk that can cause dangerous situations. One of the farmers explains that the lack of a common language on her part can result in giving up explaining things that she, as the employer, otherwise would have explained.

Several of the issues listed under 'dangerous situations' are culturally based and, according to informants, essential to further the debate with the migrant workers. This comprises, not least, the strong belief in authorities, the fear of losing the job and the alcohol culture. Furthermore, a more systematic introduction, clear communication of dangers, written safety materials and posters, and visibility and presence of the farmer are among the measures of risk reduction proposed by the informants.

Construction sites:

Four building firms were contacted. All of them occupy migrant workers through sub-contractors. One firm has on a regular basis 30-40 Polish demolishing workers from a Polish owned firm. A second firm had five steelworkers stationed from a company in Poland and had previously at the visited site, through a temping agency, employed ten Polish workers to do reinforcement work. The third firm had previously employed a gang of 160 Polish concrete workers through a Polish firm. The fourth firm often hire foreign firms to perform specialized jobs and presently had a gang of Polish bricklayers working, helping the Danish bricklayers due to a delay in the production plan.

On none of the four visited sites did the migrant workers work in gangs with Danish employees. The informants report that the social integration through social events is sporadic, and only in one case did migrant workers and Danish workers share a workmen's hut; however, this did not result in collegial friendship. More informants report that mutual language barriers and prejudice are seen as hindering collegial friendship.

In general, the managers interviewed express their satisfaction with the migrant workers' skills and their work performance, and not least their stability and willingness to work long hours. In terms of safety, this willingness and a strong sense of authority sometimes seems to be in the way of a 'safe and sound' working environment. Thus, the managers have no doubt that the foreign workers are at higher risk. For example: *"You may find many 'Tarzans' and they often do not use the technical tools and aid available, thus being in higher danger of accidents and being worn down in the long-term"*.

Suggestions to improve the safety culture are in this group of informants centred round improving the communication skills. Better Danish for the foreign workers and better English for both the Danish and the foreign workers. Other suggestions are better safety instructions on site and on-going safety courses for everyone working on site. Finally, the contract must always include questions of health and safety.

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/1/ *"International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families"*. A/RES/45/158, 69th plenary meeting 18. December 1990. United Nations.

/2/ *"Recommendations on Statistics of International Migration: Statistical Papers Series M, No. 58, Rev. 1"*. Department of Economic and Social Affairs Statistics Division. United Nations, New York, 1998.

/3/ European Agency of Safety and Health at Work Nov. 2007. *Literature study on Migrant Workers*.

http://osha.europa.eu/en/publications/literature_reviews/migrant_workers

/4/ Hviid K, Flyvholm AM (2010). *Udenlandsk arbejdskraft i Norden – Sammenfatning af landerapporter fra forprojekt til Nordisk Ministerråds globaliseringsprojekt*. TemaNord 2010:588.

Tractor incidents on Swedish road

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Keywords: farm vehicles, injury, prevention, road crashes, road collision

Introduction

Compared with other industries, agriculture is the most dangerous branch in Sweden. In 2004, at least one injury occurred on 8% of Swedish farms that resulted in body impairments and constituted obstacle at work. Beside the injuries that occurred on the farms farmers also are involved in incidents with tractors and other slow-moving vehicles (SMVs) on the roads outside the farms.

Objectives

The objective of this study is to reach a better understanding of incidents and injuries on Swedish roads involving tractors and to suggest ways of preventing them.

Methods

Together with Statistics Sweden we sorted out information on police-reported incidents involving tractors from 1992 to 2009. The data material included information on the type of incident, severity of injury, type of road user, vehicle data, road conditions, and type of road, weather conditions, and many other aspects of the accidents. Only fatal injuries and injuries that led to physical harm were selected.

Results

In an earlier study we analyzed incidents resulting in fatal and non-fatal injuries from 1992 to 2005. During each year of this period, tractors were involved in 128 traffic incidents with an average of 7 people were killed, 44 sustained serious injuries, and 143 sustained minor injuries. The number of fatalities in these tractor incidents was about 1.3% of all deaths in road incidents in Sweden. Cars were most often involved in the tractor incidents (58%) and 15% were single vehicle incidents. The mean age of the tractor driver involved was 39.8 years and young drivers (15-24 years) were overrepresented (30%). We are now increasing the data set with the years 2006-2009 in order to study the changes in the number of incidents. Special attention will be given to the younger drivers and to single vehicle road incidents. Based on the results are we developing suggestions for reducing road incidents and injuries, e.g. including measures for making farm vehicles more visible and improvement of the training provided at driving school and information campaigns directed at drivers of tractors and other farm vehicles and other road users.

Reasons of shortened working careers among farmers in Finland

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Recent trends where people retire earlier and live longer have increased pressure on retirement systems to manage payments and benefits in a sustainable way. Extending working careers has become a national priority in Finland in all industries, including agriculture. Agriculture is one of the most hazardous industries in Finland, as well as other western countries with mechanized agriculture. Mela administers an accident insurance system (MATA) in Finland. This insurance is mandatory for practically all farmers, and therefore injuries and occupational diseases are well documented among Finnish farmers. About 7% of insured farmers encounter occupational injuries or occupational diseases annually. Most of these cases result in relatively short disability periods, but some lead to long or permanent disabilities and significant loss of productive working time. A pension insurance (MYEL), which is also mandatory for all farmers provides pension benefits in case of disability due to non-work-related reasons. Old age pension is provided to all Finnish farmers with a flexible retirement age between 63-68 years of age. Other retirement options and benefits are also available for those with MYEL pension insurance.

The purpose of this study is to identify reasons for shortened working careers among farmers. The study includes identifying costs and lost working time due to various health outcomes, both from work-related and non-work-related causes. Mela's total costs for the insurance systems in 2010 were as follows: MATA accident and occupational disease insurance system 40M €, MYEL non-work-related disability pension system 70M € and MYEL old age pension system 670M €. In 2011 there were 2258 farmers on accident or occupational disease pensions and 9733 farmers on non-work-related disability pensions. This study will further explore the losses of potential working time from different insurance systems and different causes. Most important reasons for shortened working careers among farmers are identified. This information is needed for designing interventions aimed at extending working careers among Finnish farmers.

Critical success factors for improved safety outcomes in Irish agriculture

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Key words: Farm safety interventions, safety outcomes, critical success factors, hard factors, soft factors

Farming is the most dangerous occupation in Ireland. The issue of farm safety is complicated by the presence of family members, the elderly and children in a work place that is also a home.

A culture of underestimating risk and ignoring legislative requirements exists in farming in Ireland. Current structures for implementing what is a comprehensive array of legal responsibilities on farmers are not working effectively. Willingness of stakeholders to commit wholeheartedly in deed as well as words to adopting a culture of safety is fundamental for significant improvement to occur.

This paper attempts to establish the critical success factors for farm safety in Ireland. Identifying these critical success factors will help direct the safety intervention strategy of stakeholders.

The purpose of this paper is to examine in detail the best practices in Denmark and develop proposals based on that model that can be implemented in Ireland. The study is a descriptive inquiry involving qualitative research methods. The methodology incorporated a comparative analysis case study of the Danish and Irish systems supplemented by a series of in-depth interviews with key industry stakeholders in both the Irish and Danish farm safety systems.

Denmark is a country largely comparable to Ireland in terms of farming industry. Denmark has committed to definite goals in agricultural health and safety. An extensive programme of farm safety audits coupled with a comprehensive extension programme is having a positive impact.

Despite the limitations of this study which focused on a single country for comparison, there are clear critical success factors identified. The challenge for Ireland is to incorporate these to augment what is already in place.

Critical success factors are both “hard” and “soft”. The results of this paper indicate a focus on hard success factors such as; legislation, design and manufacturing standards, resources committed to safety enforcement and information, will have bounded success outcome levels. A combined intervention strategy including hard success factors and soft success factors is necessary. Soft success factors include; culture, leadership, motivation, attitudes and behaviour. Real progress will occur when farmers truly buy into the fact that farm safety is fundamental to the long term viability of their business.

Exposures to organic aerosols and effects on pulmonary function among western US dairy workers

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Key Words: Dairy, Pulmonary Function, Worker, Bioaerosol, FEV, FVC

Objectives

Organic dust inhalation has been associated with adverse respiratory responses among dairy workers. Susceptibility to the adverse health effects resulting from these agricultural exposures may be due to constituents of the dust, e.g. components of Gram-negative bacterial (endotoxins), Gram-positive bacteria (muramic acid), and fungi (ergosterol); intrinsic factors, e.g. genetic traits, immune system regulation; and extrinsic factors, e.g. smoking and work-related behaviors.

Methods

This study quantified breathing-zone personal work shift exposures and pulmonary function among 116 dairy workers during a variety of tasks. Inhalable dust was collected with Button samplers and analyzed for endotoxin (recombinant factor C [rFC] assay), 3-hydroxy fatty acid (3-OHFA), muramic acid, and ergosterol (gas chromatography/mass spectrometry). Pulmonary function tests before and after the work shift included: forced vital capacity (FVC), forced expiratory volume in 1 second (FEV1), and the FEV1/FVC ratio. The maximum of three valid maneuvers was used in analyses.

Results

Participants were 91% Hispanic/Latino and 88% male. Geometric mean inhalable dust levels were low (0.68 mg/m³), but highly variable (range 0.02 – 6.81 mg/m³). Geometric mean levels of endotoxin, 3-OHFA, and muramic acid were 469 EU/m³, 359.0 ng/m³, and 11.3 ng/m³, respectively. Ergosterol concentrations were primarily non-detectable (72%). Mean baseline FVC and FEV1 were 96.5% and 97.0% of predicted, respectively, and varied widely (FVC 75% -121%, FEV1 68% - 125% of predicted). FVC and FEV1 were significantly reduced across the work shift among all dairy workers. Mean cross-shift changes were -1.3% (95% confidence interval [CI]: -2.2, -0.4) and -1.6% (95% CI: -2.5, -0.7) for FVC and FEV1, respectively. The greatest mean reductions in cross-shift PFTs were found during rebedding/scraping stalls and corrals (-4.0% for FVC and -3.3% for FEV1) and repair tasks (-3.3% for FEV1). No clear patterns in cross-shift pulmonary function changes by exposure tertiles were observed. Results were similar when restricting the population to those with a second highest pulmonary function test within 0.2 liters of the maximum test.

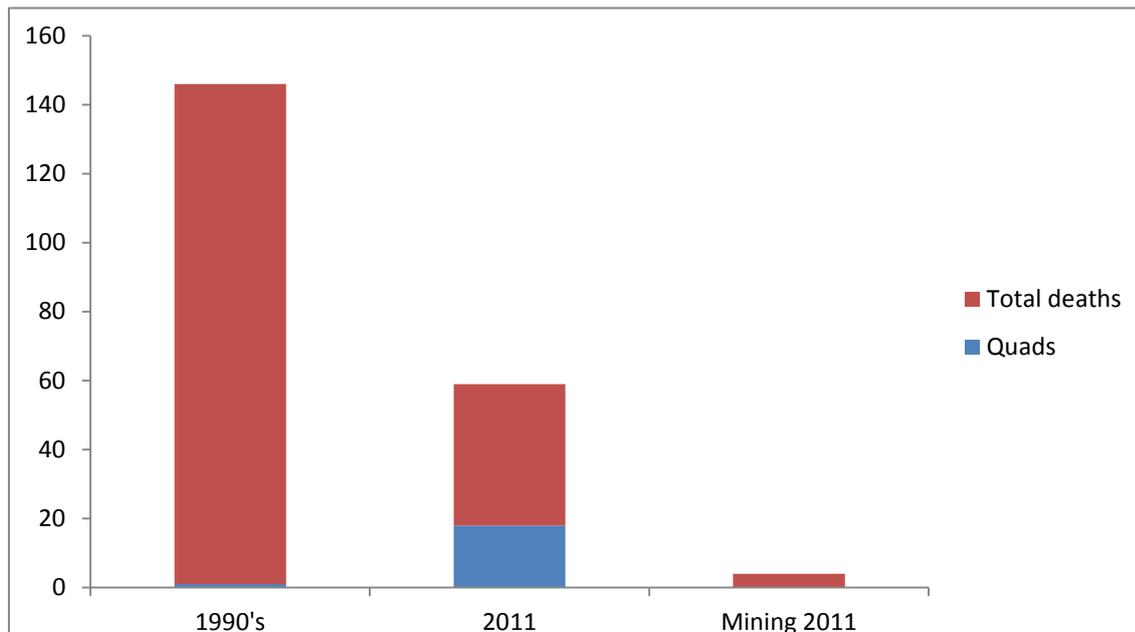
Exposures to microbial constituents of aerosols and reductions in pulmonary function were both quite variable and noteworthy for dairy workers. However, an association between

increasing exposures and cross-shift reductions in pulmonary function was not observed. The relatively high endotoxin exposures found across all workers (geometric mean exceeded recommended guideline) may contribute to this lack of association. Further analyses will include evaluation of factors that may modify the effect of aerosol exposures on pulmonary function, such as smoking, obesity, work experience/duration, and genetic status.

Rollover protection for quad bikes

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Keywords: quad bike, ATV, rollover, rollover protection, CPD



Over the past 20 years, farm deaths have reduced significantly, however quadbike related fatalities have skyrocketed. They now account for 1/3 of all on farm fatalities and injuries, surpassing the previous biggest killer on farms, tractors, by nearly two to one. Of the total on farm quadbike fatalities, 65% are due to rollovers.

It has long been thought that it was impossible to fit a rollover protection to quadbikes, this view has been promoted by the manufacturers of the machines. A recent study by Drs Wordley and Field, Department of Mechanical and Aerospace Engineering, Monash University found that the research conducted on behalf of the manufacturers had major problems with the research methodologies. Their finding opens the way to fit roll over protection to quadbikes.

QB Industries has designed a crush protection device, a form of roll over protection that can be retrofitted to most existing quadbikes. The design has undergone a range of testing and research including work by independent engineers, Ridge Solutions and the University of Southern Queensland.

Videos played during the presentation are available at www.quadbar.com

The Dutch chain approach - Ergonomics for young agricultural workers

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Key words: Stigas, ergonomics, agricultural sector, health and safety

1. Introduction

With a view to promote health and safety at the workplace, the Dutch agricultural workers and employers created in 1986 a foundation called STIGAS, which is still very alive. It has a board of equally represented workers and employers and this board decides about strategies in order to implement health and safety in the most practical way and close to the culture of the farmers. The principle is that when you ask one farmer to solve his health and safety problem he cannot change it, but when you ask it to THE farmers it will be possible to find a solutions. Therefore Stigas could start many projects to prevent musculo skeletal disorders looking for practical ergonomic solutions. For example the floor in the milkstable can move up and down by filling sort like airbags.

STIGAS counts with a team of highly motivated advisers. The agricultural social partners also started with collective sick leave activities, reintegration and insurance for health and sick leave. In this chain of activities (prevention, sick leave activities, reintegration and insurance) prevention at the workplace contributes to cost reduction of insurance. As 56% of sick leave has to do with musculoskeletal disorders (MSD) and there is a strong association with physical workload.

2, Agreement between agriculture and government

The agricultural employers and employees signed an agreement for four years (2002-2006) with the Ministeries of Labour and Agriculture in order to reduce long term sick leave caused by MSD. This agreement was financed by the agricultural employers (1/3) and the government (2/3). Amongst other this agreement led to training materials, to an instrument for risk-assessment at small scale farms, ergonomic advices, a yearly ergonomic innovation award and a project with young agricultural workers. One goal of the agreement was to reduce long term sick leave with 10%, this goal was achieved. An other goal was that the number of workers who complain of physical workload would be reduced. This goal was partially achieved.

3. Young agricultural workers

Within the agreement a project for young agricultural workers was developed. Young agricultural workers in the age under twenty-five follow classes one day a week. These young workers are not used to fill in questionnaires neighter take part of interviews about health and safety, so it is hard know what work risks they face. 300 young workers of 22 agricultural schools participated in this project. Two sessions about principles of ergonomics were given in class and the young workers had to make a risk assessment at their own work and discuss this with the employer.

In small groups the young workers had to present the most heavy physical parts of their job, choose one and create together a practical solution. This could be of technical or organizational character. The result was that STIGAS received interesting ergonomic solutions for heavy physical work. Young workers are the helping hand of the professional and this means a lot of heavy work. In 2012 Stigas could repeat this project at schools.

Exposure to fungicides in vineyard cultivation: results from three ongoing Italian studies.

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Keywords: mancozeb, passive sampler, profile, tebuconazole, whole-body

Objectives

Vineyard cultivation is a traditional agricultural activity in Italy, which often leads to products highly prized in the global market. Vineyards protection needs the use of fungicides, which are applied by different techniques (tractor or manual spraying) according to estate characteristics (large flat, hill vineyard). Since exposure of vineyard workers may occur and their health might consequently be affected in the long term, rationally planned monitoring programs can drive prevention while avoiding unnecessary concern.

Methods

Three monitoring studies are ongoing in the Northern Italian regions of Lombardy and Piedmont: (a) exposure to Mancozeb of 15 workers of flatland vineyards; (b) exposure to mancozeb of 14 workers of steep-hill vineyards; (c) exposure to tebuconazole of 10 workers of steep-hill vineyards. Studies (a) and (b) use passive samplers on workers' own clothing to assess exposure in real-life conditions while study (c) uses the regulatory 'whole body' approach, whereby workers are dressed with a standardized underwear-coverall attire as the passive sampler for the measurement of dermal exposure. In all studies monitoring includes hand washing and pre- and post-exposure urine measurement of pesticide-specific metabolites. A complete collection of data including acreage, applied quantities, duration of tasks, technical information on employed agricultural machinery, is obtained in the field through an interview and field survey by a professional agronomist.

Results

In the vineyard sprayers who participated in studies (a) and (b) the amount of mancozeb on the working attire ranged from 25 micrograms to 26 milligrams (median 681 micrograms), corresponding to 0.13 - 740 micrograms / dm². Contamination of the underwear ranged from 0,17 micrograms to 0.6 milligrams, corresponding to 0.1 nanograms - 12 micrograms / dm² and indicating a permeation rate <1% for most workers who donned whole-body coveralls. Hand washing yielded from 4 to 2700 micrograms, which makes up almost 90% of skin contamination.

In the vineyard sprayers who participated in study (c) the contamination of the coverall ranged from 1.5 to 35 milligrams, corresponding to 5-400 nanograms / dm², with higher contamination in the lower half of the body and on the forearms, depending on the amount used and on the method of application (manual spraying > open tractor > cockpit tractor).

Underwear contamination ranged from 50 to 450 micrograms, corresponding to 0.1-6 nanograms / dm² and indicating a permeation rate <10% . Hand washing yielded from 50 to 2000 micrograms.

The results are merged into a database to data-mine the determinants of exposure (application techniques and protective devices). The final aim is to build 'exposure profiles' to forecast exposure at individual workers' and small-enterprise farm levels to assess the effect of specific technical prevention in a cost-effective way.

Promoting safety and health in U.S. agritourism

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Keywords: agriculture, agritourism, children, safety, health

Objectives

Defined broadly, agritourism involves any agriculturally-based operation or activity that brings visitors to a farm or ranch. Across the United States, farm/ ranch owners are adopting agritourism activities to increase and diversify their revenue sources. This business strategy results in visitors on the farm/ ranch who are unfamiliar with hazards. In order to promote safety and health, while reducing liability associated with disease and injury, educational resources are being developed and disseminated with funding from the National Institute for Occupational Safety and Health (NIOSH). This project phase aimed to identify safety and health topics and materials of interest to agritourism operators (AOs), which will be used to develop an interactive agritourism safety and health website. Information was also obtained on the perceived "value" of this type of website.

Methods

Survey questions were developed and pilot tested. Questionnaire items were formatted for the electronic "Survey Monkey®". The survey link was emailed to 54 agritourism associations (AAs) or State Departments of Agriculture. Non-respondents were re-contacted weekly (x3).

Results

Completed surveys were received from 17 associations, representing a 31% response rate. Operations with overnight lodging were identified by all respondents as present in their region; and retail sales (e.g. garden vegetables, souvenirs) were identified by all but one. Corn mazes, pumpkin patches, agricultural/educational tours, farm-based festivals, museums, and trails were also common. About half identified hay/sleigh rides, animal based activities, as well as hosting weddings and party events. Safety and health topics "of most interest" were food safety (88.2%) and supervision of children (70.6%). Approximately half of responders identified animal safety (58.8%), hand-washing and restrooms (52.9%), incident and emergency response (52.9%), and traffic/pedestrian safety (47.1%) as topics of interest. "Signs" was identified as the most requested resource (73.3%). Also commonly requested were educational materials (66.7%) and policies/procedures (60%). Less requested materials included product information (40%), checklists/log sheets and emergency/incident forms or other safety forms (26.7%). Respondents identified an agritourism health and safety website to be of above average "value". The average "value" rating was 5.07 (on a 7 point scale, with 1 being "not valuable" and 7 being "extremely valuable"). Findings are being used by an Advisory Team developing the interactive website for Agritourism Safety and Health.

” Zero accident at my farm” - The farmers mental HES-challenge?

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Keywords: safety, agriculture, risk, safety-attitude

Objectives

The project “Skadefri bonde” combined with other Norwegian surveys and materials. Agriculture offers interesting jobs for well qualified people. Farm-work is connected with a great range of dangers. Knowledge, well-defined routines and risk-awareness are keywords to describe safe working. Farmers aims seems important to the safety-attitude at the different farms.

The project ”Skadefri bonde”, Arbeidsmedisinsk avdeling – St.Olavs Hospital, Trondheim, Norway (november 2011), (Oddfrid Aas, Marit Haugen, Per Olav Rian, Kristin Svendsen, Gunnar Løvås, Siri Slåstad, Jon Gisle Vikan, Anne Marie Heiberg, Bjørn Hilt.

Methods

“Skadefri bonde” is a survey conducted among farmers in Norway, combined with by a qualitative study of information collected through farm visits to an assortment of farmers who participated in the survey. The survey-results are combined with results from other Norwegian surveys and materials.

Results

Results show that norwegian farmers are conscious to risks. However, the impression is that farmers not always behave adequate to this risk. Many farmers seems to regard risks as a natural part of life, considering risks as something that they just have to live with. The results indicate that this is the reason why many farmers not are sufficiently aware of the useful effects of safety. The results also indicate that farmers who consider it important to avoid accidents, are more aware of the useful effects of safety-management and to a greater extent are working towards the aim “zero accident at my farm”.

Exposure and risk profile of cow milkers in the region of Lombardy, Italy

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Keywords: dairy, milkers, migrants, exposure risk profile

Objectives

Dairy farming represents one of the most important agricultural sectors in Northern Italy. The important increase of Italian cheese export (+22%) registered in 2010 put dairy farming facilities in a crucial role. In order to maintain a high quality level, hygienic requirements are essential: a correct procedure in milking, workers' hygiene and health conditions and technical changes (computer-based milking, milk refrigeration,...) allow to maintain higher and higher the hygienic and sanitary conditions. The study was aimed to the definition of an Exposure and Risk profile of the cow milker employed in dairy farms in the Region of Lombardy.

Methods

Study participants were recruited among agricultural workers involved in the occupational health surveillance programme carried out by the International Centre for Rural Health of the San Paolo University Hospital, Milan. Medical records were

Results

129 milkers underwent periodical medical examination, within the occupational health surveillance programme. Among these, 29% are Italian and more than 70% are non-nationals. The composition of the foreign milkers group is distinctive, with a 65% represented by Northern Indian migrants, all coming from Punjab and belonging to the Sikh religion.

Numerous health and safety threatens are experienced by cow milkers.

First of all the work-shift is demanding: the milker starts working at night, even at 2 a.m. and finishes the first milking phase in the morning, usually within 7.30p.m. The second shift starts in the early afternoon and lasts until late afternoon, at 7.30 p.m. This kind of work-shift imposes important difficulties in the social life and in the management of chronic diseases and pharmacological therapies.

The climate: the high humidity level worsens the thermic discomfort perceived by the worker especially in winter nights. This factor, together with inadequate posture requested by the task (standing up with a slight twisting movement of the bust), causes muscle-skeletal discomfort – or even diseases – of the vertebral column, such as lumbago, shoulder muscular tension and cervical arthritis. Hands, often wet, are involved as well by chilblain which are common in winter.

Moreover, several biological agents can affect the milkers' health: brucellosis, leptospirosis, tuberculosis, viral dermatoses (e.g.: Parapoxvirus milker's cutaneous nodule) and tetanus can represent health threatens to the worker. Finally, a certain injury risk can affect the milker's safety mainly because of animals' kicks.

Safe play areas for children on Swedish farms

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Keywords: child, farm, agriculture, play, play area

Objectives

Agriculture is known to have one of the most dangerous workplaces in Sweden with a high number of injuries, both fatal and non-fatal every year. This is the same situation as in many other countries over the whole world. A farm is not only a workplace – it is also a home for the family and for the children growing up. Each year there is a number of fatalities involving children on farms during play, work or as bystanders – it is not acceptable that children are killed on work places. It is a tough struggle for farm parents to give their children a safe and secure childhood in this dangerous environment which also has a lot of positive factors. Living close to the nature, experiencing the changes of the seasons and being close to the parents are among the positive things – growing up on a farm. Many parents on farms have been asking for advice on how to make their farm safer for their children and how to make safe play areas for small children away from the major dangers on the farm. With financial support from the The Royal Swedish Academy of Agriculture of Agriculture and Forestry (KSLA), it has been possible to start a study on these issues.

Methods

This project is collecting data from a number of different resources, such as recommendations and regulations regarding play areas. Experiences and recommendations from other countries on safe play areas are important to include, such as the Farm Safe Australia and The National Children's Center for Rural and Agricultural Health and Safety, Wisconsin, USA. Most important is however to involve the Swedish farm families with their experiences, needs, ideas and solutions. In order to collect the Swedish experiences a number of farm visits (with children under the age of 10 years old) have been done during this summer in the southern parts of Sweden.

Results

The preliminary results from the farm visits including interviews with parents, children and sometimes other relatives shows that there is a big need for recommendations on simple, but safe play areas for small children. On some farms there were good examples on safe play areas, but others had their children playing in many different locations around the farm. During the autumn 2012 final recommendations with examples from farms will be published and distributed to farm families by the farmer organizations, media and students at agricultural schools as well as the agricultural university.

Knowledge compilation on migrant workers in the green sector

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Objectives

This study provides the summary of current knowledge on migrant work in the agriculture available from journal articles, books, reports and other relevant academic publications, focusing on political, economic, legal, social and medical aspects of migrant work in the agriculture.

Methods

A systematic search was carried out on *LibHub* and *Google Scholar* in order to compile the existing peer-reviewed publications, research reports, and policy papers concerning migrant work in the agriculture. Literatures were selected through the following process:

- (1) Reading the title and abstract in English for the period 1960–2011;
- (2) Reading of the entire text of selected articles;
- (3) Making a manual search of the relevant citations in the selected articles;
- (4) Eliminating articles without a focus on migrant populations and the themes of central interest and reading and analyzing the definitive article set.

Our selection criteria were mainly theme-based, and we did not employ quality standards for inclusion.

Results

The geography, scope and focus of studies were not straightforward and necessitated careful consideration and selectivity to establish connections between different ideas contained in different articles, books, reports and policy papers, and published in different time periods. The nature and context of included 264 studies are multifaceted. The studies were carried out through descriptive, legal, qualitative, quantitative and mixed methods.

Conclusions

In spite of their varying geographical focus, scope, unit of analysis and settings, most of the reviewed studies highlighted that migrant farm workers work under very poor working conditions and face numerous health and safety hazards. Many studies pinpointed to numerous factors, ranging from inefficient laws, economic variables to social and cultural backgrounds of migrant workers as a challenge to the improvement of migrant worker rights.

Regional health & safety experts – a farmyard Success

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Keywords: regional, agriculture, forestry, accidents, incidents, safety engineer

Objectives

Statistics show that agriculture and forestry are among the most accident-prone industries in Sweden, with more than ten fatal accidents and thousands injured on an annual basis. Most accidents occur when working with machinery, manual forestry work and in contact with animals.

A project was started in 2007 with the objective to create a country wide network of regional health and safety experts (safety engineers) who offer qualified on-the-farm safety advice visits. The project is still on-going.

Methods

Regional experts (with cutting edge expertise in different areas; construction, forestry, animals, risk assessment, rehabilitation etc.) were contracted and allocated a region in which to work. Members of the Federation of Swedish Forestry and Agricultural Employers contact their regional expert to come to their farm for a two hour long safety advice visit without charge (with the option of paying for extended service). The initial cost is covered by the Federation of Swedish Forestry and Agricultural Employers. The project has an annual budget of 800 000 SEK.

The experts can help with a number of things:

- education; general or on specific topic
- assessment of farm safety, through farm visit
- consultation reg. construction
- contact with authorities
- risk assessment

Results

Results from the initial three years in the project suggest that farms who had consulted their regional expert were satisfied with the visit and the service provided free of charge. In most cases the original contact was taken as a result of an accident/incident or that they wanted advice on child injury prevention on the farm. 90% of farmers had taken preventative measures after the visit from the regional expert, but only 20% requested further help with their health and safety work on the farm, which would have come at an additional cost.

Risk factors for occupational injuries among full-time farmers in Finland

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Keywords: age, agriculture, farm, gender, health, injury, management, risk, stress

Objectives

The objectives of this study were to evaluate the frequency of and farm management-related risk factors for occupational injuries among full-time farmers.

Methods

A computer-assisted telephone interview was conducted among randomly selected self-employed full-time farmers (n=1182; 911 male and 271 female) in 2004. This study analyzes data from a larger survey "Occupational Health and Farming in Finland in 2004". The questionnaire of the original survey consisted of 276 main questions and, with sub-questions included, a total of 704 variables (Rissanen, 2006). We selected management-related variables and other co-variates of interest for analysis evaluating the associations of injury and explanatory variables.

Results

The response rate was 86%. Two-thirds of the respondents raised dairy or beef cattle. Nearly 16% of the farmers had experienced one or more occupational injuries requiring medical consultation during the past 12 months; the total number of such injuries was 222. Injuries were more common among male (17 injuries/100 person-years) than female farmers (13 injuries/100 person-years). The injuries occurred most frequently in animal husbandry work (n=97). Falling or slipping was the most common mechanism of injury. Poisson regression with a stepwise (forward) model selection procedure identified the following risk factors for occupational injuries: male gender, younger age, cooperation with other farmers, perceived high accident risk, and stress symptoms. The adjusted rate ratios (RR) for these risk factors ranged from 1.40 to 1.96. This study indicates that interventions are needed particularly among male farmers in their early years of full-time farm operation. At this stage of life, heavy financial burden and stress while establishing and expanding production may contribute to injuries. To reduce stress and related injuries, we recommend guidance for farmers regarding the organization and management of farm work.

Type 2 diabetes among farmers and rural non-farmers – prevalence and risk factors in a prospective cohort study

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Keywords: farmers, type 2 diabetes, physical activity, meal quality

Objectives

Few studies have examined the risk for type 2 diabetes (T2D) in selected occupational groups. Farmers have a low risk of coronary heart disease, but less is known about diabetes. We analyzed the cumulative prevalence of T2D among farmers in Sweden and how T2D was related to life style factors and the metabolic syndrome.

Methods

We performed a prospective analysis of 1220 farmers with rural non-farmer referents and urban referents. Outcomes were generated from national registers and from two surveys. Baseline exposure factors were procreated in the first survey conducted in 1990/91.

Results

Farmers had a significantly lower risk of T2D than urban ($p=0.014$) and rural referents (OR = 0,704; 95% CI 0,522-0,948). Fractional analyses of life style factors and for components of the metabolic syndrome showed that the low crude risk of T2D related to farming was explained by physical activity and meal quality. Farmers had a significantly higher level of physical capacity and scored higher in a meal quality index as compared to rural referents.

Conclusions

High physical activity and better meal quality explains the low observed prevalence of T2D among farmers. No occupationally related associations between farming and T2D besides these life style factors were identified.

Identification of potential plasma biomarkers of inflammation in farmers with musculoskeletal disorders; a proteomic study

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Keywords: Biomarkers of inflammation, farmers, musculoskeletal disorders

Objectives

Farmers have an increased risk for musculoskeletal disorders such as osteoarthritis of the hip and knee, low back pain, and neck and upper limb complaints. The underlying pathophysiological mechanisms are not fully understood. Here we have compared the plasma proteome from farmers and rural referents and tried to identify potential biomarkers of inflammation.

Methods

Plasma samples from 25 farmers with musculoskeletal and/or respiratory symptoms and 25 rural referents were included in this study. The high abundant proteins (albumin and IgG) were removed from plasma and proteins were separated by two-dimensional gel electrophoresis (2-DE). The protein spots were visualized by silver staining, quantified using 2-DE software PDQuest (Bio Rad, version 8.01) and selected proteins were identified by nLC-MS/MS.

Results

In total, 54 proteins were found to be significantly changed in plasma from farmers compared to rural referents. The proteins that were significantly changed in farmers with musculoskeletal disorders were leucine rich alpha2-glycoprotein, antitrombin III, vitamin D-binding protein, kininogen, complementfactor B, serotransferrin and alpha1-antitrypsin. The identified proteins are all involved in inflammation.

Conclusions

This study shows that farmers with musculoskeletal disorders have altered levels of inflammatory biomarkers. The findings illustrate the potential use of proteomics for identifying protein changes associated with musculoskeletal disorders. Further studies are required to clarify how these potential biomarkers can be used to prevent work-related musculoskeletal disorders in farmers.

Older farmers and machinery exposure – Cause for concern?

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Keywords: aging, exposure, injury, machinery

Objectives

The average age of farmers in North America is increasing each year. We had the unique opportunity to examine work patterns and how they change across the lifespan in a large cohort of farm operations.

Methods

Saskatchewan farms were surveyed via questionnaire during the winter of 2007 to examine the determinants of injury. A sub-sample of 2 751 male farmers aged 25 and older were used in this project. The primary dependent variable was the proportion of work time devoted to specific farm tasks which was related to advancing age.

Results

The weekly hours of work declined approximately 34% as farmers aged over the lifespan. The proportion of time spent operating machinery such as tractors and combines increased by about 40% in the older age groups. Exposure to potentially dangerous farm equipment does not decrease as much as would be expected based on an equal linear reduction in all work tasks as overall work quantity decreases with age. Older farmers remain relatively active in the workplace, therefore prevention efforts should focus on safe machinery operation.

The ILO code of practice on safety and health in agriculture – farm worker perspectives

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“This code is dedicated to the farmers and agricultural workers who feed the world, in the expectation that it will improve safety and health in agriculture”

The mandate given by the ILO's Governing Body was *to develop a code that would complement not be a substitute for Convention 184, a code which has the workplace as its central focus but which also provides linkages between national policy and enterprise action*".

The “workers group” were particularly pleased with:

- the language on paraquat;
- the extensive guidance on chemicals which are a major hazard to agricultural workers;
- the strong language on asbestos;
- the guidance on roving safety reps;
- the equality and gender awareness in the document including the agreement to include a model document on sexual harassment in the workplace;
- the wide scope of the code.

The code clearly refers to the right of all workers in agriculture irrespective of their employment status to work in safety and health. Some of the training activities and follow up activities should be targeted at migrant workers and looking at how the code can be used to inform them of their rights and to make sure those rights are applied.

The “workers group” hope the Code will be particularly useful to Governments on countries where large-scale acquisition of land is taking place. It is important that these newly arrived agri- businesses have good OSH practices.

In the Outreach chapter there are suggestions for tripartite and social partner collaboration to promote health and safety and the country level follow-up activities could look at how this can be turned implemented.

The “workers group” hope that this code can be a link between the UN High Level Task Force on global food security, we put our support 100% behind that – the ILO's message should be that global food security is best assured by an agricultural system that puts decent work in agriculture at its heart. A system where agricultural workers work in dignity for living wages; good health and safety is essential to that. Those workers who ensure the food safety and security of the rest of the world must have the right to work in safety themselves and to have living wages to feed themselves and their families We would also welcome increased commitment in *Decent Work Country Programmes* to work on agriculture and in particular to promote the Code.

Link to the code: http://www.ilo.org/sector/activities/sectoral-meetings/WCMS_160706/lang-en/index.htm

A hundred years of health & safety representation

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This year, 2012, are the unions in Sweden celebrating the hundredth anniversary of the passing of the law giving workers the right to appoint their own health and safety representatives. The trade unions health and safety representative's job involves great responsibility, a serious commitment to the task and the necessary practical know-how; she or he is, in fact, a member of "the trade union team" and strengthen our demands for necessary changes in the workplace and improvements in the work environment.

Health and safety representative (SO)

Workplaces with at least five employees shall appoint health and safety representatives. They act as workers' representative for both permanent and contract workers at the workplace. SO shall be appointed by the local workers' organisation.

Principal health and safety representative (HSO)

If there is more than one health and safety representative in a workplace, one of these must be appointed as HSO. HSO has a coordinating role.

Regional health and safety representative (RSR)

RSRs are appointed by local trade unions to work in a number of workplaces in a given, normally geographically limited area. The right to appoint RSRs is regulated in work environment legislation.

RSRs represent workers in small companies. These workers often do not want to risk conflict with their employer. This is where the RSR's knowledge and experience come into play and may be vital to a small company's whose capacity to management workers' health and safety is limited.

The importance of SO, HSO and RSR

Health and safety reps have collaborated very positively supporting the unions' defence of workers' rights to safer work conditions. The work environment in Swedish workplaces would without doubt have been much worse in the past and would be today without the presence of health and safety reps without support of work environment legislation. Even though it is hard to assess accurately, it seems clear that positive action in the work environment would not have happened to the same extent, if health and safety reps had never existed.

The importance of health and safety reps in Sweden will probably increase in the future and this is one of many reasons to fight for strong trade unions and forceful health and safety reps on Swedish workplaces.

Handling of animals with improved safety

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Working with animals is the cause for many injuries and unfortunately also fatal injuries. Fatalities have been increasing during the last years in Sweden. The horse is the animal involved in most of the reported work-related injuries, followed by pet animals and livestock. It is mostly females being injured by horses and pet animals, but mostly men being injured by livestock animals.

Injuries involving animals often leads to sick-leave from work, 42% of the reported sick-leave cases leads to more than 14 days of absence from work. This indicates that injuries with animals often take long time to be cured from – sometimes you never get well again.

Fatal injuries mostly involve horses and livestock animals (except one wolf). The horse related fatalities involves “being kicked” or during riding. The livestock related fatalities are mostly caused by the dairy bull attacking and killing the farmer. One important aspect is that the attention and the aggressive behavior stay with the attacking animal for a long time and this animal is prepared for a new attack. This indicated that it might be possible to see what animal has been aggressive and attacking in a flock of animals.

To handle the work environment issues related to animal handling there was a new ordinance by the Swedish Work Environment Authority which became in force by July 1, 2009. This ordinance involves all work with animals, which means all work with farm animals, animals at a zoo and animals at veterinary clinics.

The ordinance brings up important issues, such as:

- there should be a way of getting safe (a way of retreat from danger)
- there should be the right tools
- those working with animals should have adequate knowledge about animals being handled
- special rules for handling animals with behavior problems
- there should be rules for planning of the work
- there should be possibilities to handle and safely strain an individual animal

In summary

- There is no such thing as a “nice” cow with anewborn calf, bulls, a pigs with newborn piglets or boars
- A way of getting safe is important (a way of retreat from danger)
- Being able to handle and safely strain an individual animal is important

Human resource management in agricultural sector

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Keywords: Human resource management, agricultural field, globalisation, education

Objectives

The purpose of the present study is twofold: (a) to discuss the need for a globalized approach to human resource management and (b) the role of educational for human resource development in the agricultural sector.

Methods

Literature study has been conducted as method where selected articles and reports have been used as a platform to discuss human resource management as related to globalization and education.

Results

The result of the study indicates that to prepare the agricultural workforce to meet the new challenges we need a more educated and skilled workforce competent enough to understand both the technical and the social development at a global level. Countries' historic and social construction has great influence on the development of agricultural education and training. Furthermore, the way the phenomenon of globalization and its role is understood and experienced in agricultural sector has crucial impacts on the development of human recourse management.

Openness, communication, various forms of education, awareness about the national culture, collaboration between the public and private sectors and encouraging entrepreneurial spirit seems to be some of the key success in developing human resource management in agricultural sector.

Introduction

Due to the increasing challenges such as climate changes and the effect of global circumstances it becomes vital to improve the skill level of the agriculture workforce, works on innovation thinking and supporting competitiveness within the agriculture industry (p,4).³ In a constantly expanding world, human resource development need to be discussed and organized as related to globalization, cultural differences, educational possibilities and trends and consequences of these changes for organizations.

Human resource systems can be defined "... as a set of distinct but interrelated activities, functions, and processes that are directed at attracting, developing, and maintaining (or disposing of) a firm's human resources" (Lado and Wilson (1994:701). Some of the human resource management practices that have been valued as crucial for industrial achievements and competitive abilities are communication of goals, employee autonomy,

³ A report to the Primary Industries Ministerial Council by the Industries Development Committee Workforce, Training and Skills Working Group, October 2009

employee impact, open organizations and effective labor management relations (Jayaram et al 3).

These practices, as we live undeniably under global circumstances, indicate the interdependence of the different agricultural affairs at local, national and international level. Global changes and new market demands require innovative human resource practices. In order to improve and sustain organizational performance, organizations need to work towards strategic human resource management. This paper, which is a purely literature study, argues, that in order to organize and implement strategic human resource management in a time characterized by globalization, two aspects need to be investigated more carefully within agricultural organizations:

1. The need for a globalized approach to human resource management
2. The role of educational development for human resource development

Human resource management and globalization

“Human resources must play new roles and responsibilities in leading the organization in uncharted waters of globalization”. (p, 3)⁴

In understanding human resource management and its development we need to understand the social factors that influence the development of human resource management within the agricultural field. Commercialization and global changes constantly map out new agricultural workforce development needs. Due to the increased productivity, besides land, labor, and capital, knowledge have great importance with respect to human resource management within the agricultural sector (Rivera & Alex 2008:374). Therefore, as stated by Becker and Gerhart in following quotation knowledge about globalization, customer and investor needs and market competition becomes some of the key features in investigating human resource management within organizations:

A rapidly changing economic environment, characterized by such phenomena as the globalization and deregulation of markets, changing customer and investor demands, and ever-increasing product-market competition, has become the norm for most organizations. To compete, they must continually improve their performance by reducing costs, innovating products. (Becker & Gerhart 1996: 779)

As a result, global staffing and global leadership development becomes two vital components in creating potential for organizational development. Those organizations that are “willing to adapt their human resource practices to the changing global labor market conditions will be able to attract, develop and retain the right talent, and will likely succeed in the global competition”(p,1).⁵ For organization, in becoming competitive and powerful it becomes critical to engage workforce with diverse culture and language skills who can work in various countries. In this context local attachments are not the only beneficial facts but understanding the needs of the global approaches. Furthermore, it is not only about understanding the local

⁴ Impact of Globalization on Human Resource Management. Bhushan Kapoor, Professor and Chair, Information Systems & Decision Sciences, Cal State University, Fullerton, USA

⁵ Impact of Globalization on Human Resource Management. Bhushan Kapoor, Professor and Chair, Information Systems & Decision Sciences, Cal State University, Fullerton, USA

and global needs of employees and customers, it is about incorporating different value systems and global work values in order to create work environments where workers can communicate, work and realizes shared goals. (p, 3)⁶

Similar perspective is discussed in the work of (Česynienė 2008) who asserts that the effectiveness of human resource management is a result of managers' understanding and ability to balance other culture's value and practice with respect to how people from different part of the world comprehend the world (Česynienė 2008:41). Furthermore many aspects of human resource management are affected both by globalization and by differences in national culture (Česynienė 2008:52).

One might ask why it is so significant to emphasize the understanding of the critical role of global development on human resource management within the field of agriculture. The answer is explained as following by Česynienė :

Multinational companies are becoming increasingly important players in the global economy, and their HR practices are increasingly influenced by diverse cultures. A certain degree of fit between HR practices and local culture enhances performance, because congruent HR practices are consistent with existing behavioural expectations and routines that transcend the workplace. (Česynienė 2008:48)

Global expansions entail certain complexity and organizations need to understand what factors activate these kinds of complexities and in what way such complexities can be coped with for achieving positive organizational results.

The role of Education

The growth of the organizations is contingent upon the development of human capital and human resource. The development of productive skills is necessary for expanding institutional and social capital. A systematic acquisition and implementation of knowledge, therefore, plays a crucial role for human resource development (Rivera & Alex 2008:375, 377).

In this context, it is vital to recognize that human resource development, as much as it is depended on school systems (the formal education and training systems) and workforce organizations, it is also depended on the entrepreneurial strength that exists outside formal and nonformal educational institutions (Rivera & Alex 2008:377). So, the development of entrepreneurial attitudes is supposed to make it possible for the farmers to engage with the existing challenging commercial agricultural systems (ibid: 378).

One of the most fundamental ways of facing the demands of agricultural development is to organize trained agricultural human resource, (Nanda et al).⁷ However, training agricultural human resources is influenced by the historic context in terms of political stability, sociocultural (Educational equality, ethnic issues) and economic past (economic growth and industrial development) of a country (Hasler et al. 2006:101). Besides these 'macro

⁶ Impact of Globalization on Human Resource Management. Bhushan Kapoor, Professor and Chair, Information Systems & Decision Sciences, Cal State University, Fullerton, USA

⁷ Nanda, S. K. Rama Rao.D. Vizayakumar; K. HUMAN RESOURCE DEVELOPMENT FOR AGRICULTURAL SECTOR IN INDIA: A DYNAMIC ANALYSIS. National Academy of Agricultural Research Management, Rajendranagar, Hyderabad – 500 030. India. Indian Institute of Technology, KHARAGPUR. India 721302.

influences' there are a series of other influences that shape the development of the human resource management in the agricultural sector. Some examples are:

/.../industry participation in education and training, low numbers of undergraduates and graduates in tertiary agriculture courses, poor awareness of agricultural career pathways and the limited capacity of the current education and training system to deliver innovative training solutions (P,4)⁸

In achieving positive agricultural productivity, public and private institutions need to work towards innovative thinking. Here it becomes significant to acquire knowledge about the role of people, the importance of environmentally sensitive agricultural education, and training and development programs. "This new complexity requires new knowledge and skills" (Rivera & Alex 2008:384). The acquisition and fruitfulness of relevant knowledge for meeting the new challenges will be possible when there is: "a strong tradition of research and development" b) "an entrepreneurial spirit among business people" c) "a high level of skill among workers", and d) "openness by firms and workers alike to intense competition within and beyond national borders" (Rivera & Alex 2008: 379).

Summary

To prepare the agricultural workforce to meet the new challenges we need a more educated and skilled workforce competent enough to understand both the technical and the social development at global level.

Countries' historic and social construction have great influence on the development of agricultural education and training and the way the phenomenon of globalization is understood and experienced as important in the agricultural sector.

Openness, communication, various forms of education and training, awareness about the national culture, collaboration between the public and private sectors and encouraging entrepreneurial spirit seems to be some of the key success in developing human resource management in agricultural sector.

References

- Becker, B. and Gerhart, B. (1996). The Impact of Human Resource Management on Organizational Performance: Progress and Prospects., *Academy of Management Journal*, Vol.39, No.4, pp.779-801.
- Lado, A.A., Wilson, M.C., (1994). Human resource systems and sustained competitive advantage: a competency-based perspective. *Academy of Management Journal* 19 (4), 699-727.
- Jayaram J.; Droge C.; Vickery S.K. (1999) The impact of human resource management practices on manufacturing performances. *Journal of Operations Management*. Volume 18, Number 1, December, pp. 1-20(20)
- Rivera, W. M. and Alex, G. E. (2008). Human Resource Development for Modernizing Agricultural Workforce. *Hum. Resource Dev. Rev.*, 7(4): 374-386.
- Česnyienė, R. Globalization and Human resource management
ISSN 1392-1258. *Ekonomika* 2008:82
- Michael G. Hasler, Monica D. Thompson and Maria National Human Resource Development in Transitioning Societies in the Developing World: Brazil. *Advances in Developing Human Resources* 2006 8: 99

⁸ A report to the Primary Industries Ministerial Council by the Industries Development Committee Workforce, Training and Skills Working Group, October 2009