

## **Safety Management in Horticulture and Floriculture: First Results of a Study in Friuli-Venezia Giulia**

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### **Abstract**

**Agriculture remains, in Italy, one of the sectors of economic activity in which accidents still occur with a high frequency and the index that measures the number of accidents per 1000 workers is higher than in the other sectors. This leads to the need of corrective actions to increase safety levels. The objective of this research, realized during 2009 by collecting data of 10 farms located in different areas of Friuli-Venezia Giulia region, was to analyse in particular the horticulture and floriculture sectors, made up of medium-small farms, with the aim to individualize risk typologies that occur with greater frequency and all the aspects that don't fulfil the law in force. The first results underline a low attention to the obligations currently imposed by laws in force and the presence of risk sources common to the studied firms, despite the heterogeneity of productive trend.**

**Keywords:** risks analysis, greenhouses, check lists

### **Introduction**

The present search analyzes the actual state of the management of the safety at the workplace in the horticulture and floriculture areas, that has been being considered as a unique sector since few years. Such productive orientation represents an important fraction of the agricultural compartment and is characterized for the small involved surfaces and the elevated value of the production (MIPAF 2009). According to the most recent data, the horticulture and floriculture represent the 7,9% of the Gross Saleable Production of the Italian agriculture and is present with a number of 28.831 specialized firms. In the Friuli-Venezia Giulia region, according to the ISTAT data, 422 firms are present and in the last two years this number is grown of 111%. The present work wants to analyze the situation of the safety in this sector, starting from the individuation of the main risks and their classification for priority of management; to identify possible operative solutions to increase the safety level at the workplace; to furnish, if concrete applicative solutions for the elimination of the risks can't be individualized, the measures of prevention and protection for the reduction of the residual risk.

### **Methods**

The attainment of the preset objectives has foreseen the individualization and realization of intermediary steps:

1. cognitive analysis: individualization of the principals firms' aspects to be considered; individualization of the potential risks; definition of a sample of 5 firms, located on the regional territory and available to collaborate in the study;
2. check-list elaboration: the inspections in the individualized firms as well as the

- support of guides, indicative documents, manuals, brochures and the recurs to example available in literature lead up to the definition of the used check-lists
3. risks evaluation: quantification and assignment of a value to the risk factors present in the analyzed reality and consequent definition of a hierarchy of the emerged problems. The risks evaluation has foreseen the preliminary definition of an experimental protocol that considers possible measures already adopted by the employer for the reduction of the risks and determines therefore the entity of the residual risks;
  4. individualization of possible operational solutions, able to improve the safety levels. The cognitive investigation, with the purpose to identify the risk factors mainly diffused in the examined context

The check lists have been developed with reference to four macro-areas of investigation: equipments, workplaces, formal fulfilments, operational duties.

For the qualitative risk assessment, a risk matrix expressed as a function of frequency and magnitude has been used. In the traditional analysis of the safety at the workplace, the risk frequency can't be interpreted in statistical terms, but rather derives from the interpolation of subjective and objective data. Therefore, the following sources were asked:

- Inail (the Workers Compensation Authority) data (2006-2009): evolution of occupational accidents;
- Analytic reports and publications: "Guidelines for the analysis of the horticultural industry" and "Guidelines for the analysis of the horticultural sector";
- Log of Work-Related Injuries of the firms involved in the survey technical analysis and interviews of employees on the importance of the "near-misses".

Frequency	Value	Criteria
Not probable	1	The dangerous situation may occur only in conjunction with independent and unlikely events. There were no known episodes already occurring
Few probable	2	The dangerous situation may occur only in conjunction with unlikely events. Extremely rare episodes are known
Probable	3	The dangerous situation may occur, even not automatically. Some episode, in which to the dangerous situation the damage is followed, is known
Highly probable	4	A direct correlation among dangerous situation and damage event exists . Damages are already verified with reference to similar situations.

**Table 2. Method of evaluation**

In order to assess the risk, on the basis of acquired data, four classes of frequency or probability of occurrence of the damage, and magnitude have been identified, according to the criteria given in table 2.

On the basis of the data inferred from the bibliography and from the available statistics, the classes of frequency (named  $f(xSB)$ ) shown in the table 3 have been attributed to the different typologies of risk.

Code	Risk	Frequency	Code	Risk	Frequency
1	Trip hazards, fall hazards from the same level	4	21	Pregnant workers	1
2	Crash against moving objects	3	22	Allergen	2
3	Risk of falling on the stairs	3	23	Working alone	3
4	Burns or contact with material at high temperatures	2	24	Dusty and dirty activities	2
5	Contact with aerosols	1	25	Chemical risk	4
6	VDU Risk	1	26	Fire and explosion risk	1
7	Cut risk	2	27	Exposure to carcinogens or mutagens	1
8	Contact with sharp or cutting equipment	3	28	Vibrations	3
9	Incorrect postures	4	29	Biological risk	2
10	Eye strain	1	30	Noise	3
11	Illumination	1	31	Dusts	3
12	Manual Handling	4	32	Exposure to radiations	1
13	Stress	2	33	Drowning	2
14	Repetitive Movements	4	34	Monotony	4
15	Electrocution	1	35	Bust flexion and extension frequent movements	3
16	Mental Workloads	2	36	Fall, tripping, slipping	2
17	Microclimate	4	37	Carpal tunnel	3
18	Heat stress risk	2	38	Entanglement, dragging	2
19	Cold climate risk	4	39	Bust torsion frequent movements	3
20	Physical Workloads	4	40	Cimate changes	3

**Table 3. Classes of frequency,  $f(xSB)$**

The frequency identified through table 3 with the symbol  $f(xSB)$ , must be contextualized the analyzed sample, also considering the following variables:

CCO = organizational lacks;

CCG = managerial lacks;

CCTA = technical lacks of the environmental system;

CCU = human-behavioural lacks.

Therefore the assigned frequency,  $f(xR)$ , in reference to each identified risk, has been evaluated according to the following report:

$$f(xR) = f(xSB) \times (CCO \times CCG \times CCTA \times CCU)$$

and is calibrated to the surveyed sample (Cividino et al, 2008).

For each area, data have been collected during 2009 by a survey in 10 farms located in different areas of Friuli-Venezia Giulia region.

## Results

The first results underline a low attention to the obligations currently imposed by laws in force and the presence of risk sources common to the studied firms, despite the heterogeneity of productive trend.

The punctual analysis of the studies in the different productive addresses has allowed to individualize with precision those duties characterized by a more complex and serious profile

of risk. Despite the deep heterogeneity that characterizes the firms involved in the study, derived by the realization of different productive purpose and by the different management, clearly emerges that some activities are very similar can be considered communes to the firms that operate inside the compartment.

These activities can be brought back to four great groups:

- 1-loading, unloading and transportation of the product;
- 2-preparation and distribution of treatments;
- 3-potting and transplanted;
- 4-pruning of Ornamentals.

The results emerged by data processing underline the inadequacy of working conditions, due to a mismanagement of the safety inside the firms, predisposing conditions of risk for workers. Frequent failure in terms of safety emerges especially in the using of personal protective equipments and in the training of workers

## **Conclusions**

The results of this work, even if obtained referring to a reduced sample of companies, have highlighted the effective presence of a situation still very far from the ideal: risks are often underestimated and the safety management is not a priority in the general management of a company. This suggests additional studies, designed to sensitize the workers on the importance of the safety at the workplace.

## **References**

- Yang, J.N., 1976. Statistical estimation of service cracks and maintenance costs for aircraft structures, *Journal of Aircraft*, 13(12), 929-937.
- Cividino S. R. S., Colantoni A., Vello M., 2008. “New methodologies to evaluate risks in the agricultural sector”, “International conference: -Innovation technology to empower SA-, Ragusa, 15-17 settembre 2008, isbn/issn: 978-88-903151-1-4.
- ISTAT, “Annuario Statistico Italiano 2008”, pag 769: “Glossario”.
- ISTAT, “Rapporto annuale: La situazione del Paese nel 2008”, maggio 2009.
- ISTAT, “Annuario Statistico Italiano 2008”, pag 346 Tav. 13.8: “Superficie e produzione delle coltivazioni agricole. Anni 2003-2007”.
- ISTAT “Struttura e produzioni delle aziende agricole, periodo di riferimento annata agraria 2006-2007, diffuso il 03 dicembre 2008”. Disponibile su [www.istat.it](http://www.istat.it).
- Gubiani R., Vello M., Zoppello G., 2008. “La situazione del rischio alimentare, dell’operatore e ambientale nella vitivinicoltura friulana”. Atti del convegno “La sicurezza negli ambienti agroforestali: aspetti tecnici, gestione e controllo dei rischi”, Gemona del Friuli, 18 gennaio 2008.