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ERGONOMIC ANALYSIS IN AGRICULTURAL WORK

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ABSTRACT

The agricultural sector, impacted by the Industrial Revolution, has evolved with the insertion of machines and the application of ergonomics, aiming to improve working conditions and the health of employees. The research seeks to identify ergonomic risks and propose improvements, emphasizing the importance of ergonomics for the competitiveness of Brazilian agribusiness.

Keywords: Ergonomics, Agriculture.

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INTRODUCTION

The agriculture sector was one of those that experienced the impact of the Industrial Revolution that took place in the eighteenth and nineteenth centuries (Nascimento et al., 2014), moving from manual labor to the insertion of steam engines and currently to machines programmed through software (Abraão et al., 2015). Throughout each evolution, organizations have been remodeled to meet the demands of the market and their employees (Santos et al., 2011). Theories and analyses have been developed by researchers and scholars to explain the interaction between human beings and machines, two concepts studied have gained more prominence, namely, the Ergonomic Analysis of Work (AET) and the Theory of Complexity (CT) are examples of the studies developed.

The terminology of ergonomic analysis of work (AET) was coined in the 90s and is based on the study of working conditions, while its objective is to identify, evaluate and correct the factors that cause discomfort to employees and correct the work environment to be adequate (Ferreira, 2015). As for the Complexity Theory (CT) it has a bias in the concept of adaptation, where it can be applied in the social and organizational environment, employees adapt to live in society (Gemma et al., 2010). The link to the agricultural sector occurs through the historical context and the concepts described, thus enabling the application of activities that were previously only organizational, have now moved to the agricultural sector. The agriculture sector has been gaining prominence in technological innovations, and human capital is included in this development (Wedekin et al., 2019).

In line with the terms coined by several scholars, the present research seeks to respond to the objectives of identifying the ergonomic risks faced, along with the analysis of the implementation of the tool in agricultural properties, aiming at improvements for employees. The adoption of ergonomics in the agricultural environment is of paramount importance, as the Brazilian GDP is mostly composed of the agribusiness sector (Kumagai et al., 2021), adjustments in the way of working, tend to make the sector even more competitive in the market.

In the search for greater profitability and profitability, managers invested more resources in human capital, with the aim of improving the quality of life at work (Ramos, 2022). However, the competitiveness of companies is generating employee burnout, in order to achieve the service provided goal, employees are developing RSI and/or WMSD more frequently (Nascimento et al., 2014).

OBJECTIVE

The research problem of this article seeks to answer how ergonomic applications in the agricultural sector can contribute to the reduction of occupational injuries and improve the performance of employees. The objectives proposed in the research seek to contribute to a better understanding of termology and the effectiveness of the concept in practice. The three proposed objectives are to identify the main ergonomic risks faced by workers, to evaluate the impact of the adoption of ergonomic tools and equipment on the health of workers and to propose ergonomic improvements in agricultural properties.

METHODOLOGY

The research was based on the search for journals already published on online platforms, seeking to address the proposed objectives, namely, ergonomics in organizations, ergonomics in the agricultural system, impacts of this methodology and improvements obtained through the implementation of the method. 24 journals were analyzed, including theses and scientific articles, the methodology of choice occurred through the reading of the respective research abstracts. There was no time limit for the research, due to the scope of the theme being of paramount importance for the organizational and agricultural environment.

DEVELOPMENT

The context of ergonomics seeks a balance between the human being and the work environment in which he is inserted (Nascimento et al., 2014), with its objective aimed at the humanization of organizations to obtain greater productivity. Workers' health and Regulatory Normative 17 (NR 17) corroborate to achieve the objective of humanization in the work environment (Ferreira, 2015), with the aim of leaving the work environment, whether in the agricultural or industrial environment, in adequate conditions to work. The work environment aims to be adequate in various aspects, social, structural and economic (Kumagai et al., 2021).

Quality of life at work (QWL) was another concept developed in the 1950s, by Enri Trist (Kumagai et al., 2021), the concept refers to the search for methodologies to improve the health and well-being of the employee with the company, with a focus on accident prevention and employee development in the workplace.

The positive aspects of the implementation of ergonomics in companies, whether agricultural or industrial, would be the prevention of occupational diseases, such as musculoskeletal disorders (WMSDs), repetitive strain injuries (RSIs) and low back pain (Nascimento et al., 2014). Another aspect to be taken into account is the increase in

satisfaction on the part of employees, so that there is no turnover. In the agricultural sector, with the handling of heavy machinery and chemical products, employees need to be aware of the rules and laws for the use of protective equipment (Oliveira et al., 2021).

The authors Guimarães, Brisola and Alves (2005) highlight the peculiarities that agricultural work faces in relation to the working day, some items stand out, they are: long working hours in various functions, excessive displacement of employees, low hierarchical level and the lack of distinction between housing and work environment.

The concept of anthropotechnology arises from the search for solutions to the problems faced on a daily basis, its concept is based on the interdisciplinarity of the search for information for solutions to problems between the human being and the machine (Nascimento et al., 2014). Its application can be visible in the prevention of accidents, where the human being undergoes an adaptation to enjoy in the technical system (Oliveira et al., 2021), another bias in the application of the terminology to environments with a high risk of repetitive effort or risk factors, as an example in the health area (Soares et al., 2023).

Regarding the ergonomic risks faced by agricultural workers, it is possible to see in Table 01 the main problems faced.

Table 01. Main risks faced in the agricultural sector

Ergonomic Hazards	Causes
Incorrect posture	Too much time sitting, crouching, or kneeling
Repetitive motion	Manual milking; Manual cutting of crops
Repetitive physical exertion	Loading of heavy bags (Inputs)
Adverse climates	Exposure to strong sun or rain – no protection
Use of inappropriate tools	Use of scythes and shovels without maintenance
Vibration Exposure	Tractors on uneven ground
Extended working hours	Too much time awake to accomplish the task
Exposure to chemicals	Usually in the use of chemical applications in the field – without appropriate protection

Source: Prepared by the author, 2024.

Due to the intensive use of machinery in the work activity of the agricultural environment, ergonomic risks are inevitable, but the manager and the employee himself can make adaptations to mitigate these impacts suffered, a tool that helps in the decision-making of the implementation of good practices is ergonomic analysis of work.

The ergonomic analysis of work (AET) analyzes the situations faced within the work environment, that is, within rural properties. This analysis takes place in three distinct phases, with the objective of achieving greater success in solving the problems faced within the property. The three phases are, demand analysis, task and activity analysis (Gemma et al., 2010), each phase depends on the other to obtain a cohesive result.

FINAL CONSIDERATIONS

Risks will be present in any activity to be developed, but in agribusiness the focus is relevant because it works with heavy machinery and a greater workload, resulting in more worn out employees due to routine (Abraão et al., 2015). Regarding the positive impacts of the adoption of ergonomics on properties, the following impacts can be considered: reduction of injuries, increased productivity, reduction of stress, reduction of medical costs and increased employee satisfaction (Paula et al., 2016). The improvements suggested through the studies carried out can be based on five proposals, starting with the adjustment of posture, staying in a comfortable position, secondly, reorganizing the workspace, leaving it with adequate light and airy, thirdly, use of ergonomic equipment, an example would be the foot support, or even non-slip, fourthly, avoid repetitive movements, so as not to generate RSI later, and finally, adjust the luminosity of the place, whether artificial or natural (Zanetin and Fatel, 2017).

It was possible through the research to highlight the importance of implementing ergonomic plans in agricultural properties, as well as the implementation in industrial and other market segments. The greater relevance of the agricultural environment occurs due to the high rate of accidents and leaves due to prominent diseases of labor work.

This research focused on the literary analysis of several authors, finding several terminologies and studies that are not present in the daily life of the company or property, thus leaving scope for exploratory research and case studies in agricultural properties.

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