



# **SNS COLLEGE OF TECHNOLOGY**

**An Autonomous Institution  
Coimbatore – 35**

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Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai.

## **DEPARTMENT OF AGRICULTURE ENGINEERING**

**19AGE307 – ERGONOMICS OF FARM MACHINERY AND IMPLEMENTS**

**III – YEAR VI SEMESTER**

**UNIT 1 – INTRODUCTION**

**TOPIC – IMPORTANCE OF ERGONOMICS AND ITS APPLICATION IN AGRICULTURE**





# Why Ergonomics?

- ❖ The ergonomic aspects during application in agricultural machinery are of great importance as the operator has to operate the machine in field.
- ❖ If ergonomic aspects are not given due consideration, the performance of the system will be poor and the effective working time will be reduced.
- ❖ The goal of ergonomics is to design workplace to conform to the physiological, psychological, and behavioural capabilities of workers. There are many factors acting as stress on the operator during the work.
- ❖ These stresses may be due to workload, immobilization for longer duration work, ambient temperature, relative humidity, vibrations, noise, dust, smoke and other gases. A feeling of chance of accident during work, space confinement, overload of information to be handled, etc. results in psychological fatigue. During the ergonomic studies, these stresses can be measured in terms of strain on the operator.



# Why Ergonomics?

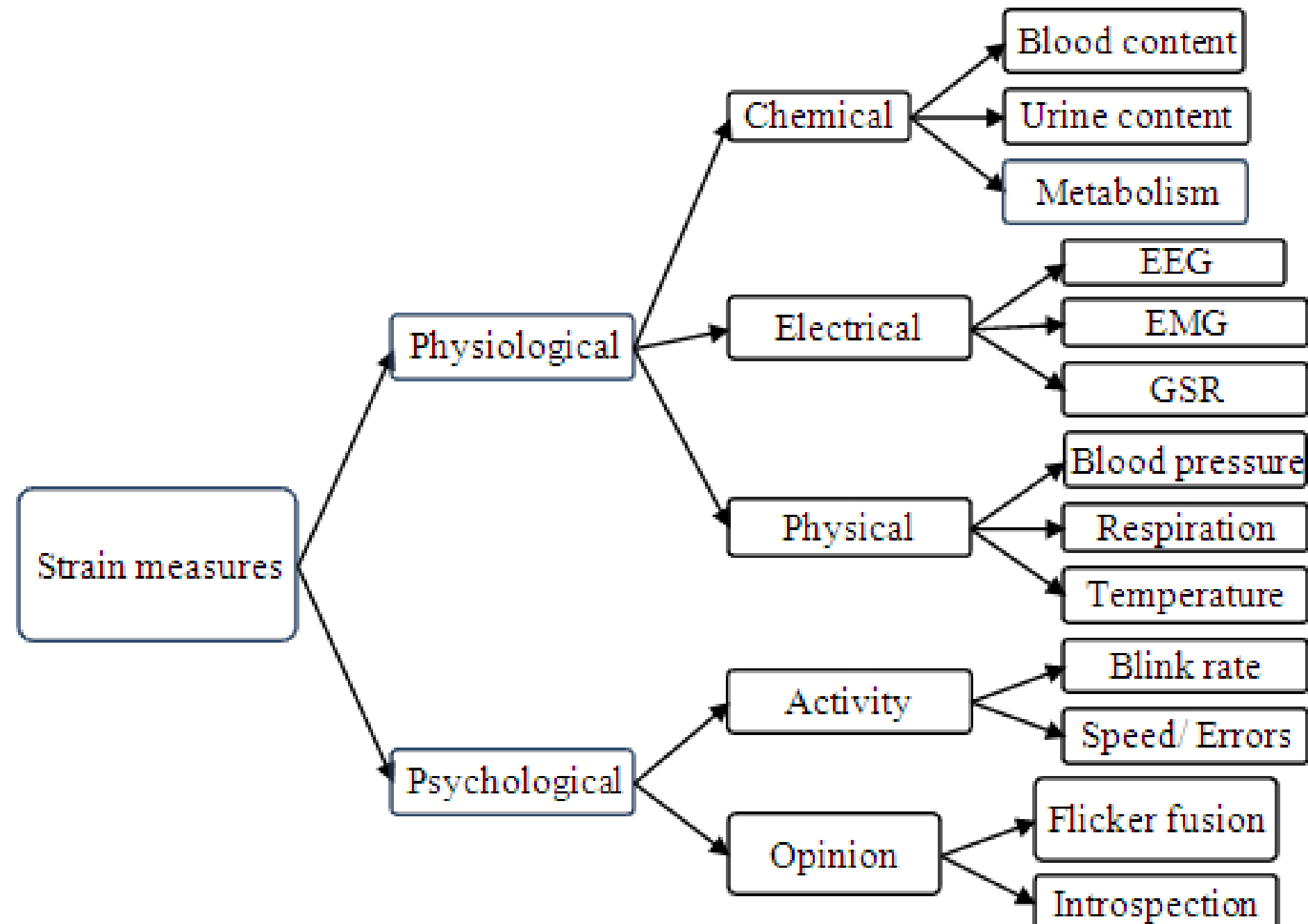
- ❖ The most important among physiological strains are related to heart activity, respiration, discomfort, muscular fatigue, etc. For the psychological /mental strain measurements stress on eyes, hearing loss, errors, speed of work, work performance are mostly used in studies
- ❖ Whenever we have to plan for ergonomic study, subjects (operators or workers) are an integral part of the study. The objective is to eliminate the affect of individual characteristics from the rest of independent parameters and also to have an estimate of human workload during the actual work.
- ❖ The subjects must be medically fit and represent real user population in operation of the selected machinery.
- ❖ Their selection is made on the basis of gender, age and weight. Generally male subjects are selected for conducting ergonomic studies on agricultural machinery in India.





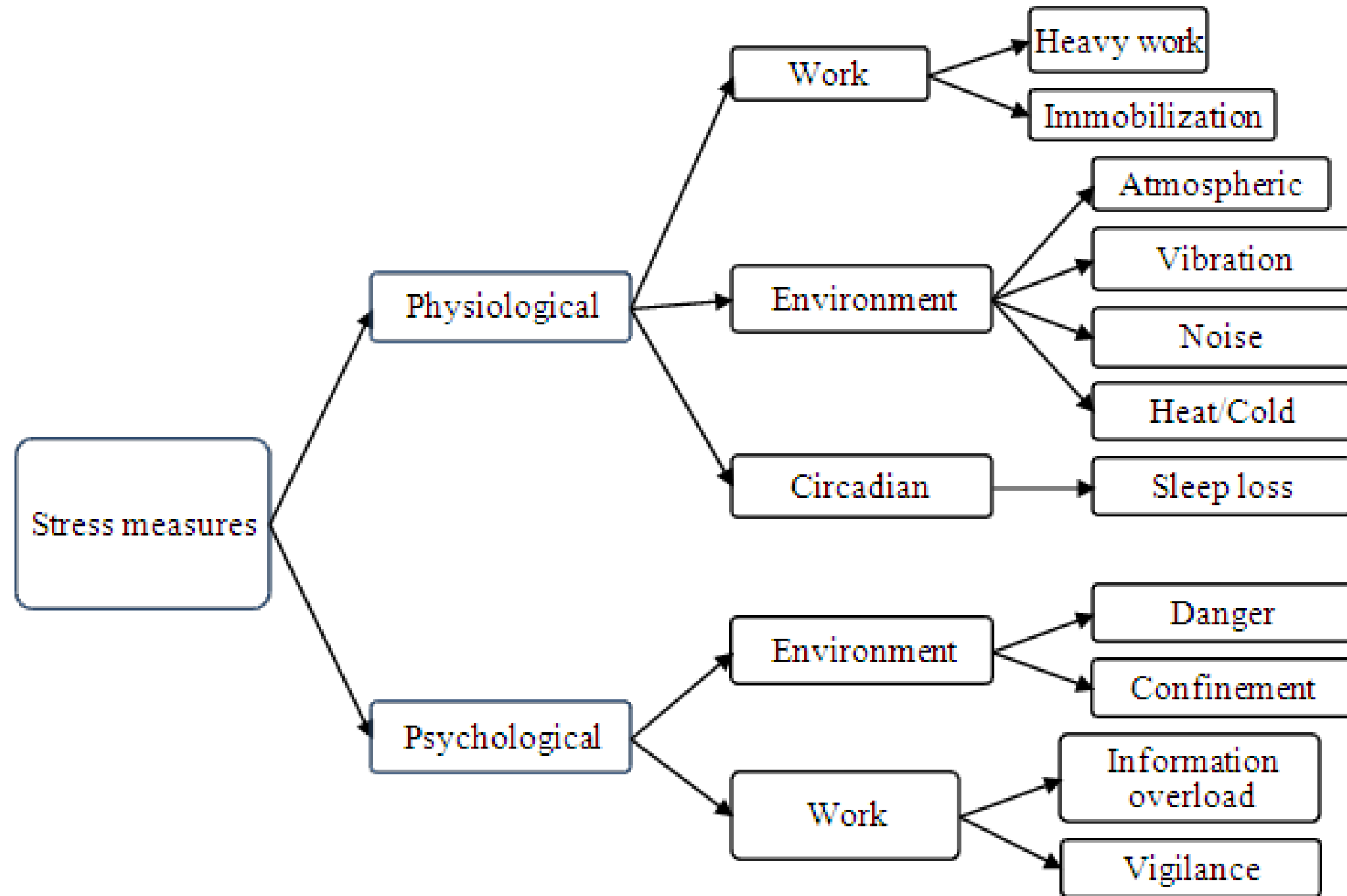
# Physiological factors for measurements

❖ Physical activities stimulate certain physiological responses in human beings. These responses provide basis for human energy expenditure and fatigue. The physiological measurements are made generally in terms of heart and respiration activities.





# Physiological factors for measurements



Stresses in ergonomic studies



# Importance

In the context of agriculture, where manual labor is often required, considering ergonomics is essential for various reasons:

## 1. Worker Health and Safety:

- Agricultural activities often involve repetitive tasks, heavy lifting, and prolonged periods of standing or bending. Poor ergonomics can lead to musculoskeletal disorders (MSDs) and other health issues among farmers and labourers.
- Properly designed equipment and workstations reduce the risk of injuries, strains, and fatigue, promoting the overall health and safety of agricultural workers.

## 2. Productivity:

- Ergonomically designed tools and equipment can enhance efficiency and productivity by reducing the physical strain on workers. This can result in increased output and reduced downtime due to injuries or fatigue.



# Importance

- Comfortable and user-friendly equipment allows workers to perform tasks more effectively and with less effort, contributing to overall operational efficiency.

## 3. Quality of Work:

- Fatigue and discomfort resulting from poor ergonomics can affect the quality of work. Workers may make mistakes or be less precise in their tasks when they are physically strained or uncomfortable.
- Ergonomically designed equipment can contribute to improved accuracy and attention to detail, ensuring better quality in agricultural operations.

## 4. Adaptation to Diverse Workforces:

- Agriculture often involves a diverse workforce with varying physical abilities, ages, and sizes. Ergonomic design allows for the adaptation of tools and equipment to accommodate different user profiles, making the work environment inclusive.





# Application



## ✓ Farm Equipment Design:

Ergonomic principles can be applied to design tractors, plows, harvesters, and other agricultural machinery to ensure they are comfortable and user-friendly. This includes considerations for seat design, control placement, and ease of operation to reduce physical strain on operators.

## ✓ Hand Tools and Implements:

Ergonomic design is crucial for hand tools such as shovels, hoes, and pruners. Ensuring proper grip, handle design, and weight distribution can reduce the risk of musculoskeletal disorders and improve the efficiency of manual tasks.

## ✓ Workstation Design:

For tasks that involve prolonged periods of standing or sitting, designing ergonomic workstations is essential. This includes considering the height of work surfaces, seating arrangements, and the placement of tools to reduce strain on the body.



# Application



## ✓ Crop Harvesting Techniques:

Ergonomic principles can be applied to the design of harvesting tools and containers. Ensuring that harvesting equipment is lightweight, easy to handle, and promotes proper body posture can contribute to the well-being of workers during the harvesting process.

## ✓ Environmental Factors:

Ergonomics also considers environmental factors such as lighting, noise, and temperature. Creating comfortable and well-lit working environments can positively impact worker performance and reduce the risk of accidents.



*Thank You!*