CONTROLLED ENVIRONMENTAL AGRICULTURE

SMART

GREENHOUSES POWERED BY IOT, AI, AND

ADVANCED SENSORS

INTRODUCTION

SMART GREENHOUSES ARE TRANSFORMING AGRICULTURE. BY INTEGRATING IOT, AI, AND ADVANCED SENSORS, THESE GREENHOUSES OPTIMIZE PLANT GROWTH AND RESOURCE USE. .CEA INCLUDES INNOVATIONS SUCH AS VERTICAL FARMING, HYDROPONICS, AND SMART GREENHOUSES THAT ALLOW CROPS TO GROW IN CONTROLLED, INDOOR ENVIRONMENTS WITH PRECISE MANAGEMENT OF TEMPERATURE, HUMIDITY, LIGHT, AND WATER.

IOT IN AGRICULTURE

THE INTERNET OF THINGS (IOT) CONNECTS DEVICES AND SYSTEMS TO GATHER AND EXCHANGE DATA. IN AGRICULTURE, IOT ENABLES REAL-TIME MONITORING OF ENVIRONMENTAL CONDITIONS, HELPING FARMERS MAKE INFORMED DECISIONS. THIS TECHNOLOGY IS CRUCIAL FOR OPTIMIZING RESOURCES AND MAXIMIZING CROP YIELD.

ROLE OF AI IN FARMING

ARTIFICIAL INTELLIGENCE (AI) ANALYZES VAST AMOUNTS OF DATA COLLECTED FROM SENSORS. IT PREDICTS PLANT GROWTH, IDENTIFIES DISEASES, AND SUGGESTS OPTIMAL CONDITIONS. BY LEVERAGING AI, FARMERS CAN ENHANCE PRODUCTIVITY AND REDUCE WASTE, LEADING TO MORE EFFICIENT AGRICULTURAL PRACTICES.

DRAWBACKS OF EXISTING SMART GREENHOUSES

- EXCESS WATER FLOW
- UNEVEN WATER DISTRIBUTION
- INEFFICIENT RAINWATER USAGE

ADVANTAGES OF PROPOSED SYSTEM

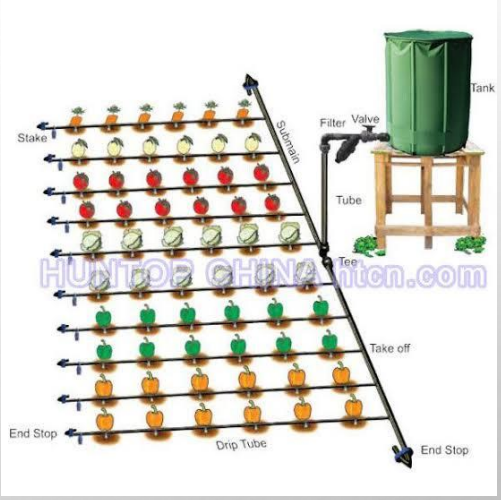
1. WATER WASTAGE IS REDUCED AND PROPER USAGE OF RAIN WATER
2. ENERGY EFFICIENT SYSTEM
3. MODIFICATIONS IN VENTILATION SYSTEM

- BALANCING OF ATMOSPHERIC CONDITIONS

WATER MANAGEMENT

A WATER TANK IS PLACED AT THE HEIGHT OF THE GREENHOUSE TO STORE RAIN WATER.ABOVE A MINIMUM LEVEL OF WATER , HYDRAULIC PRESSURE IS USED FOR IRRIGATION INSTEAD OF PUMPING.THUS ENERGY CONSUMPTION IS REDUCED.

BY USING A SENSOR,SOIL MOISTURE LEVEL CAN BE DETECTED.THUS WE CAN CONTROL THE AMOUNT OF WATER TO BE SPRINKLED AND CAN ADJUST THE TIME DURATION OF PUMPING WATER.



MODIFICATION OF VENTILATION

- BY USING A FAN, HEATING COIL AND COOLING COIL WE CAN ADJUST THE TEMPERATURE INSIDE THE GREENHOUSE WITH RESPECT TO THE ATMOSPHERIC TEMPERATURE.
- IF THE OUTSIDE ATMOSPHERIC CONDITIONS ARE SUITABLE FOR THE CROPS,THE AUTOMATION SYSTEM WILL TURN OFF AND THE SHADES WILL OPEN.THUS WE CAN REDUCE THE WEAR AND TEAR OF THE EQUIPMENTS.

CONCLUSION

- THE PROPOSED SYSTEM IS MORE ENERGY EFFICIENT THAN THE EXISTING ONE.WE CAN ALSO REDUCE THE COST BY USING LOCALLY AVAILABLE RESOURCES.BY USING RELIABLE EQUIPMENTS WE CAN INCREASE THE LIFESPAN OF THE SYSTEM.BY OPTIMIZING RESOURCE USE AND REDUCING WASTE, THEY CONTRIBUTE TO A HEALTHIER ENVIRONMENT.