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A REVIEW OF FOOD SECURITY IN THE ERA OF TECHNOLOGICAL EDUCATION MODERN

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Abstract:

Food security is one of the enormous issues in responding to worldwide challenges in today's technological environment. This article aims to provide a detailed overview and in-depth objectives regarding the relationship between food security and technological progress, as well as new perspectives to address these challenges. The rise of technological innovations such as US precision agriculture, biofortification, and big data is creating new opportunities to improve productivity and sustainability in the food system. While technology opens the door to new solutions, challenges such as the digital divide and environmental sustainability must also be addressed. This article highlights how important social inclusion is in technological development so that all levels of society, including marginalised groups, can also enjoy its benefits fairly and equitably. Furthermore, a sustainable approach is needed to ensure that technology benefits the current generation and considers future generations' needs. This article also aims to enhance our understanding of how technology can effectively address food-related global challenges by analysing the complex relationship between modern technology and food security. The information presented in this article is expected to contribute to developing more effective policies and sustainable Strategies to ensure food sufficient for the world's population in the future.

Keywords: *Food Security, Technological Progress, Precision Agriculture, Sustainability, Social Inclusion.*

INTRODUCTION

In the last several decades, progressive technology has changed various aspects of life for humans, including the agricultural and food sectors. In the era of modern technology, we are witnessing significant changes. In how food is produced, managed, and consumed. Innovation technology has opened a door for solutions to global food security challenges.

The approach is based on technology like agriculture precision and variety development plants, which have improved productivity and efficiency in the agricultural sector. Information and communication technology also play a role in the management chain of food supply, allowing the estimation of the market to be more accurate and management of more efficient inventory.

Technological advances offer great opportunities, but global challenges to resilient food remain. The growth of residents, changing climate, significantly degraded environment, and unstable politics impact the food system world. In context, the article discusses the role of technology in increasing resistant food challenges globally, which are still being faced, and the approach the new need takes to overcome these challenges. Understanding dynamics complex This

allows us to look for holistic and sustainable solutions to reach resilient food that is stable and fair to all.

Along with world population growth and the emergence of new like climate change, resilience in food has become more important. The problem that increasingly urges has an impact on the production and distribution of food. Article This explores an approach to overcoming the challenge of food security by utilising technology and introduces a new perspective for solving the challenge that has not yet been widely published.

RESEARCH METHOD

This research employs a qualitative method that combines a literature review and case study approach to analyze the role of technology in addressing global food security challenges. A systematic review of existing studies is conducted to explore technological advancements such as precision agriculture, plant variety development, and information and communication technology (ICT) in the agricultural sector. Additionally, the research examines global challenges, including climate change, environmental degradation, and population growth, which impact food systems. Real-world case studies of successful applications of technology in agriculture and food supply chain management are analyzed to understand their contributions to productivity, efficiency, and sustainability. Secondary data from academic journals, industry reports, and government publications are utilized to gather insights into both challenges and opportunities associated with modern technology in agriculture. Thematic analysis is employed to identify patterns and recurring themes related to technological innovations and their role in enhancing food security. Finally, the study synthesizes findings to propose holistic and sustainable strategies aimed at improving food system resilience, emphasizing the importance of equitable and inclusive solutions that ensure benefits are shared fairly across all populations.

RESULT AND DISCUSSION

Modern Technology and Food Security

In era technology modern,innovation in field agriculture And system food has change method food produced, managed, and consumed.Wrong one aspect main technology modern Which have an impact on resilience food is agriculture precision.Agriculture precision i use sensor And technology information to monitor and optimize use of resources such as water, fertilizer, and pesticides.Things This increase p productivity And efficiency agriculture, enabling farmers to produce more yak tire with more input A little

Besides that,technology modern Also allow development variety plant Which more stand to disease And weather extreme as well as have higher nutritional value. This is called biofortification and can help solve problem food global with increase quality nutrition food produced. In addition to direct innovation in production food, information technology And communication also plays an important role in management supply chain food.With use data big And analytics,company can predict request market,manage inventory, and reduce waste in distribution food.Things This help guard stability supply food and reduce losses in along the chain supply.

Global ChallengesIn Food security

Food security is an issue Which very important in world at this time, where various global issues have an impact on whole system food. Growth resident Which rapid, change climate Which extreme, degradation environment,conflict and inequality of access to resources is a number of factor main Which threaten resilience food. Rapid population growth puts pressure on which very big to production food global.population world will continue increase

And estimated will exceed 9 billion souls on year 2050. Fulfill request food Which Keep going increase This need improvement productivity agriculture Which sustainable.

Change climate Also cause challenge Serious in maintain resilience food, with increase temperature global, change rainfall pattern rain, and the more often incident weather extreme like flood and drought Which impact on production i food in Lots material world. Farmers need adapt with condition weather Which No can predicted, and effort mitigation change climate Also become priority.

In addition, environmental degradation caused by unsustainable agricultural practices And exploitation source Power nature reduces productivity land agriculture And cause loss of biodiversity. This threatens the sustainability of production food And sustainability environment in long-term.

Conflict And instability political Also is factor Which to worsen resilience food with influence production, distribution and access to food.conflict armed and war you often cause hunger mass And crisis humanity in various country in world.Apart from that, the gap access to resource And food service too is serious problem.Society poor, especially in countries growing, often time difficulty get access to food quality tall in quantity Which Enough Because factors like poverty, inequality gender, and social discrimination.

Use of Modern Technology in Agriculture

One of the most important innovations in modern agriculture is agriculture precision.Agriculture precision use sensors, GPS, drones, and technology information For monitor And optimize use source power.Collect And analyze data in a way I'm a rat about land, plants, and condition environment Which help farmer make a decision that more intelligent when managing their land. For example, precision irrigation systems allow for more efficient use of clean water, reducing waste, and maximize results harvest.

In addition, development variety plant quality tall is also part important from technology agriculture modern. Through biotechnology techniques And engineering genetics, researcher can create variety plant Which more stand to diseases, pests, and condition extreme weather, as well as more nutritious.I this called biofortification And aiming For increase the nutritional value of the food produced.

Use data big And analytic Also the more general in management agriculture modern.With By collecting and analyzing data on market conditions, consumer trends, and other factors that impact agricultural production, companies can take decision strategic Which more appropriate when manage chain supply their food. This reduces business risks, increases efficiency and ensure supply food Which stable for the community.

Besides technology direct Which used in agricultural products, technology information And communication also plays a role role important in connecting farmers with markets and other supporting services. Mobile applications, platforms e-commerce, and social networking make it easy farmer access information market,price products, and best practices agriculture. Things This help increase welfare farmer And expand range market product agriculture.

Overall, the use of modern technology in agricultural sector have an impact which is significant to increasing productivity, efficiency, and sustainability system agriculture world.Just by ensuring that technology available for all farmers and pay attention to their impact on the environment, we can take advantage of fully potential technology modern And reach resilience food sustainable For all person.

Agricultural Sensors And Crop Monitoring

Sensor agriculture and crop monitoring are part integral from technology modern in field agriculture.Things This enable farmers For monitor condition plant And environment agriculture in real - time, optimizing utilization source power, and increase results harvest.Here are some examples of agricultural

sensors and monitoring technologies. plant Which used in practice agriculture modern :

a. Soil sensor: Soil moisture sensors are used to monitor the water content in the soil. Farmers can determine the right time to water their plants and avoid overwatering. Which too much or too little can have a negative impact on plant growth.
b. Weather sensor: sensor weather monitoring weather conditions such as temperature, humidity relative, and speed wind in around area agriculture. This information helps farmers plan agricultural activities such as planting. And harvest based on forecast weather Which accurate.
c. Plant sensors: plant sensor can used For monitor in a way direct condition plant like level chlorophyll,density leaves, and growth rate. Farmers can detect diseases and deficiencies. nutrition since early And take action proper prevention.
d. Satellites and drones: satellite and drone technology is used to monitoring plants on a large and large scale big.Providing information to farmers about health plant they are overall including use uniformity distribution plants, existence pest And this disease, and results harvest.
e. Automatic irrigation system : automatic irrigation system use sensor humidity land And sensor weather For adapt watering plants automatically. This system can optimize usage water, reduce waste, and ensure plant own Enough water.
f. Monitoring nutrition: plant nutrient sensors are used to monitor concentration nutrition in solution nutrition hydroponics or land.This allows farmer u to adjust and optimize dose fertilizer in a way right, so plant can grow optimal without fertilization excessive. This help farmers improve efficiency production, reduce cost operational and optimize harvest results.

Artificial Intelligence In Production And Market Forecasting

Intelligence artificial (AI) has bring significant changes in various industry sectors, including production and market forecasts. Ability AI For analyze data with fast And accurate has opening the door for increased efficiency and accuracy in many aspects business, including production planning And market trend prediction.

a. Production Based on AI: in manufacturing, AI is used to optimize process production with method Which previously impossible to do by humans or even system computer traditional. Through real-time analysis of sensor data, machines, and production processes, AI can detect anomalies, identify patterns, and make recommendation For increase efficiency production and reduce unplanned machine downtime. This reduce cost production, increase quality product And reduce the risk of equipment failure.
b. Prediction Market Use AI : on the other hand, AI also used for analyze data market And predict trend market in time front. With use algorithm learning machine And analysis big data,AI can detect pattern complex in behavior consumers, changing market trends, and other factors that influence demand. and market offerings. This allows companies to take decision strategic Which better such as, placement better prices, product development that better meets needs market, and plan marketing Which more effective.

Use Al in production And estimation market have an impact that significant to business strategy.Company n that can using artificial intelligence effectively will improve operational efficiency,Use of intelligence artificial in field agriculture allow prediction Which more accurate about production plant And market conditions.By analyzing historical data and variables others, intelligence systems artificial can help farmer plan plant optimally And predict request market, so that reduce risk uncertainty Which related with food production.

Modeling Data For Monitoring Health Plants:Building AI Based Solutions For Modern Agriculture.

Agriculture modern the more move going to approach Which smarter and digitally connected. Data is the key to improving bag productivity And

sustainability.Wrong One field where data modeling and artificial intelligence are developing rapidly is monitoring health plant.

a. Data Collection: to model plant health, first of all We need data Which adequate.Data This can originate from various sources, including sensor land And plane,image satellite, and notes Field.Data This can Diana Lys And modeled for give understanding comprehensive about health plant.
b. Data Analysis: the next step is to analyze it using techniques data modeling and AI. This involves use algorithm learning machine For identify pattern in data Which Possible indicates health plants. For example, analysis picture can used For detect symptoms of the disease or lack element happiness on plants, while soil sensor can give information about water content and availability element happiness in land.
c. Forecasting and Monitoring: once implemented, the model can be used to predict conditions. plants in the future based on data Which t is available.Thing This allow farmer with Quickly take preventive and therapeutic measures to protect plants they from disease And condition environment Which harm.
d. Implementing AI-Based Solutions: in addition to traditional data modeling, solution based on Al the more Lots used in monitoring health plants.For example, the system based on AI use data satellite imagery to automatically identify the area Which vulnerable to disease or lack water, so that allow farmers for respond quickly. In addition, agricultural robots equipped with AI technology can directly monitor plants in field and provide appropriate care as needed each plant.

Modeling data very effective for monitor health plant And with fast identify potential attack disease And pest. This modeling has become a tool Which great. By using technology like analysis image digital and machine learning, farmers can identify symptoms of disease and pests in plants more accurately and take precautions or control in a timely manner.

Perspective New To Address Global Challenges

Besides increase access to technology, also necessary be considered when overcome global challenges related resilience food.There is some new perspectives Which need taken.First, inclusion social must become priority in development technology And policy food. Things This means ensure that the interests and needs of the most vulnerable communities taken into account in every initiative and program that was launched. For example, technology must designed with consider need farmer small and rural areas and ensure that they have access and skills For use it.

Furthermore, the development of a modern food system must focus on sustainability. environment.From da sacrifice environment for the sake of economic benefits, we need to use technology to make food production more efficient. sustainable. Things This including push practice agriculture friendly environment, reduce waste food And reduce footprint carbon in the entire food system.

Approach holistic Also required in overcome challenge global related resilience pan gan.This is about collaboration between industry And country to develop inclusive solutions and sustainable. For example, government,organization international, private sector, and civil society need Work The same For develop policy And program Which effective to ensure availability Enough food For all public.

CONCLUSION

In face challenge resilience food in era modern this, utilization technology modern in agriculture offer potential big to increase productivity, efficiency, and hold on food in a way overall. With Keep going develop and implement innovative solutions technology based , we can overcome t challenges existing and build the system food Which more sustainable And inclusivefor time front.

This article attempts to introduce a new perspective in understanding and addressing resilience challenges food by utilizing technology modern in agriculture.Yang expected can give valuable insights And trigger discussion more carry on in effort reach sustainable food security .

Food security is Wrong One challenge the biggest one faced by the people man in era modern this . However , with progress technology open opportunities new For overcome challenge i this.With utilise innovations such as precision agriculture, biofortification, and the use of big data, we can improve productivity and efficiency in the global food system. However, For ensure that benefit technology can felt by all people and No harm environment ,need There is approach holistic Which involving social inclusion, environmental sustainability, and cross-sectoral cooperation. Only with joint efforts can we achieve sustainable food security. sustainable and adequate for everyone in the modern technological era.

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