HUFPI x FAO

Harvard Undergraduate Foreign Policy Initiative

Table of contents

01

Introduction

Objectives

Background

- AI technologies increasingly used in agrifood systems
- Revenue 20% annual increase
- Key concerns include drought, insufficient food supply, and harmful pesticide use

Methods

- Automate agricultural processes
- Ease farmers workload
- Examine legal and political implications of AI implementation

Implementation

- Contribute to the mission of the Food and Agriculture Organization (FAO)
- Provide advice on policy in the global south

02

AI: Strengths and Challenges

Strengths

Decision Making

- Can analyze patterns in big data, forecast outcomes, and analyze the effectiveness of prior projects and decisions
- Helpful for enhancing logistical components of agrifood systems
    - Ie optimizing transportation, resource allocation, drafting pro-cons for policies

Technical Implementation

- Time-saving: minimizes manual observation and labor
- Can be embedded to enhance physical hardware (“smart devices”)
- Helpful for optimizing farming practices
    - Ie analyzing weather patterns, soil conditions, and crop health

Challenges

Technological Infrastructure

Skill Gaps and Training

Accessibility and Quality

Regulatory Challenges

Ethical Considerations

Gender Equity in AI Implementation

- Gender disparities exist in the agricultural sector, with women often lacking access to land, resources, and authority despite comprising a significant portion of the workforce.

Consideration of Historical and Cultural Contexts

- AI implementation in agriculture should consider the historical and cultural contexts of countries in the Global South, avoiding the erasure of traditional practices.

Environmental Sustainability and Ethical Considerations

- AI in agriculture should prioritize environmental sustainability by promoting healthy agrifood practices.

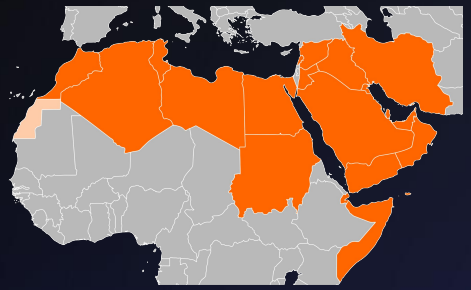
03

Current Agricultural Issues

MENA: Middle East & North Africa

Yemen & South Sudan

- MENA region accounts >12% of world undernourished population
- Yemen food insecurity exacerbated by geopolitical conflicts, food import cutoff, and oil pipeline damage



- South Sudan struggles with economic instability and flooding
- dam releases from neighboring Uganda add to flood risk

South Asia

- South Asia, home to over one-fifth of the global population, faces significant agricultural challenges due to its dense population and heavy reliance on rainfed agriculture.

- Challenges such as high population density, rapid urbanization, and industrialization exacerbate food insecurity, environmental degradation, and depletion of natural resources.

04

Present AI in Agriculture

Technology

Image Processing

- Useful with predictive modeling
- K-Neural Networks (K-NNs): compare similarities to nearby crops.
- Convolutional Neural Networks (CNNs): Analyze small sections of crop images

Internet of Things (IOT)

- computing devices embedded in everyday objects, all connected through the internet
- Precision agriculture: IOT using neural networks
- Examples: predicting crop yield, soilless culturing, satellite imaging allocation

AI Adoption and Implementation in Agriculture

Autonomous Robots in Agriculture

- Autonomous robots equipped with GPS technology and vision-based navigation are revolutionizing agriculture by reducing human error and labor dependency.

AI in Agricultural Supply Chains

- AI is transforming agricultural supply chains by optimizing demand, personalizing customer experiences, and managing storage and waste.

AI for Agricultural Resource Management

- Agricultural research initiatives demonstrate the effectiveness of artificial neural networks (ANN) in optimizing energy inputs and greenhouse gas emissions in crop production.

Projects & Policy

Projects: Nuru

- International Institute of Tropical Agriculture (IITA) in Nigeria, utilize AI to empower farmers
- Nuru operates offline to diagnose plant diseases

Nuru Impact

- Implemented in 19+ West African countries
- Help as an assistance tool for both trained extension officers and farmers

Policy: NGOs

- VoteLGBT Brazil prevents misinformation online
- Wilson Center's Latin American Program works with local governments and technology companies to promote ethical creation

Regional Perspectives and Case Studies

AI Adoption Challenges in South Asia

- South Asia faces challenges in AI adoption due to factors such as high population density, reliance on agriculture, and infrastructure limitations.

AI Implementation in Brazil

- Brazil's growing implementation of AI can be supported by policymakers through investments in electricity, agriculture, and clean energy.

AI Implementation in Africa

- AI has the potential to automate farming processes, reduce labor costs, and prevent crop diseases in Africa.

Recommendations

- **Implement targeted investment strategies aimed at improving infrastructure, enhancing agricultural productivity, and fostering sustainable energy practices to create an enabling environment for AI adoption while ensuring inclusivity and socio-economic equity.**
    - Support capacity-building programs to enhance the digital literacy and technical skills of farmers, extension workers, and other stakeholders, empowering them to effectively utilize AI technologies.
    - Foster public-private partnerships to leverage the expertise and resources of both sectors in advancing AI adoption in agriculture, particularly in areas such as precision farming, crop monitoring, and supply chain optimization.
- **Establish policy protecting and uplifting farmers' rights while providing a voice for the local community**
    - Local governments create regulations protecting the accessibility of data used by AI companies, ensuring data surrounding crops or land is being used beneficially and righteously
    - Promoting policy and technology by creating programs that partner local universities, tech incubators, and local organizations to connect students and faculty to work on the implementation of AI
    - Similar to Independent Ethics Committees (IEC) for health projects, create a separate policy committee publicly funded (no funding from private interests) for AI implementation ensuring all issues brought against AI implementation are handled effectively through local communities

Thank you!