



CURRENT AFFAIRS



Argasia Education PVT. Ltd. (GST NO.-09AAPCAI478E1ZH)
Address: Basement C59 Noida, opposite to Priyagold Building gate, Sector 02,
Pocket I, Noida, Uttar Pradesh, 201301, CONTACT NO:-8448440231

Date -16 Aug 2024

LEVERAGING E-TECHNOLOGY FOR AGRICULTURE: THE ROLE OF THE NATIONAL PEST SURVEILLANCE SYSTEM (NPSS)

Leveraging E-Technology for Agriculture: The Role of the National Pest Surveillance System (NPSS)

This article covers the “Daily Current Affairs” topic of the National Pest Surveillance System (NPSS) and E- Technology in the aid of farmers.

SYLLABUS MAPPING:

GS- 3: Agriculture: E-technology in the aid of farmers.

FOR PRELIMS:

What is the NPSS and its applications?

FOR MAINS:

What are the technologies used to improve agriculture productivity in India? Various initiatives of GOI, Challenges faced by farmers in the use of technology, and ways suggested by the committees.

Why In the News?

Union Minister of Agriculture and Farmers Welfare, Shivraj Singh Chauhan today inaugurated the National Pest Surveillance System (NPSS) in New Delhi. Mr Chauhan highlighted that through NPSS, the farmers will be able to know different types of insecticides and pesticides and save their crops from their harmful effects.

What is the NPSS?

The National Pest Surveillance System (NPSS) is a strategic initiative of the Ministry of Agriculture and Farmers Welfare, Government of India. It leverages cutting-edge artificial intelligence (AI) and machine learning (ML) technologies to provide timely and effective pest management solutions to the farming community. The system is designed to mitigate the impact of pest attacks and ensure that agricultural advisories reach the affected regions efficiently.

Developed By: ICAR-NCIPM (Indian Council of Agricultural Research – National Centre for Integrated Pest Management): The primary organization responsible for developing NPSS.

Supported By: DPPQ&S (Directorate of Plant Protection, Quarantine & Storage) and IT partners from DA & FW (Department of Agriculture and Farmers Welfare).

Key Objectives:

1. Early Detection and Management:

Early Detection: Identify pest incidences promptly to initiate emergency measures.

Timely Action: Provide actionable insights and support to prevent pest damage.

2. Expert Support and Advisory:

Expert Access: Facilitate easy and timely access to pest identification and management advice.

Real-time Data: Utilize real-time data from field functionaries, and trained personnel, and lead farmers to minimize crop loss.

3. Pest Epidemic Prevention:

Avoidance: Assist in preventing pest epidemics through effective monitoring and management.

4. National Pest Data Repository:

Data Sharing: Provide a comprehensive repository of national pest data to public agencies for identifying pest hotspots and developing plant protection policies.

5. AI-Driven Solutions:

Advanced Tools: Support the development of AI-based solutions for diverse pest-crop combinations using extensive data.

Benefits of the NPSS:

Enhanced Pest Management: Early detection and immediate action help contain pest outbreaks effectively.

Access to Expertise: Farmers receive expert guidance on pest management through accessible channels.

Reduced Crop Loss: Utilization of real-time field data aids in minimizing crop losses due to pest attacks.

Epidemic Prevention: Helps in preventing widespread pest epidemics.

Policy Support: Provides valuable data for formulating plant protection policies and identifying pest hotspots.

AI Solution Development: Contributes to creating AI-based pest management solutions through collected data.

Key Features:

AI-Based Pest Identification Module:

Function: Provides accurate and efficient identification of pests and diseases.

Coverage: Currently identifies important pests and diseases affecting 61 crops.

Surveillance Module:

Quantitative Surveillance: Scientific-based surveillance for use by scientific staff, requiring login credentials.

Qualitative Surveillance: User-friendly surveillance for farmers and laypersons to assess pest infestation levels (Severe, Moderate, Low) without needing login credentials.

Trap-Based Surveillance: For scouts using pheromone traps, currently available for cotton-based models.

Advisory Module:

Expert Advisories: Subject matter experts provide crop and pest-specific advisories through a web portal.

Farmer Access: Advisories are accessible to farmers via the advisory module, ensuring they receive timely and relevant information.

NPSS represents a significant advancement in agricultural pest management, combining modern technology with practical solutions to support farmers across India.

“E-TECHNOLOGY IN THE AID OF FARMERS”

What is E-technology in agriculture?

E-technology in agriculture, commonly referred to as e-agriculture or digital agriculture, encompasses the use of digital technologies to support and enhance various aspects of farming and agricultural management. These technologies leverage information and communication technology (ICT) to improve efficiency, productivity, and sustainability in agriculture.

What are the various types of technology and its use in Agriculture?

1. Digital Platforms and Apps

Mobile Apps: Provide farmers with access to real-time information on weather forecasts, market prices, crop management, and pest control. Examples include apps like Kisan Suvidha and AgriApp.

Online Marketplaces: Platforms such as eNAM allow farmers to sell their produce directly to buyers, enhancing market access and transparency.

2. Precision Farming Technologies

GPS and GIS: Enable precise mapping and monitoring of fields. This technology helps in soil analysis, crop health monitoring, and optimized use of resources like water and fertilizers.

Drones: Used for aerial surveys and monitoring of crop health, pest infestations, and soil conditions. Drones provide detailed images and data that help in precision agriculture.

3. Smart Irrigation Systems

Automated Irrigation: Systems that use sensors and data analytics to optimize water usage based on soil moisture levels and weather conditions. Examples include drip irrigation and sprinkler systems controlled via mobile apps.

4. Remote Sensing and Satellite Imagery

Satellite Data: Provides comprehensive information on crop health, soil moisture, and weather patterns. Remote sensing technologies help in large-scale monitoring and management of agricultural activities.

5. Big Data and Analytics

Data Collection: Gathering data from various sources such as sensors, satellite imagery, and weather stations.

Analytics: Analyzing this data to make informed decisions about planting, irrigation, fertilization, and harvesting. Predictive analytics can forecast crop yields and market trends.

6. Blockchain Technology

Supply Chain Transparency: Blockchain can create transparent and tamper-proof records of agricultural supply chains, enhancing traceability and reducing fraud.

Smart Contracts: Used for automating transactions and agreements between farmers and buyers.

7. Artificial Intelligence (AI) and Machine Learning (ML)

Predictive Models: AI and ML algorithms analyze historical data and trends to provide forecasts on crop performance, disease outbreaks, and market conditions.

Automation: AI-driven systems can automate tasks such as planting, weeding, and harvesting, improving efficiency and reducing labor costs.

What are the Benefits of E-Technology in Agriculture?

Increased Efficiency: Automation and precision technologies reduce manual labor and optimize resource use, leading to higher productivity.

Better Decision-Making: Access to real-time data and analytics helps farmers make informed decisions about crop management, irrigation, and market strategies.

Enhanced Market Access: Digital platforms connect farmers with buyers, reducing reliance on intermediaries and improving income.

Sustainability: Smart technologies promote sustainable practices by optimizing resource use and minimizing environmental impact.

Risk Management: Technologies such as weather forecasting and pest detection help in managing risks and preventing losses.

What are the various initiatives of the Government Initiatives to Promote Technology in Agriculture?

Digital India Initiative: Enhance digital infrastructure and provide digital services in rural areas. Features: Includes the expansion of internet connectivity and digital literacy programs.

Pradhan Mantri Krishi Sinchai Yojana (PMKSY): Improve irrigation infrastructure and water use efficiency.

Technologies: Supports the use of technology for efficient water management and irrigation systems.

National Agriculture Market (eNAM): Create a unified national market for agricultural commodities.

Features: Provides a digital platform for farmers to sell their produce directly to buyers, enhancing transparency and market access.

Kisan Credit Card (KCC) Scheme: Provide affordable credit to farmers for various agricultural activities.

Features: Facilitates the use of technology for managing credit and financial transactions. Financial assistant to purchase the new technology

Soil Health Management (SHM) Scheme: Promote the use of technology for soil testing and health monitoring.

Features: Provides support for soil testing labs and soil health cards.

National Agriculture Infra Financing facility: Encourage innovation and the adoption of new technologies.

Features: Government support for agritech startups through grants, subsidies, and incubators.

What are the examples where we can use the technology in agriculture?

Precision Farming: Use of GPS and drones for mapping and monitoring crops.

Impact: Improves crop yield and resource efficiency by providing precise data on soil conditions and crop health.

Smart Irrigation Systems: Drip irrigation and automated irrigation systems.

Impact: Reduces water usage and enhances crop yield by providing the right amount of water at the right time.

Mobile Apps and Platforms: Kisan Suvidha: Provides weather forecasts, market prices, and crop advisory services. AgriApp: Offers information on crop management, pest control, and agricultural practices.

Impact: Enhances farmers' access to information and decision-making tools.

Climate-Smart Agriculture: Use of weather forecasting tools and climate-resilient crop varieties.

Impact: Helps farmers adapt to climate changes and reduce the impact of extreme weather events.

Soil Testing Kits: Portable soil testing kits for on-site soil analysis.

Impact: Provides farmers with real-time soil health data, aiding in better fertilizer and crop management.

What are the Issues Faced by Indian Farmers in Adopting Agricultural Technology?

Limited Access to Technology:

Infrastructure: Many rural areas lack reliable internet and electricity. the digital divide is more in remote areas only 45% of rural households have internet access.

Affordability: High costs of technology can be prohibitive for small-scale farmers. the best example is the staple cutting machine in Haryana and Punjab belt.

Lack of Technical Knowledge:

Training: Farmers often lack the training to effectively use new technologies. More than 50% of farmers lack knowledge about the use of technology.

Awareness: There is limited awareness of available technologies and their benefits.

Integration Challenges:

Compatibility: New technologies may not always integrate well with traditional farming practices. Commercial farming is destructive and less comfortable with traditional methods, especially in North East India.

Maintenance: Farmers may face difficulties in maintaining and repairing sophisticated equipment.

Financial Constraints:

Investment: Initial investment costs for advanced technologies can be high. Most (73%) of the Indian farmers are women and they lack land ownership rights this results in a lack of formal financial support.

Risk: Farmers might be hesitant to invest in technology due to perceived risks and uncertain returns. In India, more than 80% of farmers are small and marginal farmers.

How are the challenges and issues resolved to achieve the goal of developed India by 2047?

Several committees and commissions in India have proposed measures to enhance the use of technology in agriculture.

M.S. Swaminathan Committee (National Commission on Farmers)

- 1. Integration of Technology:** Promote the integration of modern technology with traditional farming practices.
- 2. Infrastructure Development:** Enhance rural infrastructure, including electricity, internet connectivity, and storage facilities.
- 3. Training and Extension Services:** Provide comprehensive training to farmers on the use of new technologies and best practices.
- 3. Financial Support:** Facilitate easier access to credit and subsidies for technology adoption.
- 4. Research and Development:** Increase funding for agricultural R&D to develop technology suited to Indian conditions.

NITI Aayog's Strategy for New India @75

- 1. Digital Platforms:** Develop digital platforms for real-time information on weather, market prices, and crop management.
- 2. Data Analytics:** Leverage big data and analytics for precision farming and decision-making.
- 3. Public-Private Partnerships:** Encourage collaboration between government, private sector, and academic institutions to drive technological innovation.
- 4. Incentives for Startups:** Provide incentives and support for agritech startups to foster innovation.

Report of the Committee on Doubling Farmers' Income

- 1. Technology Adoption:** Encourage the use of technology for precision farming, pest management, and irrigation.
- 2. Infrastructure Improvement:** Invest in infrastructure such as cold storage, transportation, and warehousing to support technology adoption.
- 3. Capacity Building:** Strengthen extension services and training programs to enhance farmers' technological skills.
- 4. Policy Support:** Create policies that support the adoption of technology, including subsidies and tax incentives.

Agricultural Technology Management Agency (ATMA)

- 1. Local Innovations:** Promote the development and dissemination of locally relevant agricultural technologies.
- 2. Farmer Participation:** Involve farmers in the technology development process to ensure that solutions meet their needs.
- 3. Field Demonstrations:** Conduct field demonstrations and trials to showcase the benefits of new technologies.

Report of the High-Level Committee on Agricultural Exports

- 1. Technology for Export Quality:** Implement technologies that enhance the quality and safety of agricultural exports.
- 2. Traceability Systems:** Develop traceability systems using technology to meet international export standards.
- 3. Market Intelligence:** Use technology for better market intelligence and to identify export opportunities.

Conclusion:

In conclusion, achieving the vision of a technologically advanced and prosperous agricultural sector in India requires a concerted effort from all stakeholders, including the government, private sector, and farmers themselves. By addressing current challenges and embracing both traditional and novel technologies, India can significantly enhance its agricultural productivity, support farmers' livelihoods, and contribute to the nation's goal of becoming a developed economy by 2047.

Prelims Question?

Q. With reference to the National Pest Surveillance System (NPSS) Consider the following statement:

1. The National Pests Surveillance System (NPSS) is launched by the ISRO.
2. The primary objective of the National Pest Surveillance System (NPSS) is to reduce pests in agriculture.
3. India is the first country to develop its own National Pest Surveillance System (NPSS).

How many of the above-given statements are correct?

- A. Only one
- B. Only two
- C. All three
- D. None.

ANSWER: B

Mains Question:

Discuss the various technologies employed to enhance agricultural productivity in India and briefly outline the key initiatives undertaken by the Government of India to promote these technologies. (150 words 10 marks)

[Munde Dhananjay Navnath](#)

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Shailendra Upadhyay

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✉ info@plutusias.com

☎ 8448440231

🌐 www.plutusias.com

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