

## Internet & Web Portals: Revolutionizing Agriculture with Online Databases and E-Learning Platforms

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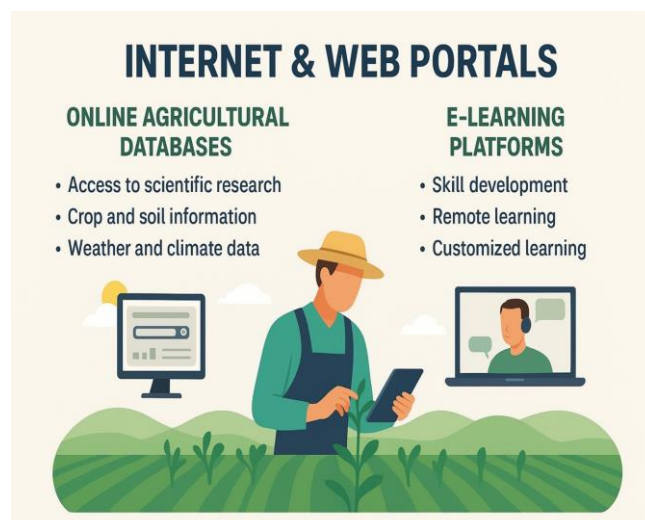
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### INTRODUCTION

The exponential growth in internet technologies has revolutionized agriculture in its very essence. Farmers, scientists, extension agents, and policymakers are now better equipped with a large number of online agricultural databases and e-learning platforms, offering timely data, improving knowledge, and enabling data-based decisions. Such digital interfaces bridge the research-practice gap, promoting sustainable, efficient, and climate-resilient farming practices.



### Online Agricultural Databases

Online agricultural databases are organized storehouses of knowledge encompassing crops, livestock, soil, climate, market trend, pests, diseases, and government schemes. These databases offer simple access to reliable, research-based information, which is essential for contemporary farming. Main advantages are:

#### Access to Scientific Research

Farmers and agronomists can refer to research papers, crop management books, best practices, and case studies to increase productivity, ensure quality, and embrace innovative farming practices. This lessens dependence on traditional knowledge only and promotes evidence-based decision-making.

### Crop and Soil Data

Soil databases offer region-specific soil properties, nutrient recommendations, and crop suitability maps to guide farmers in selecting the right crops and applying accurate soil management practices.

### Weather and Climate Data

Live weather information, such as rain forecast, temperature patterns, and weather extremes, enables farmers to schedule sowing, irrigation, harvesting, and pest control effectively. This prevents crop losses and builds climate variability resilience.

### Market Intelligence

Market price, demand pattern, export-import data, and supply chain data information enables farmers to make effective marketing decisions, select remunerative crops, and minimize post-harvest losses.

### Illustrations of Large-scale Agricultural Databases

- ✓ ICAR AgriPortal – Offers research publications, crop guides, and extension materials for Indian agriculture.
- ✓ FAO FAOSTAT Database – World statistics on crop yields, livestock, trade, and food security indicators.
- ✓ USDA National Agricultural Statistics Service (NASS) – Provides data on US agricultural production, market, and surveys.
- ✓ CGIAR Research Program Portals – Knowledge centers on crop improvement, soil health, and climate-smart agriculture.

## 2. Agriculture E-Learning Platforms

E-learning platforms are online platforms that provide agricultural information and training via web-based courses, webinars, videos, and interactive modules. They offer farmers, extension agents, and learners flexible, convenient, and applicable learning opportunities. Major benefits are:

### Skill Development

E-learning allows farmers and extension agents to learn about up-to-date cultivation methods, integrated pest management, nutrient management, post-harvest management, and value addition practices. This enhances their ability to enhance productivity, efficiency, and quality of crops.

### Remote Learning

Online platforms transcend geographical limitations, and farmers in rural and remote areas can obtain quality training without having to travel to physical training facilities. This is

especially useful for smallholder and marginalized farmers.

### Customized Learning

Modules are adapted to target crops, agro-climatic zones, and local methods of farming so that the content is useful and applicable right away. A farmer growing rice, for instance, can take modules specifically on transplanting and paddy field water management.

### Retention of Learning

Interactive multimedia material e.g., videos, animations, quizzes, and simulation ensures better understanding and learning retention of agricultural principles. Learners can review modules several times for repetition.

### Examples of E-Learning Platforms

- ✓ **eKrishi (Government of India):** Provides MOOCs, training videos, and certification courses for farmers and extension workers.
- ✓ **Coursera & edX:** Offer international agriculture courses on precision farming, sustainable agriculture, and climate-smart agriculture.
- ✓ **Digital Green:** A non-profit platform based on video-based learning to spread locally applicable agricultural practices among smallholder farmers.

### Integration of Databases and E-Learning Platforms

The merging of online farm databases and e-learning websites forms an integrated digital environment that advances farm knowledge, decision-making, and community interaction. Some of the main features are:

### Decision Support Systems

Farmers can draw information from databases e.g., soil type, crop suitability maps, pest warnings, and market conditions and utilize e-learning modules to translate and utilize this information efficiently. This supports informed farming decisions, such as choosing favorable crops, optimizing fertilizers, and timing irrigation.

### Community Engagement

Many platforms provide discussion forums, chat groups, and social features where farmers can share experiences, ask questions, troubleshoot problems, and collectively learn from peers and experts. This collaborative learning environment strengthens knowledge dissemination and adoption of best practices.

### Continuous Updates

Integration keeps users updated with the latest research results, government notices, weather

forecasts, and pest/disease warning in real time. It keeps farmers aware and responsive to changing situations, improving productivity, resilience, and sustainability.

### Improved Agricultural Outcomes

The complementarity of databases and e-learning enables farmers to integrate scientific thinking with on-ground realities, resulting in better crop management, fewer losses, optimal resource utilization, and enhanced market interactions.

### Advantages of Internet & Web Portals in Agriculture

The application of internet technologies and web portals to agriculture provides numerous advantages that promote productivity, efficiency, and sustainability:

#### Improved Access to Knowledge

Farmers, extension agents, and agronomists can now access scientific research, best practices, crop management advice, and government advisories that were otherwise reserved for research institutions. This makes knowledge democratized and empowers farmers to practice evidence-based approaches.

#### Improved Productivity

Accurate and timely information on weather, pest and disease attacks, market prices, and soil health enables farmers to take informed decisions on crop choice, use of inputs, and farm operations, which increase yields and quality.

#### Cost and Time Saving

Remote access to training, advisory services, and information provided by web portals saves time and costs on visits to agricultural offices or extension centers for farmers.

#### Empowerment of Farmers

Accessibility of digital tools facilitates farmers to take well-informed decisions, embrace innovative techniques, and engage actively in knowledge-sharing networks, promoting self-reliance and decision-making capability.

#### Aid for Climate-Resilient Practices

Web sites offer important data for climate variability adaptation, e.g., weather forecasts, warnings of drought or flooding, and climate-smart cultivation strategies, so that farmers can adopt sustainable and resilient practices.

#### Challenges and Future Prospects

Though they have great transformational potential, online agricultural portals' adoption is hampered by several concerns:

- ✓ **Limited Internet Connectivity:** Rural and sparsely populated regions might not have stable internet connectivity, which could be restrictive.
- ✓ **Digital Literacy Barriers:** The farmers who are smallholder in scale might lack skills to utilize online platforms fully.
- ✓ **Language Constraints:** Most platforms are predominantly English, and this can restrict accessibility for local language-speaking farmers.

### Future Prospects

The future of digital agriculture is extremely promising. New trends include:

- ✓ **Mobile Apps:** Smartphone portals offer on-the-spot, easily accessible information.
- ✓ **Multilingual Sites:** Content localization makes the platform accessible across different language groups.
- ✓ **AI Recommendations:** Personalized advice can be given by artificial intelligence based on farm data, soil type, and weather forecasts.
- ✓ **Real-Time Advisory Services:** IoT sensors, satellite imagery, and weather stations integration enable dynamic and real-time advisories for pest management, irrigation, and crop care.

These breakthroughs will make data more usable, actionable, and accessible to the user, allowing farmers to take informed, smarter decisions.

### CONCLUSION

Internet and web portals are transforming agriculture by making information more accessible, actionable, and usable to the user, allowing farmers to take informed, smarter decisions. Online databases offer scientific information for evidence-based decision-making, while e-learning platforms augment practical knowledge and skills. Collectively, these digital technologies promote climate-resilient, sustainable, and productive agriculture, leading to an agricultural revolution fueled by technology. With ever-improving connectivity and increasingly localized and user-friendly digital platforms, the web-based agricultural resources will be at the forefront of attaining global food security and sustainable rural development.