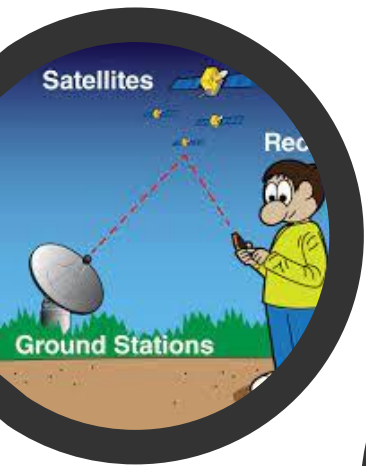
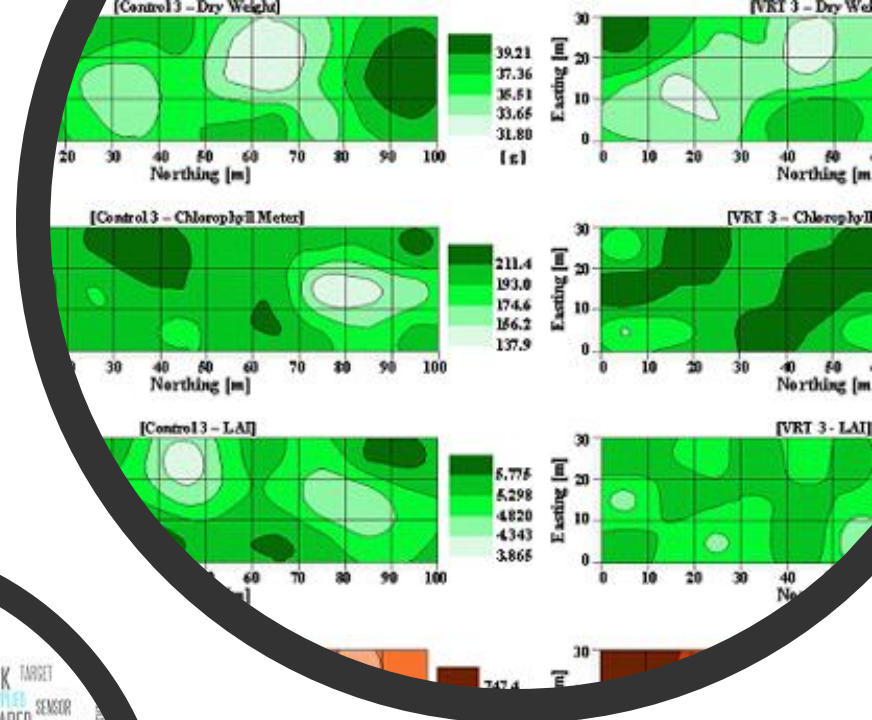
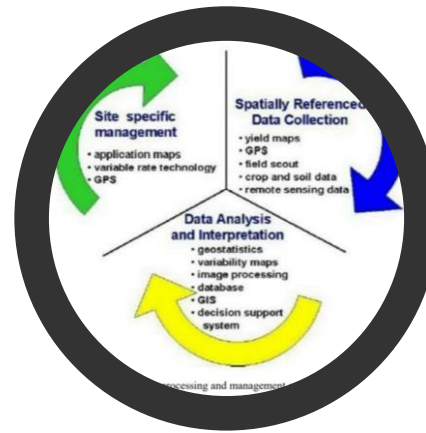


DBMS , use of DBMS in Agriculture

Tufleuddin Biswas- Day-3



PEER-REVIEWED ARTICLE

Precision Farming Data Management Using Geographic Information Systems

E. Lynn Usery, Stuart Pocknee, and Broughton Boydell

Abstract
 Agricultural ecosystems are inherently variable entities. To manage spatial variability, modern farmers are looking for advanced technological solutions. Management strategies incorporating remote sensing, the Global Positioning System (GPS), and variable rate treatment (VRT) offer the possibility of positioning inputs exactly in order to optimize farm returns and minimize chemical inputs and environmental hazards. The use of geographic information systems (GIS) is essential for such a management paradigm. This paper introduces the concept of precision farming and discusses the

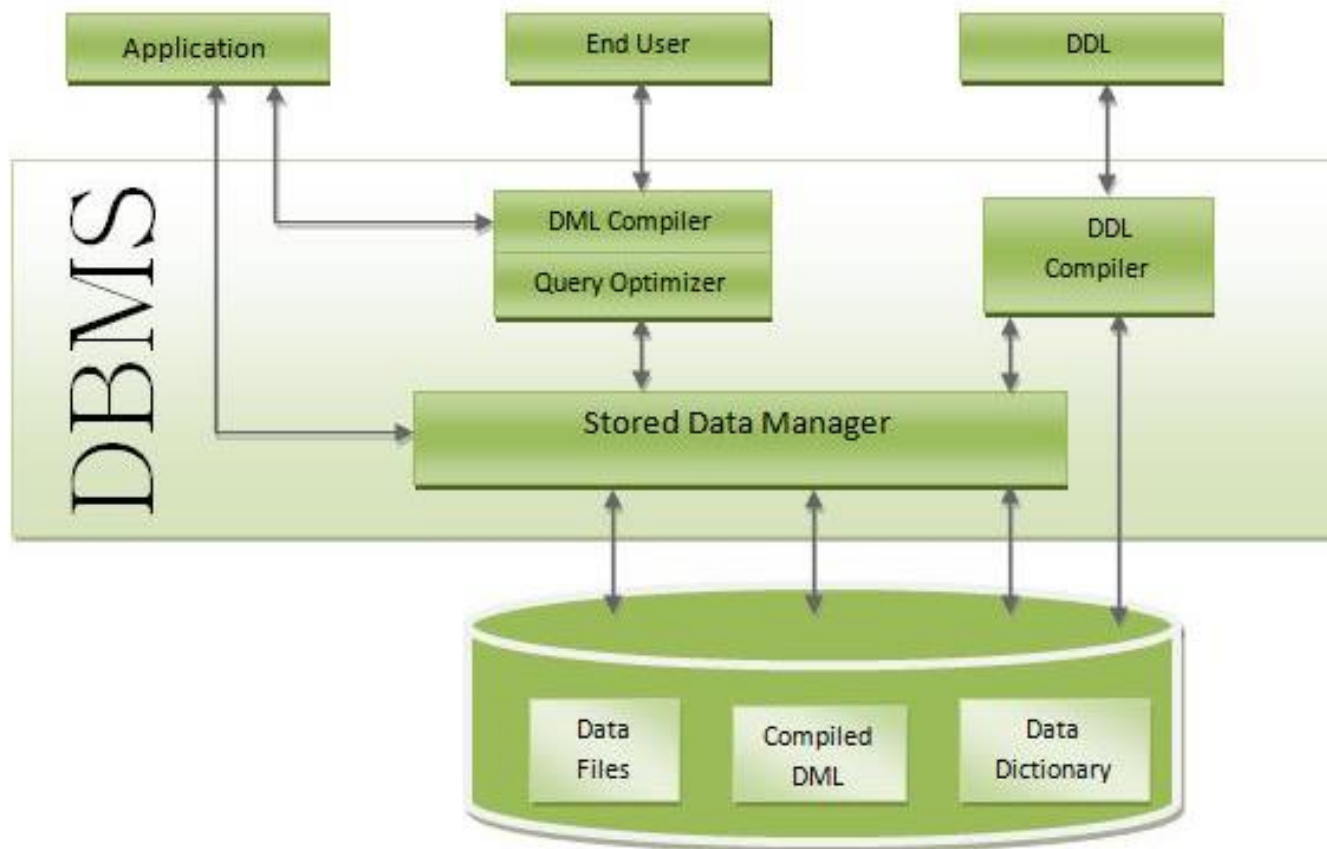
data may be one of the greatest contributions of GIS to human populations.
 It is the purpose of this paper to explore GIS as a tool for integration and analysis of precision farming data and to present a brief survey of the use of GIS in precision-farming research and applications. The next section of this paper provides a brief review of developments in the major technologies associated with precision farming, i.e., GPS, continuous-yield sensors, remote sensing, VRT, and GIS. The third section provides an examination of GIS as the hub of precision-farming data management and analysis as being implemented by



Concept

- **Database Management Systems (DBMS)**

- A database management system is the software that functions as the interface between users, other programs and the database itself. It allows the data to be stored, maintained, manipulated and retrieved.
- DBMS act as an interface between the database and user
- USER ↔ DBMS ↔ DATABASE
- The set of programs provided to facilitate the user in organisation, creating, detecting, updating, and manipulating data in a database to form a DBMS.
- DBMS software is also known DBMS, which works at a lightning pace



Features of DBMS

- The DBMS permits the user to create, maintain and manipulate the information stored within a file. These features are common to almost all database packages.
- 1. Creating a file
- 2. Entering database records
- 3. Sorting
- 4. Deleting
- 5. Updating

Structure of database management packages

The structure of DBMS is used to organize the data elements in three basic ways:

1. Hierarchical database structure
2. Network database structure
3. Relational database structure



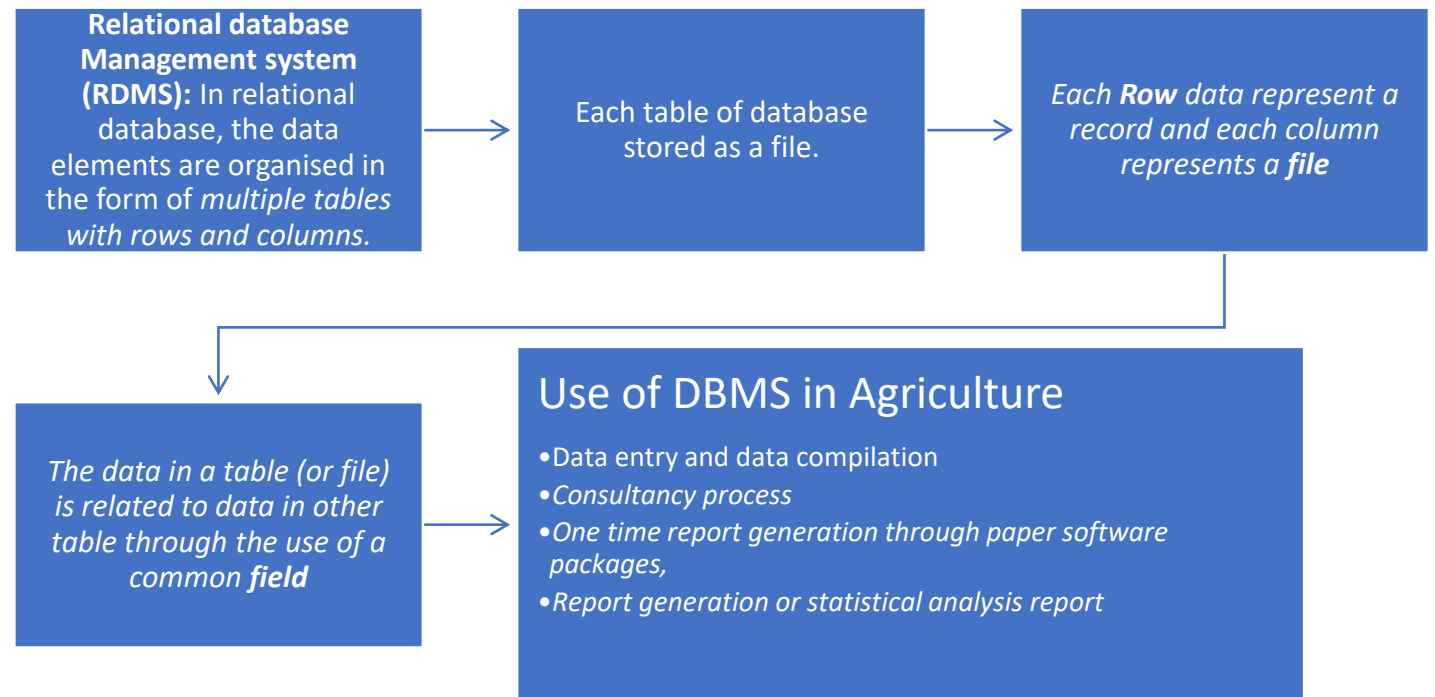
Anil S. Parlikar
Milind L. Waikar

Application of Visual Basic for DBMS of Irrigation Water Management

A Database Management System using VB



Conti...RDMS; USE of DBMS in Agriculture



The water is a precious commodity in water scarce regions. Hence, proper water accounting and its data management for irrigation is prime important. Handling of voluminous data is required in management. Applying user friendly computer programming, its accuracy can be increased. It will help better water use and revenue assessment/collection. It is important to keep in mind "More crop per drop of water".

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USE of DBMS in Agriculture (1)

- I. Global positioning system (GPS) based technology helps to monitor irrigation, field mapping, soil sampling, tractor guidance and crop scouting.
- II. GPS data helps in electronical map factors and areas that might affect crop yield, such as wet spot and weed patches, according to Virginia Cooperative Extension (<https://ext.vt.edu/index.html>)
- III. GPS equips farmers with enough information which helps in increasing crop yield in a manner that is consistent with the best environmental practices for sustainable agriculture



USE of DBMS in Agriculture (2)

- Global positioning system (GPS) being used for developing ranking systems that evaluate land and provided a site assessment to aid what is now known as precision agriculture.
- These hi-tech, interactive systems provide information based on variety factors such as soil conditions, drainage and slope conditions, soil Ph, and nutrient status, etc.
- Precision agriculture provides farmers with control by predicting vital information including fertilizer application and problems with drainage, insects, and weeds. Most government websites provide this kind of information.



GPS Applications in Crop Production

The Global Positioning System (GPS) provides opportunities for agricultural producers to manage and crop production more precisely. Common names for general GPS applications in farming and include precision agriculture, site-specific farming, and prescription farming. GPS applications in f include guidance of equipment such as sprayers, fertilizer applicators, and tillage implements to r excess overlap and skips. They can also be used to precisely locate soil-sampling sites, to map w disease, and insect infestations in fields, and to apply variable rate crop inputs and, in conjunctio yield monitors, record crop yields in fields.



recision Farming – Use Farming Tech to Improve Agrc

recision farming has revolutionized the way we produce crops and farm as well as our understz in general. Using precision tech has helped farmers reach a level of profitability that wa of and created a vast industry that thrives with strictly calculated ROI, yield projections n. Aside from the staggering profitability of employing precision farming techniques, it h sustainable attitude to farming, one that is more ethical and environmentally conscious

USE of DBMS in Agriculture (3)



- **Benefit to the government:**

- ✓ Fallow crop area estimation by DBMS
- ✓ Planning of cropping pattern could be done using DBMS
- ✓ Employment facilities can be generated through this process as per qualification and skills
- ✓ Maintaining production and productivity data of different crops can be easily maintained through DBMS

- **Benefit to the farmer:**

- ✓ Farm mechanisation
- ✓ Providing soil testing report at proper interval
- ✓ Financial assistance from bank and other institution
- ✓ Providing necessary information about agriculture marketing process
- ✓ Soil and water management

Top 5 Database Software



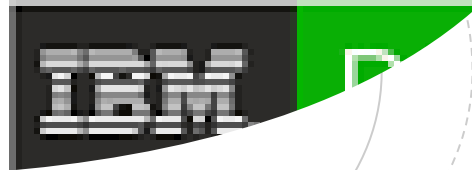
1. Oracle
2. PostgreSQL
3. Microsoft SQL Server
4. MySQL
5. IBM DB2

ORACLE
DATABASE



PostgreSQL

MySQL



*Some popular
DBMS*

e-Agriculture, concepts, design and development.



- E-agriculture, or ICTs in agriculture, is about designing, developing and applying innovative ways to use ICTs in the rural domain, with a primary focus on agriculture. **E-agriculture offers a wide range of solutions to some agricultural challenges** (<https://www.fao.org>)
- E-Agriculture – using ICT and digital solutions in innovative ways to boost the agricultural sector – offers an immense opportunity to improve the livelihood of rural communities, foster sustainable agriculture and drive socio-economic development, while also allowing environmental protection.
- International telecommunication union (ITU) is engaged in several initiatives to facilitate the use of digital technology and improved access to information to create opportunities in agriculture and address some of its most pressing challenges – such as climate change, loss of biodiversity, drought, and desertification – bringing impact to the SDGs.
- Adopting a national approach to e-agriculture will result in improved livelihoods and incomes for people living in rural communities. E-agriculture holds great potential in promoting sustainable agriculture while protecting the environment and finding an effective way to feed the world's population.

Conti....



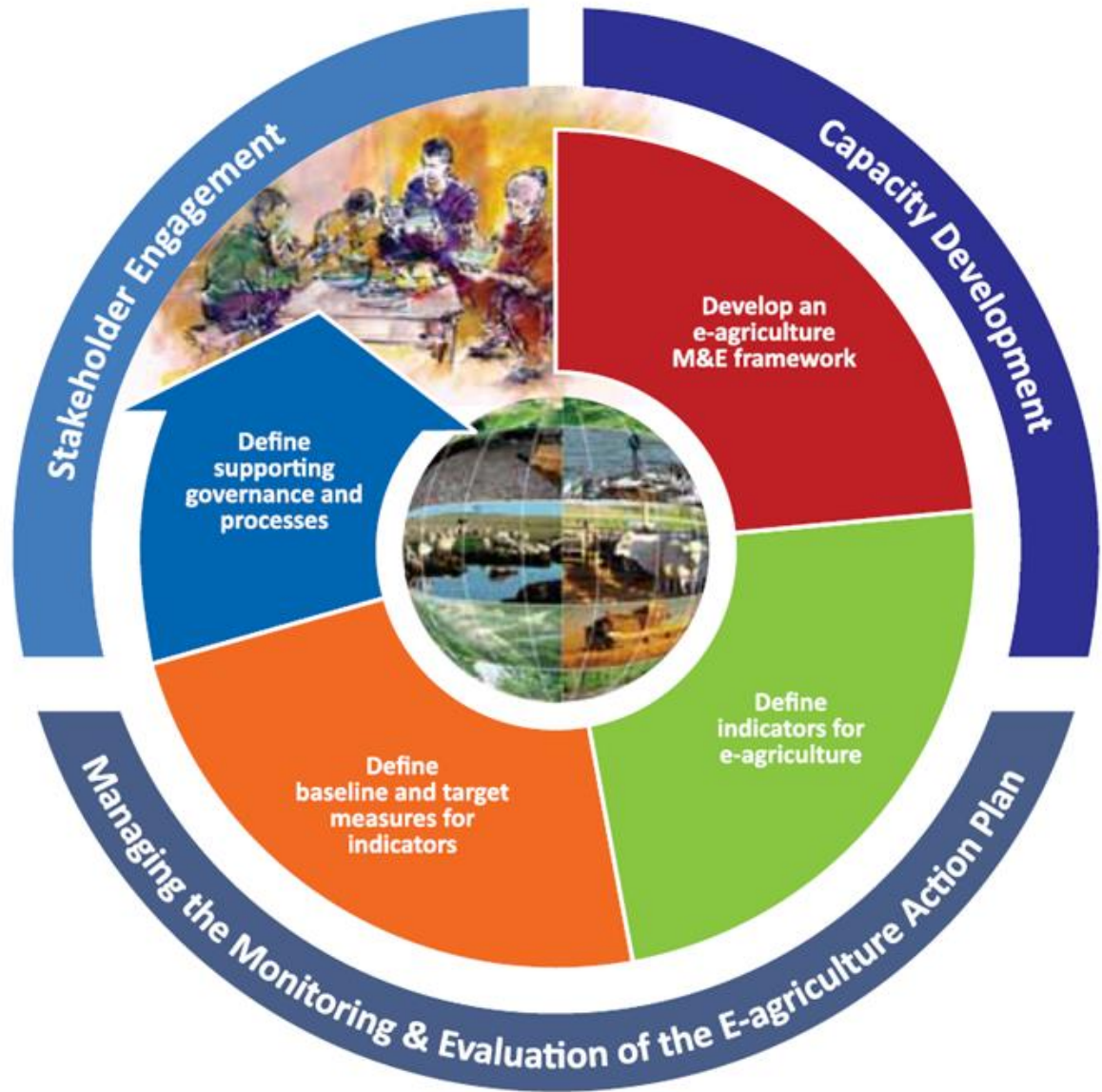
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- e-Agriculture has gained increased attention as a key enabler in modernizing the agriculture sector through improved information and communication processes. Today, e-Agriculture applications provide farmers and other stakeholders in agriculture with digital platforms to access technology, receive timely information, and conduct trading.
- The Food and Agriculture Organization (FAO) of the United Nations, in collaboration with the International Telecommunication Union, has come up with the e-agriculture strategy to help countries use information and communication technology to drive rural development.
- Primarily focusing on agriculture, information and communication technologies (ICTs) can help boost agricultural development by improving farmers' access to vital information so that they make the best decisions and use their resources sustainably.
- According to Gerard Sylvester, Knowledge and Information Management Officer at the FAO, ICTs may include devices, networks, services and applications, including internet-based technologies and tools such as telephones, mobiles, televisions, radio and satellites.

Identifying required e-agriculture components



MONITORING AND DEVELOPING of E- agriculture



Design and development of E-agriculture

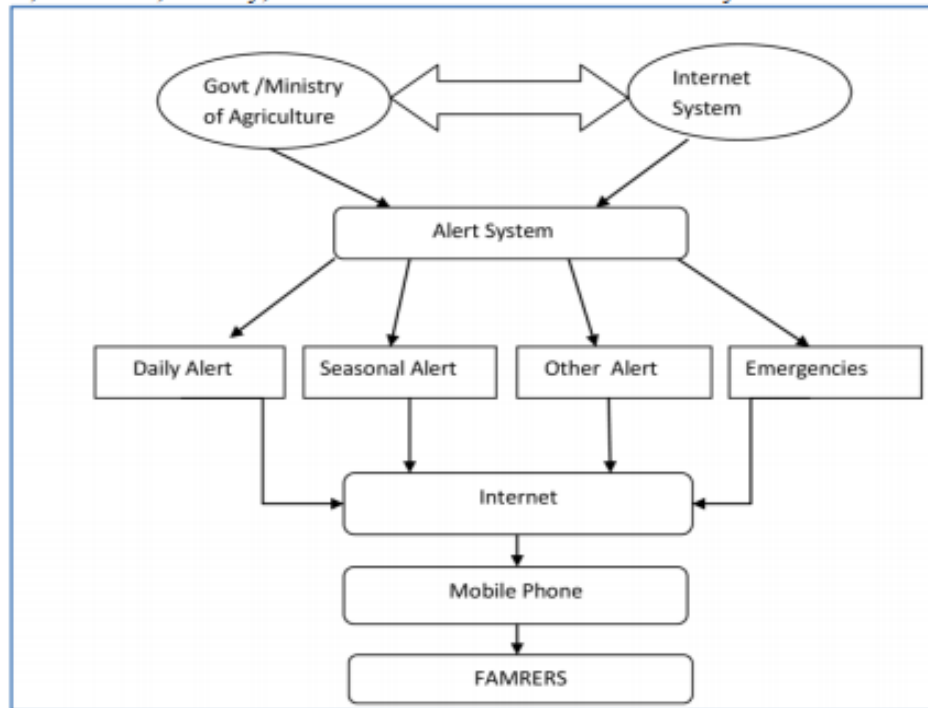


Fig. 1 Architecture of Modern system

- For improving agricultural productivity an expert agricultural advice is given to the farmers both in a timely and personalized situations.
- Here, in this system agricultural experts generate the advice by using the modern agriculture which is highly knowledge intensive which also requires timely, reliable and accurate information on natural resource endowments and their usage patterns at present and future technology available for their utilization and other information about markets, weather, insurance, subsidy, etc.
- The Architecture of the modern system is as follows:

ICTs in agriculture

TELEPHONE> Interactive voice response



COMPUTERS AND WEBSITES> Agriculture information and markets



BROADCASTING> Expertise sharing, advisory, community



SATELLITE> Weather, universal accessibility, remote sensing



MOBILE> Advisory, sales, banking, networking



INTERNET AND BROADBAND> Knowledge sharing, social media, e-community, banking, market platform, trading, etc.



SENSOR NETWORKS> Real time information, better data quantity and quality, decision making



DATA STORAGE AND ANALYTICS> Precision agriculture, actionable knowledge

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ICT in agriculture

The role of ICTs in agriculture



Role of ICTs in Agriculture

Introduction

E-Agriculture involves the conceptualisation, design, development, evaluation and application of innovative ways to use information and communication technologies (ICT) in the rural domain, with a primary focus on agriculture.

ICTs in Agriculture



E-Agriculture

Food and Agriculture Organization (FAO), in collaboration with the International Telecommunication Union, has come up with the **e-agriculture strategy** to help countries use information and communication technology to drive rural development.

International efforts

Bhutan and Sri Lanka became the first two countries in the world to have full-fledged e-agriculture strategies.

E-agriculture and climate change

In this era of climate change when extreme weather events have become the order of the day, e-agriculture can offer services like **weather forecasts and disaster alerts** which can help farmers plan accordingly.

Initiatives such as **e-Choupal** have demonstrated the power of bringing communities together.

The Indian Council of Agricultural Research (ICAR) has established a network of around Krishi Vigyan Kendras (KVKs) in the country mandated with **Technology Assessment and Demonstration for its Application and Capacity Development (TADA-CD)**.

Initiatives in India

mKisan portal is a platform which provides web-based mobile advisory to farmers with the technological backstopping from Research Institutes and Agricultural Universities.

National Agriculture Market (e-NAM) scheme for remunerative prices for the farmers for their produce.

Benefits of E-Agriculture

India's **food production and productivity may be increased** by an effective use of ICT for agricultural purposes.

Information and communication technologies can help boost agricultural development by **improving farmers' access to vital information** so that they make the best decisions and use their resources sustainably.

Today, agriculture has become knowledge intensive and access to right information at the right time makes a huge difference in the **livelihood of small-holder farmers**.

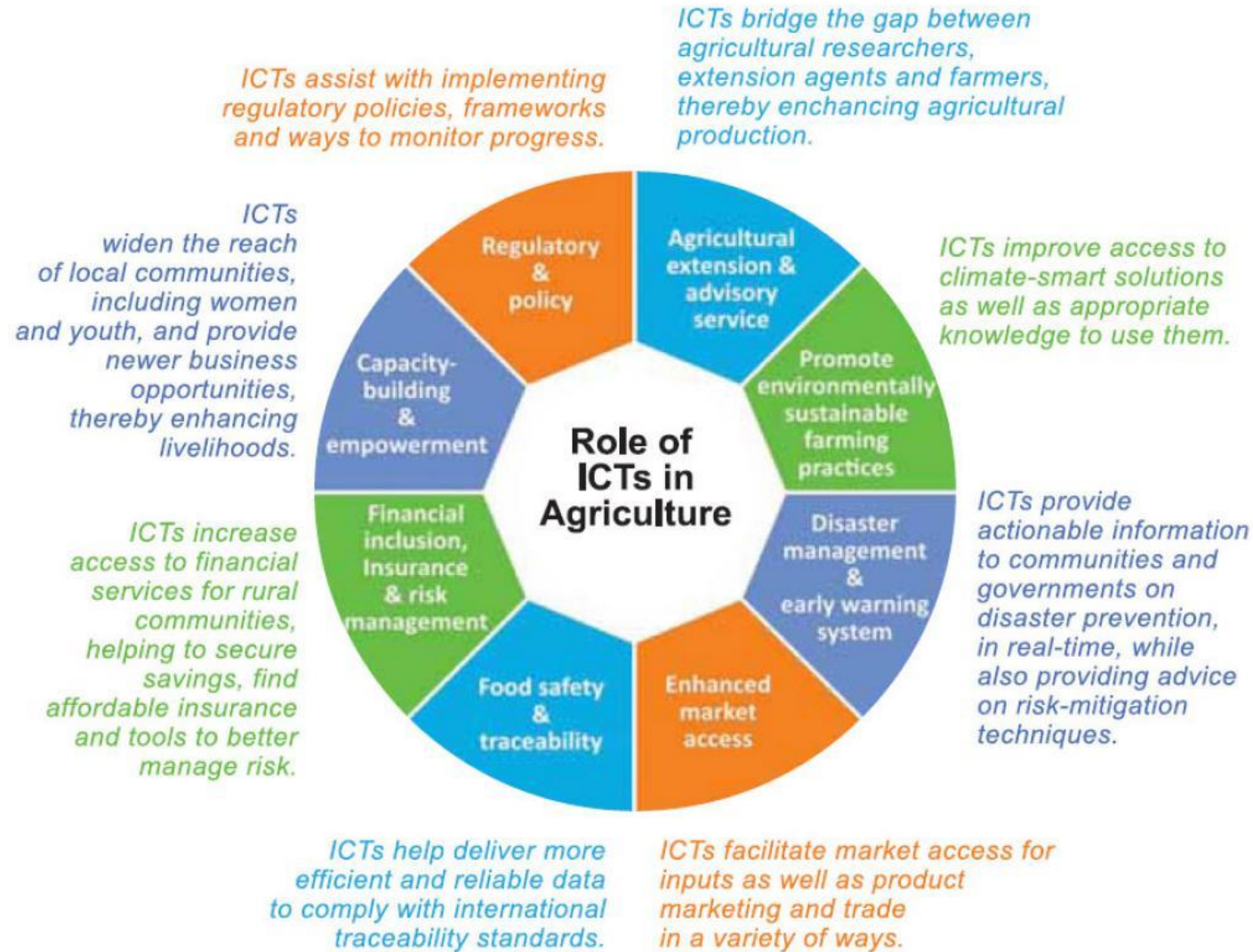
With right kind of ICT services, governments can provide rural communities with **information on weather, market prices and insurance**.

Disaster preparedness and management and accurate weather information and so on can go a long way in reducing the impacts brought about by the vagaries of weather and climate change.

Developed Nations are using laser technology instead of tractors to plough lands. This helps in optimising the use of various inputs such as water, seeds, fertilisers, etc.

Alternative means of power like solar energy panels, regulated and optimised by ICT, can benefit Indian farmers.

The role of ICTs in agriculture



Advantages of ICT in E-agriculture

- 1) It can initiate new agricultural and rural business such as e-commerce, real estate business for satellite offices, rural tourism, and virtual corporation of small-scale farms.
- 2) It can support policy-making and evaluation on optimal farm production, disaster management, agro-environmental resource management etc., using tools such as geographic information systems (GIS).
- 3) It can improve farm management and farming technologies by efficient farm management, risk management, effective information or knowledge transfer etc., realizing competitive and sustainable farming with safe products. For example, farmer has to make critical decisions such as what to plant? When to plant? how to manage pests?, while considering off farm factors such as environmental impacts, market access, and industry standards. IT-based decision support system (DSS) can surely help their decisions.

Conti

- 1) It can provide systems and tools to secure food traceability and reliability that has been an emerging issue concerning farm products since serious contamination such as chicken flu was detected.
- 2) It can facilitate rural activities and provide more comfortable and safe rural life with equivalent services to those in the urban areas, such as provision of distance education, telemedicine, remote public services, remote entertainment etc.
- 3) Empowerment of Stakeholders (Government Officials, Research, Education & Extension Scientists, farmers and other service providers such as Community Information centers).
- 4) Development of Knowledge Management, Decision Support and Advisory Systems to strengthen Extension services and also used for Farmers Redressal system
- 5) Efficient management (Development, Conservation, allocation and utilization) of resources .
- 6) Improved productivity and profitability of farmers