Contents

Foreword ................................................................. v
Preface ................................................................. vii
Acknowledgement ................................................... ix

1. Introduction to Agroinformatics ................................. 1-3
   • What is Agroinformatics?  • Agroinformatics Definitions
   • Objectives of Agroinformatics  • Information Systems
     Terminology  • Agroinformatics Tools

2. Agriculture Information System ................................. 5-8
   • Agriculture Information Systems  • Major Trends  • Agriculture
     Information System  • Importance  • Internet Based Agriculture
     Information System  • Support Provided by Agriculture
     Information System  • AGRIS/CARIS  • AGROVOC  • Agriculture
     Research Information System (ARIS)  • Agriculture Research
     Information Center

3. Farm Management System ..................................... 9-10
   • Introduction  • The Concept of a Farm Management System

4. Management Information System ............................... 11-14
   • Introduction  • Characteristics of Management Information
     System  • Management Information Systems Advantage  • Outputs
     of a Management Information System
5. Geographic Information System ........................................ 15-32  
   - Defining GIS  
   - Fundamentals of GIS  
   - Mapping Concepts, Features and Properties  
   - Geographical Data Sets  
   - Spatial & Non-spatial Data  
   - Attribute Data  
   - Remote Sensing in Agriculture  
   - Remote Sensing in Farm  
   - Principles of Remote Sensing  
   - How Does Remote Sensing Work?  
   - Global Positioning System  
   - Components of a GPS  
   - GPS Positioning Types  
   - GPS Applications  
   - Remote Sensing and GIS  
   - Use of GPS in Agriculture  
   - General Packet Radio Service (GPRS) Network  
   - The GPRS Network  
   - Benefits

6. Artificial Intelligence .................................................. 33-42  
   - What is Intelligence?  
   - What is Artificial Intelligence?  
   - Branches of AI  
   - Natural-Language  
   - Natural Language Processing  
   - Natural Language Recognition  
   - Simple Natural Language Grammar  
   - Intelligent Technologies in Agriculture  
   - Intelligent Animal Houses  
   - Agricultural Robots

7. Artificial Neural Networks ............................................ 43-55  
   - What is a Neural Network?  
   - How does an Artificial Neural Network (ANN) work?  
   - Characteristics of Neural Networks  
   - Architectures of Artificial Neural Networks  
   - Learning Process  
   - Classification of Learning Algorithms  
   - Artificial Neural Networks in Agriculture  
   - Intelligent Agents  
   - Characteristic of Intelligent Agents

8. Expert Systems .......................................................... 57-70  
   - What is Meant by the Term Expert?  
   - Building Blocks of Expert Systems  
   - Designing Expert Systems in Problem Solving  
   - Applications of Expert System  
   - An Expert System for Decision Problem  
   - Advantages of Expert System  
   - Cases of Expert Systems in Agriculture

9. Decision Support System (DSS) ...................................... 71-81  
   - Introduction  
   - Types of DSS  
   - Scope of DSS  
   - Benefits of DSS  
   - Common Uses of Decision Support Systems  
   - Decision Support System for Farm Management

10. Genetic Algorithms ................................................... 83-95  
    - Introduction  
    - Features of Genetic Algorithm  
    - Steps in Executing the Genetic Algorithm  
    - Applications of Genetic Algorithm  
    - Artificial Ant Problem
11. Programming Language - Visual Basic .................................. 97-129
  • A Brief Description of Visual Basic • Types of Application in VB • Creating the Project • Steps in Building a Visual Basic Application • Visual Basic Data Types • Managing Variables • Constants • String Functions • Operators in Visual Basic • Controlling Program Flow • Looping • The InputBox() Function • Methods • Procedure • Control Array • MsgBoxes • Data Access • Data Access Objects (DAO) • Microsoft Jet Database Engine • Remote Data Objects • Microsoft ActiveX Data Objects • Data Control • Object Linking and Embedding (OLE)  

12. Database Management System ............................................. 131-166
  • Database • Data Model • Database Software • DBMS Facility • Architecture for a DBMS • Data Modeling • Components of a Data Model • RDBMS (Relational Database Management System) • Client/Server Model of Computing • Entity Relationship Diagram (E-R diagram) • Entity Relationship Diagram Notations - Front-end and Back-end • Codd's Rules • SQL - Structured Query Language • Data Definition Language (DDL) • Data Manipulation Language (DML) • DCL • Data Control Language • Transaction Control (TCL)  

  • Agriculture Database Concepts and Importance • The Orientation of Topic Selection for the Construction of the Agricultural Database • The Principle of Specialization in the Construction of the Agricultural Database • Top Quality Principle of Building Databases • Agriculture Database Types • Agriculture Libraries • Agriculture Journals • Technical Reports • Conference Papers • E-Books in Agriculture  

14. Web Portal ................................................................. 191-195
  • Web Portal • Types of Portals  

15. Introduction to Bioinformatics ............................................. 197-241
  • Definition of Bioinformatics • History of Bioinformatics • Structural Bioinformatics • New Branch of Bioinformatics • Bioinformatics - Application in Agriculture • Analyzing Protein Sequence • Pairwise Alignment • Multiple Alignment • Blast - A Sequence Alignment Tool • EMBL • SWISS-PROT • Rice Genome Project • Software for Bioinformatics • Major Categories of Bioinformatics Software • Internet Sites For Bioinformatics