

Chapter-4

Supply Chain Management: The ICT Application

From technologies and design of information and communication systems for rural communities, we move to the "applications" of those technologies and systems within participatory rural development initiatives.

The Internet and rural development

- Don Richardson looks at the use of the Internet as a tool for rural and agricultural development. Enhanced communication services and accessibility of information are related to social and economic development. In the "Global village", the privileged are those with access to information; typically these people reside in urban areas. Rural people, particularly the food-insecure, must be given the opportunity to obtain relevant information, to communicate and to plan their own development efficiently.

Participatory approaches for promoting rural connectivity: an exploration of issues

The Internet is a tool that may promote participatory communication, but only if its design and implementation are done in a participatory manner. Communities need to understand the structure of the electronic system and participate in the design of a customized communication programme tailored for their interests, needs, and local culture. Approaching electronic communication development in this way

allows communities to be prepared for the significant changes that could result from the ensuing rapid information exchange.

Empowering communities in the information society: an international perspective

Community telecentres allow populations in rural and remote areas to participate exchanging information. They offer a practical and community-oriented way to bring new information and communication technologies to the service of rural people. Johan Ernberg describes how rural community telecentres can empower communities in the information society.

Applying the lessons of participatory communication and training to rural telecentres.

It is widely accepted that ICTs may support economic and social development, but a framework to guide the introduction of these technologies to development, but a framework to guide the introduction of these technologies to developing regions is absent.

Effective partnering and leadership in rural telecommunications: rural distance learning via video conferencing telecommunication - the Northnet experience.

If we are to facilitate participatory communication among the communities with whom we work, we must make a conscious effort to practice it ourselves.

Connecting with the unconnected: proposing an evaluation of the impacts of the Internet on unconnected rural stakeholders.

If rural communication programmes are to stay relevant, they must be closely monitored and evaluated. Scot McConnell points out that current evaluation ignore the impacts that ICTs may have on the rural stakeholder communities.

The policy context: to keystone to improving rural telecommunications and ICT application for development

Enabling policies have a key role in encouraging rural telecommunication applications for development. We explore the issues involved in constructing appropriate policies for rural telecommunication development.

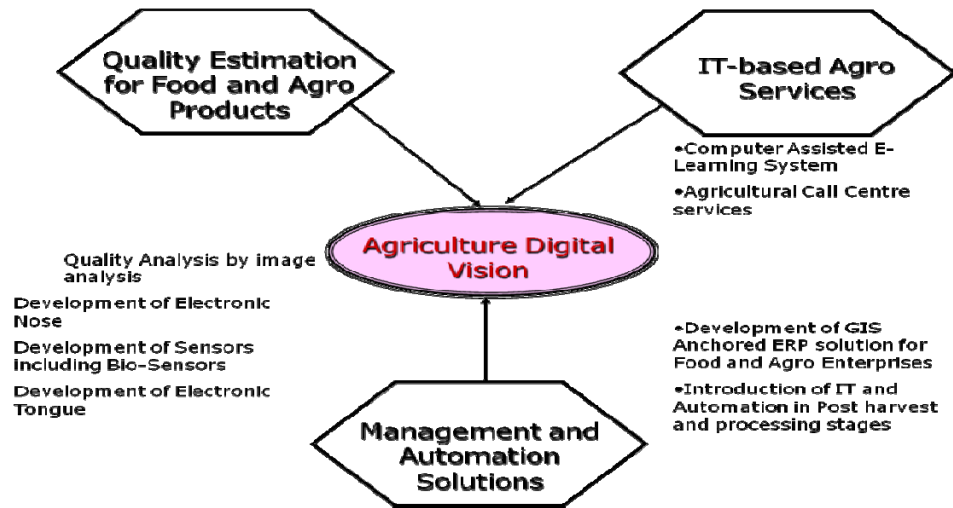
INFORMATION TECHNOLOGY (IT) AGRICULTURE QUALITY ISSUES

SELECTION OF FOCUSED AREAS

- Speech and Language Technology
- Image Processing
- Agro-Electronics
- IT-led Employment Generation
- E&T - High-end IT & DOEACC

Centre's Strategy

- Product Sales as Technology Component
- Turn-key Solutions after Systems Integration as "Proof-of-Concept"
- Stand-alone demo
- Core Competence
- R & D Ideas
- Demonstratable TECHNOLOGIES
- Field-tried SOLUTIONS
- BUSINESS REALISATION & IP GENERATION



ICT IN Agriculture

- IT-anchored Non-Invasive, On-Line, Real Time Quality Assessment for Food & Agro Products
 - Image Analysis and Processing
 - Electronic Olfaction (E-Nose, E.-Tongue)
- Development and Implementation of Agricultural Call Centre Service for Hand Holding Indian agricultural community Pursuing Non-Traditional Crop Pattern.

IT and Automation

Objective

- Reliable Data Collection
- Automated Process Monitoring & Control
- Physical Parameter monitoring & Control During Post-harvest Storage

Benefits

- Improvement of Productivity & Efficiency
- Energy Saving

- Smart MIS
- Quality Improvement

Image Analysis and Processing

- On line and in process grading and sorting can be done by Image Analysis
- Visual quality attributes can be measured objectively with a camera system
- The captured image may be compared with desirable attributes stored in a database for intelligent decision support
- The main advantages of automation are objective quality evaluation and elimination of human elements in quality evaluation process, which makes the process reliable, repeatable and less subjective
- Integration with a processing machineries and post harvest control systems facilitates conveyor zed transportation of produce at high speed, full-sight inspection and physical rejection of products

Electronic Olfaction E-Nose, E-Tongue

- To identify major aroma and flavor determining volatile compounds in various food and agro products.
- To firm up Flavor Mapping Model with Standard odour terminology
- To correlate Electronic Nose readings with organoleptic evaluation by human experts.
- Electronic Nose is a machine designed to detect complex odours using sensor arrays.
- The fingerprint (or smellprint) is classified and identified with suitable pattern recognition engine for declaration of odour.

E-Tongue

- An instrumental approach towards mimicking human taste leads to Electronic Tongue.
- To construct an artificial electronic tongue, a little silicon chip that has polymer micro beads arrayed on it, in a similar fashion to the taste buds on our tongue, may be used.
- The sensors to be used for E-Tongue respond to chemical stimuli by changing colour.

GEOINFORMATICS

- Geographic Information Systems (GIS)
- Global Positioning System (GPS)
- Remote Sensing Technologies (RST)

What is GIS

- A Geographic Information System (GIS) is a computer based tool for mapping and analyzing things that exists and events that happen on earth. GIS technology integrates common data base operations such as query and statistical analysis with the unique visualization and geographic analysis benefits offered by maps. These abilities distinguish GIS from other information systems and make it valuable to a wide range of public and private enterprises for explaining events, predicting outcomes, and planning strategies.
- Whether sitting a new business, finding the best soil for growing bananas, or figuring out the best route for an emergency vehicle, local problems also have a geographical component GIS will give you the power to create maps, integrate information, visualize scenarios, solve complicated problems, present powerful ideas and develop effective solutions like never before. GIS is a tool used by

individuals and organizations, schools, governments, and business seeking innovative ways to solve their problems

Definitions of GIS

- **Toolbox based definition**
A system for capturing, storing, checking, manipulating, analyzing and displaying data which are spatially referenced to the earth department of environment
- **Data based definition**
Any manual or computer based set of procedure used to store and manipulate geo-graphically referenced data (Aronoff 1989)
- **Organizational based definition**
An automated set of functions that provides professionals with advanced capabilities for the storage, retrieval, manipulation, and display of geographically located data (ozemoy, smith and sicherman)

Importance of GIS

- To make maps for specific user needs.
- To make map production possible in situations where skilled staff are unavailable.
- To allow experimentation with different graphical representations of the same data.
- To facilitate map making and updating when the data are already in digital form.
- To facilitate analyses of data that demand interaction between statistical analysis and mapping.
- To create maps that is difficult to make by hand, e.g., 3 dimensional maps or stereoscopic maps. To create maps in which

selection and generalization procedures are explicitly defined and consistently executed.

What can GIS do for you?

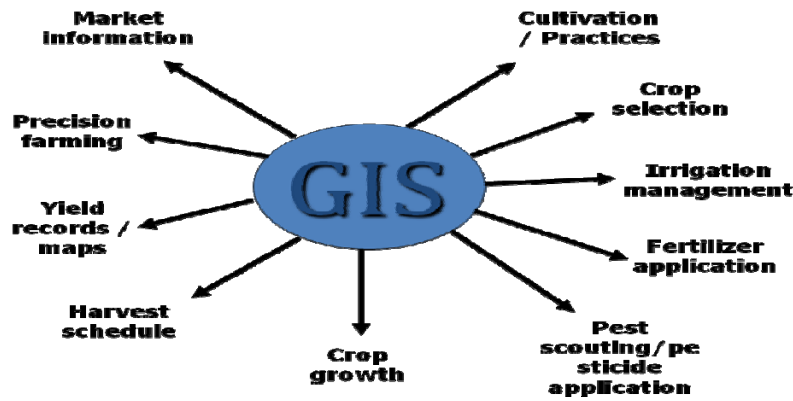
- Improve Organizational Integration
- Make Better Decisions
- Making Maps

What can you do with GIS?

- Find a feature people use maps to see where or what an individual feature is.
- Finding patterns looking at the distribution of features on the map instead of just an individual feature, se patterns emerge.
- Map Quantities
- Map Densities
- Map Change

Primary components of GIS

- Hardware: Hardware is the computer on which a GIS operates. Today, GIS software runs on a wide range of hardware types, form centralized computer servers to desktop computers used in stand alone or networked configuration.
- Software: GIS software provides the functions and tools needed to store, analyze and display geographic information.



Global Positioning System

- The location of field observed reference data is usually determined GPS methods.
- GPS includes a group of 24 satellites rotating around the earth in precisely known orbits.
- The satellites revolve around the earth approximately once every 12hrs and the position in space precisely known at all times.

GPS Instrument

- These instruments help in taking field observation data. Based on the location references.
- Digitalized and portable as mobile cell phones.

What is remote sensing?

- According to the physics of remote sensing, different objects return different amounts of energy in different wavelengths of the electromagnetic spectrum. Detection and measurement of these spectral signatures enables identification of surface objects both from the air-borne and space-borne platforms. Remote sensing through air-borne and satellite based sensors covers surveying as well as monitoring which are essential for the planning and management of national resources.

- This technology, integrated with traditional techniques, is emerging as an efficient, speedy, cost effective and important tool for the national development efforts. Remote sensing of earth's environment essentially comprises of measuring and recording of electromagnetic energy reflected from or emitted by the plants surface and atmosphere from a vantage point above the surface and relating of such measurements to the nature and distribution of surface materials and atmospheric conditions.

Purpose of Remote Sensing

- Useful in the management and exploration of natural resources like oil, mineral
- Planning and land management like highway designs and optimal routing for road and others.
- For resource management like fisheries, forestry, hydrology, city planning, oceanography and agriculture.
- Atmospheric and weather study.

Advantages of Remote Sensing

- Large area coverage for regional survey for a variety of themes and identification of classification of features.
- Repetitive coverage allowing monitoring of dynamic phenomena like crop growth.
- Data acquisition over inaccessible areas.
- Data acquisition at multiple heights for obtaining data in different scales and resolution.