ABSTRACT

AGRO-TECHNOLOGY INFORMATION DISSEMINATION IN INDIA:
USING XML AS A TOOL

The calamitous weather shifts and repeated crop failures in subsequent years have forced nearly 200,000 Indian farmers to commit suicide in the last decade. The same number have left agriculture and moved to cities in search of jobs. It is a very dangerous trend for the food and social security of the country in which agriculture is the stronghold of the economy providing employment to 58.2 per cent of the work force and accounting for 14.6 percent of the country’s GDP (2009-10 figures). In spite of the huge scientific and extension community the scientific developments have failed to reach the common Indian farmer due to the weak extension linkages. Hence there is need that the developments in IT are harnessed and an indigenous AIDS (Agricultural Information Dissemination System) is designed which can facilitate the improvement of existing agricultural information management processes by improving ease of access, transparency, accountability, efficiency, speed of delivery and providing new information sharing opportunities through affordability, availability and ease of use.

Online information does not comply with a specific structure. It is not characterized by a unified presentation style and principles. On the contrary, each public authority applies its own format to present the information. Several types of data needs to be exchanged among different stakeholders. Each authority stores its information in a proprietary data format and storage system like HTML, ASCII, RDBMS etc. Therefore data conversion must take place from the data format adopted by one authority to the format adopted by the others, whenever exchange of data is required. One way of IT intervention in Indian agriculture sector is by making use of the existing technologies of DBMS, Data Mining, Multimedia, Networking etc. to provide benefit to the stakeholders. Another way is by modifying the existing technologies to suit to the particular domain.

In this thesis the needs of the farmers have been identified, and then a prototype has been developed for the mushroom growing component of agriculture by using XML which simplifies sharing, data transport, platform changes, makes
handling of data more easier and efficient for describing document content, validating
the correctness, defining data facets and converting data between different data types.
Mushroom growing was chosen as it is a complex process involving many sub
processes like compost preparation, spawn production, crop management, crop
protection, harvesting, processing and marketing. In addition to these activities
involved, farm design plays a very important role in mushroom production as the
environmental parameters of the mushroom house (temperature, humidity, carbon
dioxide content) have to be kept under specific range depending upon the mushroom
species being grown. All these activities make mushroom growing a highly technical
enterprise which requires expert technical guidance. The prototype can be scaled up to
include other agricultural commodities. XML has been used as it has become the:
widespread format for information exchange and has several advantages over HTML.

After a detailed study of the different approaches of storing and managing
data, it was decided to use Relational Database to store and manage XML data for
our prototype. This enabled us to harvest the benefits of the advantages offered by this
approach. Some of these are efficient storage, indexes, security, transactions and data
integrity, multi-user access, triggers, queries across multiple documents, and so on.
Ontologies, which provide formal semantic representation that describes a particular,
real world domain were defined for various operations concerned with mushroom
growing. It also includes specification for featuring a number of advanced
characteristics i.e. access from different devices including WAP enabled devices.

An open XML document structure would aim to support data exchange among
different public sector agencies and consumers. The success of the prototype would
be judged by the consumers’ increase in the level of abstraction and efficient and
effective access to agricultural information would be the critical success factor. The
proposed Mushroom Markup Language (MushML) addresses the common structure,
presentation and interoperability challenges stated above. The components of the
proposed document structure were determined for the description of various activities
related to mushroom growing.

The prototype development and implementation is based on the Microsoft
Windows xp operating system, MySQL, the Java 2 Enterprise Edition integrated
platform and the Apache-Tomcat web server. The Microsoft Access simulates the
database management system. Various XML Editors such as “XMLSpy,” “XMLMind” and Web browsers, such as the Internet Explorer and Netscape Navigator tested and used to develop and test the system. Java platform, Apache web server and Netscape are freeware and open-source products making them easily customized to the specific needs of every application. These have adequate capabilities to support general requirements to manipulate, distribute and store XML documents.

The results for testing of the prototype have been presented for computer literate as well as computer illiterate audience. The results are encouraging and the farmers are willing to become members if exhaustive information is provided to them in the advisory services.

Once in use, the beneficiaries should have an opportunity to access agricultural information through multiple access channels. The flexibility and extensibility characteristics of XML would facilitate its maintenance and adaptation to potential new requirements, whenever the prototype is scaled up to include additional agricultural commodities.