Web-Based Application in the Agriculture: Opportunities and Challenges

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ABSTRACT

Agriculture is an important sector in many developing nations with the most rural population depending on it. The sector faces major challenges of enhancing production in a situation of dwindling natural resources necessary for production. The growing demand for agriculture products, however, also offers opportunities for producers to sustain and improve their livelihood. Web-Based Application offers a vital role in addressing these challenges and uplifting the livelihood of the farming community. This paper attempts to review the significance of existing Web-based application in agriculture, discuss their opportunities in agriculture and examine their challenges as well.

Keywords: *Web based application*

INTRODUCTION

Frank (1987) maintains that the greatest challenge facing the agricultural sector is the delivery of useful information to rural communities. In the same vein, Van Niekerk (1993) sees one of the ways of improving production in agriculture as the reduction of the gap between theory and practice. The gap between theory and practice can only be reduced if correct methods of communication are implemented. These methods should be able to support both direct and indirect communication. The emergence of the Internet, and more specifically the Web, in the last few years has brought along positive possibilities in terms of combining these two methods of communication. The Web-Based Applications in this era of globalization has accentuated new modes of knowledge transformation and communication patterns. Web-Based applications have opened up uncommon opportunities for developing countries in terms of providing low cost access to information. India has 70% of its population, which is dependent on Agriculture for its livelihood. Considering this, use of Web-Based Applications in Agriculture Sector is of strategic importance in a country like India. Web-Based Applications has tremendous potential in timely collection of data and distributing it to the potential users even in developing countries. Web-Based Applications, however have the potential of getting vast amount of information for rural populations in a more timely, comprehensive and cost effective manner. The Web-Based Applications are becoming more accessible and users can obtain information from various sources, one web-based application could meet the needs of a large community. These modern technologies offer new and multiple perspectives, such as faster and better-focused access to information.

METHODOLOGY

Web-based applications has been implemented as a layered structure having three layers viz., User Interface layer (UIL), Application layer (APL) and Database layer (DBL). Each layer has its own specific functions. Applications are usually broken into logical chunks called “tiers”, where every tier is assigned a role. Traditional applications consist only of 1 tier, which resides on the client machine, but web applications lend themselves to an n-tiered approach by nature. Though many variations are possible, the most common structure is the three-tiered application. In its most common form, the three tiers are called presentation, application and storage, in this order. A web browser is the first tier (presentation), an engine using some dynamic Web content technology

(such as ASP, ASP.NET, CGI, ColdFusion, JSP/Java, PHP, Perl, Python, Ruby on Rails or Struts2) is the middle tier (application logic), and a database is the third tier (storage). The web browser sends requests to the middle tier, which services them by making queries and updates against the database and generates a user interface. The basic structure of a 3-tier web-based application is presented in Fig. 1

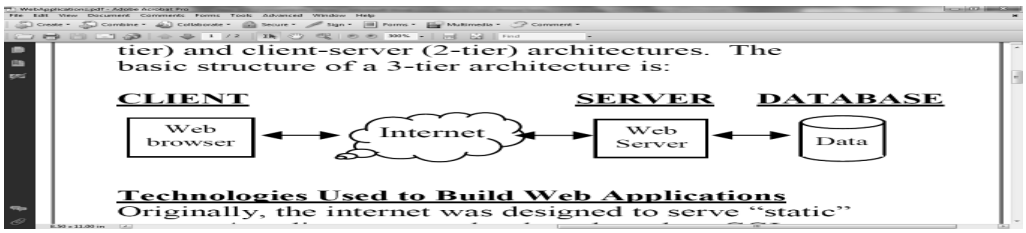

Fig. 1 Basic structure of 3-tier web-based application

Web-Based applications in the Agriculture

Web-Based applications are central catalysts of agricultural development. These developments have opened the door to a whole new generation of 'multi-modal' market information services that bring much needed price and product information directly to these farmers. Some of the examples of live web-based applications in agriculture are as follows:

e-Krishi Kiran

The e-Krishi Kiran (http://shc.aau.in) is web based application. This web-based application provides a Soil Health Card to each farmer of Gujarat state with details about his land condition and cropping practice to be followed. It is a repository of agricultural information for the benefit of farmers, agricultural scientists and decision makers at Government level. It is crop productivity and income enhancing scientific information provider structure for the grass-root level farmers at their doorstep or any locations about their land, soil fertility status, suitability of their land to grow different crops, irrigation, scientific recommendation of crops, the best cropping pattern to be followed in their fields, guidance of agricultural scientists, alternative cropping pattern and requirement if fertilizers considering soil analysis report and moisture index of the area all the way through intranet, internet and Gujarat State Wide Area Network.

Warana Wired Village Project

Web-Base Warana Wired Village Project (http://www.e-agriculture.org/content/ warana-wired-village-project) is an attempt to modernize farmers' co-operatives in Warana Nagar, Maharashtra, India. Existing co-operatives have been Web-Enabled to increase farmers' capacities for information exchange in a government driven experiment to discover the potential of rural ICT. It covers a cluster of 70 villages from district Kolhapur and 24 villages from district Sangli. All villages are linked with the Directorate of marketing, Pune, which gives up to-date information to the farmers on rates of vegetables, fruits and other crops. The National Informatics Centre (NIC), the Warna Co-operative Society and government of Maharashtra jointly implement the project. At least 25 farmers visit a website every day for information prices. Through the web-based applications, harvesting dates at each farm and village can be predetermined and farmers can complain online to the co-operative chief if the harvester does not arrive in time. Warna's sugarcane farmers are among the first in the country to benefit from the high-tech wave. It provides farmer's pricelists of farm produce in the region thus enabling them to monitor the rates of agricultural produce across the state. They can also access daily weather forecasts, information on cropping patterns, soil conservation and government schemes.

Expert System on Wheat Crop Management (EXOWHEM)

Web-based EXOWHEM (**http://iasri.res.in/expert1**, Islam, et al., 2007) system holds a collection of general principles that are potentially applied to solve a problem related to wheat crop management and is capable to extend expert advice to the researchers and wheat-growing farmers. The system provides the users with recommendations and advice concerning wheat production. The system is designed to cover the agricultural operations, variety selection, fertilizer application, and insecticide / pesticide application on one hand and economic benefits on the other hand. The system analyses the question given by the user and gives piece of advice to the user. The developed system extends the research done on the wheat crop to the farmers in effective way to help in getting instant solution to the problems faced by them. It encourages the dissemination

of research findings and helps farmer's where services of the experts are not available.

E-choupal

Web-based e-choupal (https://echoupal.com) application is launched in June 2000, 'e-Choupal', has already become the largest initiative among all web-based interventions in rural India. 'e-Choupal' services today reach out to over 4 million farmers growing a range of crops - soyabean, coffee, wheat, rice, pulses, shrimp - in over 40,000 villages through 6500 kiosks across ten states (Madhya Pradesh, Haryana, Uttarakhand, Karnataka, Andhra Pradesh, Uttar Pradesh, Rajasthan, Maharashtra, Kerela and Tamil Nadu). Farmers can use the web-based kiosks to check the current market prices of their commodities, access market data, information on local and global weather and best farming practices. Today ITC-IBD is buying agriculture products such as soybeans, coffee, shrimp, wheat, rice and pulses, all through web-based e-choupal applications.

Expert System of Extension

The Web-based Expert System of Extension (Sudeep et al., 2002) was developed under the NATP-CGP project in collaboration with IARI (Bahal, et al, 2004 a, b; 2006). The main objective was to help farmers to take appropriate decisions and disseminate need based research findings to millions of the farmers at a time, which is neither possible nor practicable by conventional system of extension. It acts as a helping tool for the farmers and extension workers to take appropriate decision regarding the variety selection,insect and disease identification, nematode and physiological disorder identification and their control.

The process of market liberalization, the demise of state marketing boards and the lifting of price controls have created a vacuum for the farmers in many developing countries in terms of information on the pricing of their produce and farm inputs, commodity markets and export channels. Just as nature abhors a vacuum, so opportunistic middleman are rushing in to take advantage of farmers' lack of information. Web-base application services could bring much needed price and product information directly to farmers. Other examples of areas where web-based application could play a major role in the lives of farmers are sound decision making due to timely information, knowledge of market outlook, creating employment through the establishment of rural information centers etc.

Challenges ahead

India cannot truly advantage itself of its growing strength in the field of Web-base application technology without servicing its own domestic needs first, particularly those in rural areas. Web-based applications offer both challenges and promises for political, social, economic and environmental development. It is true that in spite of all the efforts made by the various agriculture and technology scientists, there is still a long way for an average farmer to enjoy the fruits of Web-base application technology and relish its ultimate use. Some of the challenges associated with the use of Web-base application technology for farmers are listed below:

(a) Policy considerations: In most developing countries, the regulations are rigid and telecommunication tariffs and import duties on ICT equipment are high. The situation is compounded by lack of political goodwill.

(b) High telecommunication costs: The cost of basic Internet remains a strong deterrent in many developing countries.

(c) Infrastructure: The telecommunication and electricity infrastructure in developing countries is lacking or is poorly developed in rural areas. Satellite and wireless technologies are now used in some developing countries, but these are largely developed around urban areas. India has a long way to go before its telecommunication infrastructure can provide easy access to a majority of its people. ICT has to contend with poor rural infrastructure and unreliable web connectivity – the prime requisites for the success of this project.

(d) Lack of local content and language barrier: Information available through Web-base application is mostly in English, which the majority of developing country rural communities cannot read. There is a marked shortage of relevant material in local languages that responds to their needs and this calls for "significant investment and support for local content".

(e) High rate of Illiteracy: Illiteracy is a fundamental barrier to participation in knowledge societies. A large portion of rural population of developing countries are illiterate i.e. they do not possess the basic skills required to harness the benefits of Web-base application.

(f) Inadequate human resources: It is often seen that most of the staff managing Web-based application

projects lack adequate training which would enable them to take full advantage of the new technologies. So, in order to ensure more meaningful participation in rural development and to pave the way for the creation of a critical mass of people that effectively harness web-based application technology in developing countries, training and capacity building must be an integral part of all Web-base applications.

(g) Gender differences: Women produce half the world's food (Anon, 1999). Still when new technologies are introduced, women are seen as a domain of men and they are often left out of the initiatives associated with Web-base application technology. No doubt, farmwomen often have wisdom and indigenous knowledge that is rooted on culture, traditions, values and experience

CONCLUSION

Web-base application have a major role to play in the life of farmers as they provide them with latest know-how on agriculture, on line selling and buying, problem solving through Web-based application. They can also access daily weather forecasts, information on cropping patterns, soil conservation, and government schemes. These developments have also opened the door to a whole new generation of 'multi- modal' market information services, which bring much needed price and product information directly to the farmers. By addressing these challenges and connecting the rural communities, India can boost its efficiency and economic competitiveness. India would benefit from approaching the issue by using web-based application technology in Agriculture by focusing on providing broadband connectivity and a centric development approach.

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