

**ADDRESSING INFORMATION NEEDS OF MUSHROOM FARMERS THROUGH AN INTERACTIVE
ADVISORY SYSTEM**

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ABSTRACT

Information and Communication Technologies (ICTs) can accelerate agricultural development by facilitating knowledge Management. Indian Agricultural Statistics Research Institute (IASRI), New Delhi and Directorate of Mushroom Research (DMR), Solan has developed such a system using a tool called *AGRIdaksh*, and is available at <http://agridaksh.iasri.res.in/mushroom.jsp>. The Expert System developed has a farmer's feedback/expert's response window through which queries can be sent online. The expert responds back with a suitable answer to the query. The system developed provides an interactive environment where the queries of the mushroom farmers/users are replied by the experts. The interactive system developed is expected to facilitate better decision making ability among the mushroom entrepreneurs and farmers, thereby minimizing losses due to diseases and pests infestation. It will provide the stakeholder's location specific Mushroom varieties, disease diagnosis and insects/pests identification that would definitely lead to awareness regarding qualities and growing process of different mushrooms and also an improvement in mushroom productivity.

KEYWORDS: mushroom, information, productivity

INTRODUCTION

The Department of Agricultural Research and Education (DARE) is operating through 61 Central Research Institutes, 6 National Bureaus, 15 Project Directorates, 14 National Research Institutes, 90 All India Coordinated Projects, 626 Krishi Vigyan Kendras (KVKs), 8 Trainers' Training Institutes and 54 Agricultural Universities. In spite of this huge workforce and infrastructure available in the agricultural sector in India, it is a matter of great concern that an ordinary Indian farmer is not getting the desired information when in need(Alex, 2011).

Knowledge is an increasingly significant factor of production in modern agriculture. Information and Communication Technologies (ICTs) can accelerate agricultural development by facilitating knowledge Management (Rao, 2007). In spite of successful research on new agricultural practices concerning crop cultivation, majority of the farmers are not getting upper-bound yield due to several reasons. One of them is that expert/scientific advice regarding crop cultivation is not reaching the farming community in a timely manner (Krishna Reddy, 2005).

In the present study, a survey was carried out to determine the information needs of around 400 mushroom farmers of four states, namely, Himachal Pradesh, Punjab Haryana and Uttarakhand, and an internet based interactive advisory system has been developed for mushroom stakeholders. Since the mushroom productivity in India is relatively low as compared to other mushroom producing countries, an attempt was also made to measure the Technical Efficiency (*which is the effectiveness with which a given set of inputs are used to produce an output*) of mushroom farm operations of farmers in Himachal Pradesh.

In the present scenario Web technologies are extensively being used in direct as well as indirect interventions in the agricultural sector (Mangstl, 1997, E-Sagu, 2004). In fact GOI has taken special initiatives for using Internet and communications Technology (ICT) in agriculture. Introduction of low cost payphones and a specific number (eg. 1551) for availing helpline services are steps in this direction. Considering the information needs of the farmers, it was inferred that information technology should be employed to develop a facility wherein a mushroom farmer could have online interaction with experts of different fields who could guide him/her during the various stages of the cultivation of different mushrooms(Roling, 1988, Y. Gautam,2005, 2006,2007). The advantage of a two way communication process is that there is quick response from the experts which leads to a speedy answer/solution to the queries/problems of the farmers/users. Indian Agricultural Statistics Research Institute (IASRI), New Delhi and Directorate of Mushroom Research (DMR), Solan has developed such a system using a tool called *AGRIDaksh*, and is available at <http://agridaksh.iasri.res.in/mushroom.jsp>.

METHODOLOGY

The information was collected personally as well as through mailed questionnaires. The information requirement of the farmers was ranked using Summary Cards which were based on the CRC (Class-Responsibilities-Collaboration) Card modeling technique.

The web-based tool named 'AgriDaksh', which was developed by IASRI, has been used to develop expert system of Mushroom cultivation. Multiple users were created with different rights for authorization into the system. The five types of users created in AgriDaksh are the Administrator, the Crop Administrator, and the Domain Expert with Validation Rights, Domain Experts and Farmers. The building up of the expert system for mushroom was initiated by building a Knowledge Model for the crop. Knowledge Model (which can be built by the Administrator or the Crop Administrator), was built by selecting various attributes specific to the mushroom crop.

The n-tier approach used to develop the system provides future scalability and flexibility options to enhance the system. At any point of time, any particular layer may be enhanced or rebuilt without affecting the other layers. So as the technology changes, the system can also evolve accordingly to maintain its validity against the time component. The system has a user interaction layer, which is browser based, the server side Application Logic Layer (ALL), the inference engine layer and the RDBMS knowledgebase. The Expert System has been built using Java technology. The user interaction layer has been built using JavaScript, HTML and CSS and the knowledgebase has been developed in SQL Server 2000. The Application Logic Layer is built using Java Server Pages (JSP). It contains all the necessary logic for interaction among front end, which includes the knowledge acquisition & the explanatory interface, the inference engine, which works as an interpreter and the knowledge base, which contains the structured as well as unstructured information. It also hides all the implementation level details of the inference procedure and knowledge fetching. Thus it provides formatted result to the user interface. The inference engine has been implemented using the Java Expert System Shell (JESS). JESS supports the development of rule-based expert systems that can be tightly coupled to the code written in Java language, which is both powerful and portable.

The main attributes for mushroom were selected from the exhaustive list provided in the system. Some new attributes pertaining to mushroom crop were also entered corresponding to different varieties. The information related to diseases, pests, nematodes and physiological disorders etc. has also been entered into the system. Information on the post-harvest technologies has also been entered and the recipes of mushrooms can be viewed in the PHT section.

The farmer's question & feedback window is used by farmers for asking questions and experts for answering them.

RESULTS

The farmers were asked to rank the information desired from 1-3 and the results are presented in Table 1.

Table 1: Information desired by farmers in the order of preference

S.No	Information desired	Priority of information		
		1	2	3
1.	Loan and subsidy schemes of the Government	106	170	124
2.	Marketing of agricultural products	58	226	116
3.	Post-harvest management and value addition	52	194	154
4.	Cultivation of export oriented and cash crops	46	172	182
5.	Integrated Pest Management	42	146	212
6.	Irrigation and Rain water harvesting	36	274	90
7.	Latest agricultural equipments	26	142	232
8.	Seed production	20	48	332
9.	Self-employment scheme	14	30	356

The most preferred information was related to “Loans and Subsidy schemes of the government” followed by “Marketing of mushrooms” and “Post-harvest management and value addition” respectively. Information related to “Cultivation of mushrooms for exports” was desired by 46 farmers as first preference, 172 farmers as second preference and 182 farmers as third preference. Some educated farmers mentioned that they have to depend on crawling down of decision inputs from conventional sources which are very slow and sometimes unreliable. They desired that more and more information/alerts should be made available on mobiles in local language so that they can derive maximum benefit from latest Information Technology creations.

In addition to the information related to mushroom cultivation, economic analysis and disease management, the Expert System has a farmer’s feedback/expert’s response window through which queries can be sent online. The expert responds back with a suitable answer to the query. The system developed provides an interactive environment where the queries of the mushroom farmers/users are replied by the experts. The queries come straight to the expert’s email. If the expert has answered a query, his screen would look like that in Fig. 2 with a tick in green color indicating that a response has been sent for that particular query. But if a query has not been answered, the screen would look like Fig. 1 with a cross marked in red indicating that the expert needs to send a response for that query. The IDs and passwords provided to the domain experts enable them to update the

information available in the system.

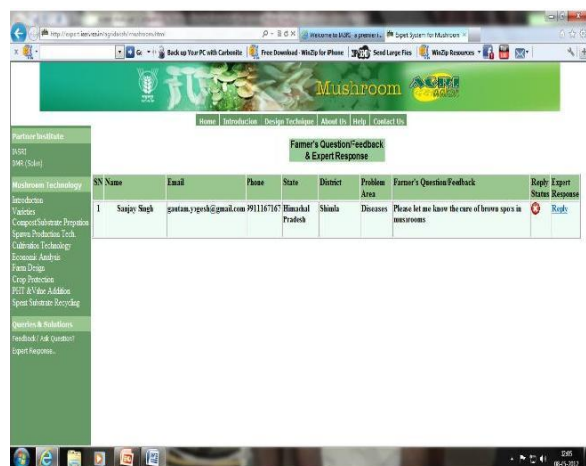


Fig.1

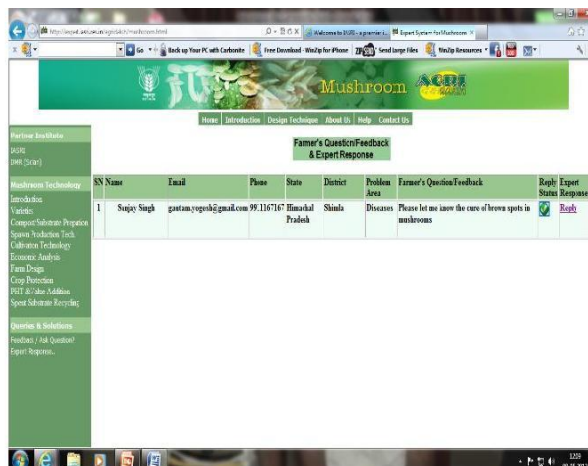


Fig 2.

CONCLUSION

The study showed that a good number of the farmers are well aware of the standards expected by the consumers at national and international levels. Also, there is a large scope for improvement in the different farm operations related to mushroom cultivation.

The interactive system developed is expected to facilitate better decision making ability among the mushroom entrepreneurs and farmers, thereby minimizing losses due to diseases and pests infestation. It will provide the stakeholder's location specific Mushroom varieties, diseases diagnosis and insects/pests identification. The system will also guide for cultural practices on Mushroom crop and would carry a large amount of research work done by the Directorate of Mushroom Research (DMR) formerly National Research Centre on Mushroom, Solan to enhance the efficiency of farmers, entrepreneurs or Agricultural Extension personnel. Overall, the system developed would definitely lead to awareness regarding qualities and growing process of different mushrooms and also an improvement in mushroom productivity.

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