

# Web Based Multimedia Bilingual Expert System for Chickpea Cultivation

Sonal Dubey, R.K. Pandey, S.S. Gautam

**Abstract**— Expert Systems are widely used in various areas of agriculture. This paper describes the possibility of the production of chickpea with the use of expert systems. Among the Rabi crops, chickpea is a very important. The expert system is divided into two parts the information system and the other the diagnostic block. The first one is the information system which gives information about all the aspects of chickpea cultivation like varieties, sowing, land preparation, pest and disease management, nutritional disorder, post harvest technology. The second part i.e the diagnostic block in which the expert system asks the user to answer few questions and accordingly decides the insect or disease attacking the plant and suggests control and remedial measures. The main feature of this expert system is that it is bilingual i.e. in English and hindi language (which can be easily understood by the Indian farmers).

**Keywords**— multimedia, expert system, hindi language, chickpea cultivation technology.

## I. INTRODUCTION

In any agricultural production system, accumulation and integration of related knowledge and information from many diverse sources play important role. Agriculture specialists and raw experiences are the common sources to provide information that the different stakeholders require for decision making to improve agricultural production [1]. Guidance from agricultural experts are not always available when needed. To overcome this problem expert system are extensively used in agriculture. Expert systems are tools for agriculture management since they can provide the site specific integrated and interpreted advice to the farmers.[2] Many expert systems are developed in agriculture sector but are in English language. The present expert system is bilingual also in Hindi so that the less educated farmers can also understand and use it.

An expert system is a computer program, which mimics behavior of an expert in a particular area of knowledge. Expert systems (ES) have been developed and applied in many agriculture fields i.e. diagnose insects and diseases of various crops. Farmers across the world face problems like soil erosion, increasing cost of chemical pesticides, weather damage recovery, the need to spray, mixing and application, yield loses and pest resistance.[3]

An expert system has three components: the knowledge base, inference engine and the user interface. Knowledge

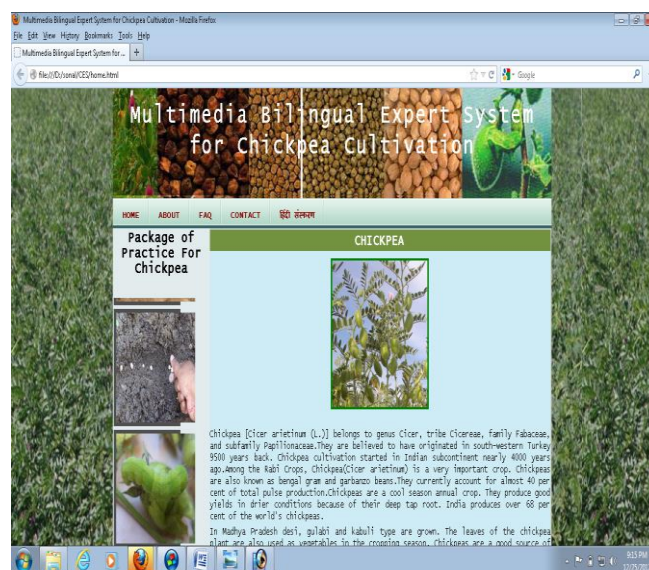
collected from expert of various fields is stored in the knowledge base. The inference engine is the component that manipulates the knowledge found in the knowledge base as needed to arrive at a result or solution. The user interface is the component that allows the user to query the system and receive the results of those queries.[4]

## II. THE PROPOSED SYSTEM

The proposed system is the multimedia bilingual expert system for chickpea cultivation. The expert system is divided into two parts. The expert system is divided into two parts the information system and the other the diagnostic block. The first one is the information system which gives information about all the aspects of chickpea cultivation like varieties, sowing, land preparation, pest and disease management, nutritional disorder, post harvest technology. The second part i.e the diagnostic block in which the expert system asks the user to answer few questions and accordingly decides the insect or disease attacking the plant and suggests control and remedial measures. The main feature of this expert system is that it is bilingual i.e. in English and hindi language (which can be easily understood by the less educated farmers).

## III. CHICKPEA INFORMATION SYSTEM

The chickpea information system gives static information about various aspects of chickpea cultivation like soil selection, land preparation, seed sowing, seed treatment, interculture operation, fertilizer management, nutritional disorder, insect and disease control, weed control, post harvest technology and nutritional value etc.



The user can get information about package of practice for chickpea by clicking on the left picture menu.

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If the user clicks the Hindi version the system provides information in Hindi. If the user selects the soil and climate option from the left image menu in the Hindi version the information about soil selection and climate requirements are provided in Hindi language.

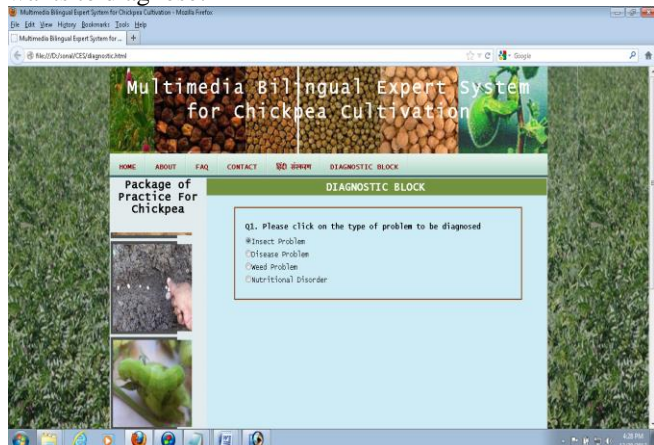


If the user clicks on the seed sowing option in the left scrolling menu the system gives information about seed rate, time of sowing, spacing, seed inoculation, seed treatment and method of sowing.

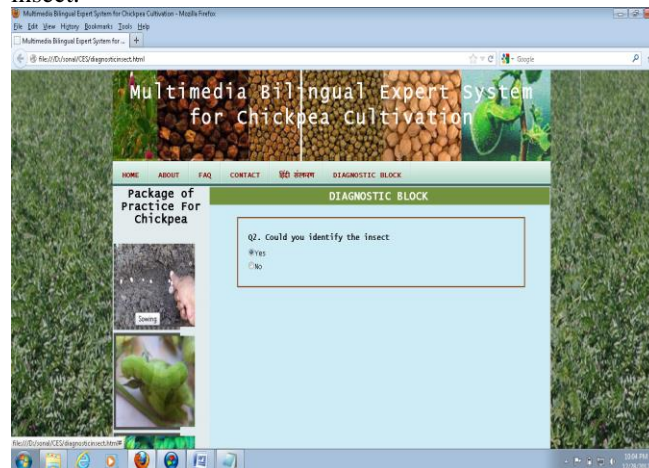
For any expert system describing symptoms in words is very difficult and sometimes is very confusing. Therefore, images are identified to be used for two main purposes: describing a disorder symptom, and confirming the diagnosis of the cause of a certain disorder. Detailed images for all symptoms, and unique images that confirm the occurrence of disorders at different stages has to be collected. [5] Since the expert system gives recommendations including agricultural operations in text form it is difficult for the user to completely understand how to perform the operations. Therefore, multimedia is also incorporated in the system to ease the learning process of the users. In the disease, insect and weed control modules the system gives information as well as images so that identification of the pest is much easier. Video files are also incorporated on methods of seed treatment and use of herbicides. Similarly the system provides information about different aspects of chickpea cultivation in both the languages.

#### IV. DIAGNOSTIC EXPERT SYSTEM

The second part of the expert system is a diagnostic block. The user has to answer certain questions asked by the expert system. Firstly the user is asked about the type of problem he wants to diagnose.

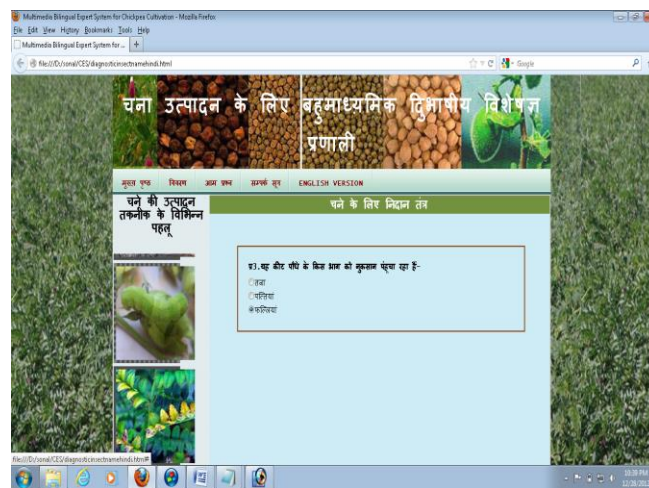


For example if the user checks the Insect problem radio button then the system again asks if the user identifies the insect.

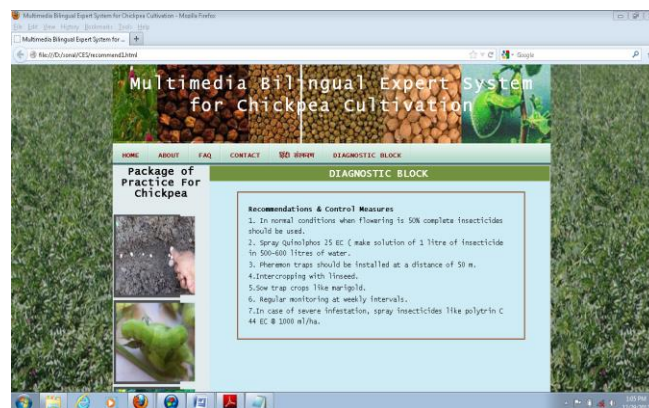


Now if the user checks the Yes radio button then the system asks to check the name of the insect.

And accordingly give control and remedial measures. If the user checks No radio button then questions about the part of the plant which is attacked.



Based on the inputs provided by the user and rules stored in the knowledge base the inference engine come to a conclusion i.e. it identifies the problem and suggests control measures. The system also shows images of different stages of insect and diseases so that the problem can be identified easily and crop damage is reduced.



## V. CONCLUSION

It is a web based application developed using Hypertext Preprocessor (php) and mysql as back end, which is in the initial stages of testing. The knowledge from agricultural experts, published literature is compiled and stored in the knowledge base. This type of system is especially useful for those farmers who are not getting the agricultural specialists at any time while taking decisions during the whole period of cultivation.

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