

A CASE STUDY :

Development of a decision support system of farm implements and machinery for selected crops of Kerala

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SUMMARY : The study was conducted during 2013-14 to develop a decision support system (DSS) in farm mechanization in selected crops for extension personnel and farmers of Kerala state. Farm implements and machinery having more than 25 per cent efficiency were selected to include in the decision support system. Ninety one implements or machinery used in rice plantation crops and fruit and vegetable crops were included in the system. The development of decision support system “farm mechanization” and the Malayalam version of the same, “*Karshika yanthravalkaranam*” was done through seven stages: a) Development of basic guidelines for presentation, b) Preparation of general outline for the content, c) Naming of the decision support system and its components, d) Preparation of information output sheets, e) Preparation of graphical elements, f) Development of page layouts and g) Development of the software component.

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KEY WORDS :

Decision support systems, Farm implements, Machinery, Crops

BACKGROUND AND OBJECTIVES

The role of public extension is changing in this era of globalization. In the new environment, the first and foremost thing is that agricultural extension has to strengthen its control over the technology delivery mechanism. This requires new methodologies and a radical shift from the conventional extension methods to information and communication technologies (ICTs). In this context the decision support system (DSS) forms the surest way to bridge this gap. Decision support system is a computer

application that supports the user to make decisions on particular aspects. The information and decision support systems are the ICT tools to store human knowledge in computers for the purpose of making the knowledge of experts available to users. Mechanization is considered as a remedy to the growing labour scarcity and to make cultivation profitable. Mechanization, besides facilitating and ensuring timeliness, thoroughness and cost effectiveness of agricultural operations its role and contribution in improving the quality of life of the rural

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work force and the farm families is quite substantial. During the last few decades scientists, farm engineers and manufacturing companies have developed a large number of agricultural equipments and technologies which have led to rapid growth in agricultural mechanization in country. Dissemination of information about such technologies to farmers, manufacturers, research and extension workers and policy makers is essential for quick transfer of technology.

Mohan and Arumugam (1997) revealed that an expert system for choice of multiple crop types – CROPES for large regions in South India act as a decision support tool considering the availability of water and other resources, climate, soil characteristics and farmer related factors.

Ganesan (2002) stated that AGREX (Agricultural Expert System) is a user friendly computer based package which provide precise, up-to-date information, advises and suggestions to farmers regarding diseases and pests affecting plants and recommendations on the prevention/control measures against them, in the swiftest possible manner. AGREX consists of four modules such as FRS (Fertilizer Recommendation System), CPS (Crop Protection System), FARMWAT (Farm watering) and RICEDIAG (Rice Diagnosis).

Ganesan (2004) indicated Diagnos 4.0, a computer aided software incorporating all the modern features such as multimedia and graphics, is a decision support system for agricultural extension officers to diagnose the pests and diseases of major crops of Kerala, India and to suggest suitable control measures.

Sunil (2006) developed information and decision support system in Banana called banana technology manager. The software for the system was developed in HTML, Flash and Java. The results of the study revealed the existence of information and decision need in the areas such as cultivation, plant protection, marketing and management.

Ganesan (2007) revealed that 'CROP-9-DSS', has been designed incorporating various aspects of crop production like water and fertilizer requirement, crop protection and implement selection for the selected nine crops of Kerala.

RESOURCES AND METHODS

The present study was conducted in Kerala state in India. Designing and development of the decision support

System was exploratory in nature. Based on their extensive cultivation and commercial orientation in Kerala state rice, plantation crops like coconut, rubber, arecanut, cashew, oil palm, tea, coffee, and cocoa, fruits like mango, banana, papaya, pineapple and vegetable crops like bhendi, brinjal, snake gourd, ash gourd, bitter gourd, coccinia, amaranthus and cow pea were selected to develop decision support system. The development of decision support system "farm mechanization" was done through seven stages: a) Development of basic guidelines for presentation, b) Preparation of general outline for the content, c) Naming of the decision support system and its components, d) Preparation of information output sheets, e) Preparation of graphical elements, f) Development of page layouts and g) Development of the software component.

OBSERVATIONS AND ANALYSIS

The design and development of decision support system was done through seven stages identified based on the opinion of resource personnel and through referring various literatures. These stages include: a) Development of basic guidelines for presentation, b) Preparation of general outline for the content, c) Naming of the decision support system and its components, d) Preparation of information output sheets, e) Preparation of graphical elements, f) Development of page layouts and g) Development of the software component. For content structuring, basic guidelines were developed based on the principles like chunking, relevance, labeling, modularity, sequencing, layering and hierarchy. Similarly, principles such as balance, proportion, unity, repetitions, variety, rhythm, emphasis and contrast were used for developing an effective composition.

Farm implements and machinery used in each crops *viz.*, rice, plantation crops like coconut, rubber, arecanut, cashew, oil palm, tea, coffee, and cocoa, fruits like mango, banana, papaya, pineapple and vegetable crops like okra, brinjal, snake gourd, ash gourd, bitter gourd, coccinia, amaranthus and cow pea identified to include in decision support system were categorized based on the farm operation performed by them and in each category implements are again grouped according to the mode of operation such as manually operated, animal drawn and power operated.

A flow chart has been designed to arrange the information about farm implements and machinery of the

selected crops viz., rice, plantation crops, fruit and vegetable crops collected and compiled from different sources. Flow chart was prepared separately for each crop using the basic design to make the development of the software for decision support system easy (Fig. 1).

As the decision support system deals exclusively with the farm implements and machinery used in selected crops viz., rice, plantation crops, fruits and vegetables, the system was named as “Farm Mechanization”. Malayalam version of the Decision Support System developed for farmers was named as “*Karshika yanthravalkaranam*” which means farm mechanization in Malayalam.

Prepared information output sheets, information on farm implements and machinery was filled in sheets and photographs were attached along with it to bring more

clarity and relevance to the information. Graphical design was done with the development of various graphical elements like colour, type, illustrations etc. Contrasting colours were used against the background images in each page. Blue letters were used to label each icon. Black letters were used in white background of final information output sheets. Calibri was selected as the basic font for the Decision Support System. For the Malayalam version, font *Anjali old lipi* was used. On white background, black letters were used for general output sheet. A total of 101 photos were found needed for the Decision Support System. The collected photos were edited and affixed as *jpg* image in the respective places maintaining the right proportion.

The front page or home page which is the introduction page of the decision support system

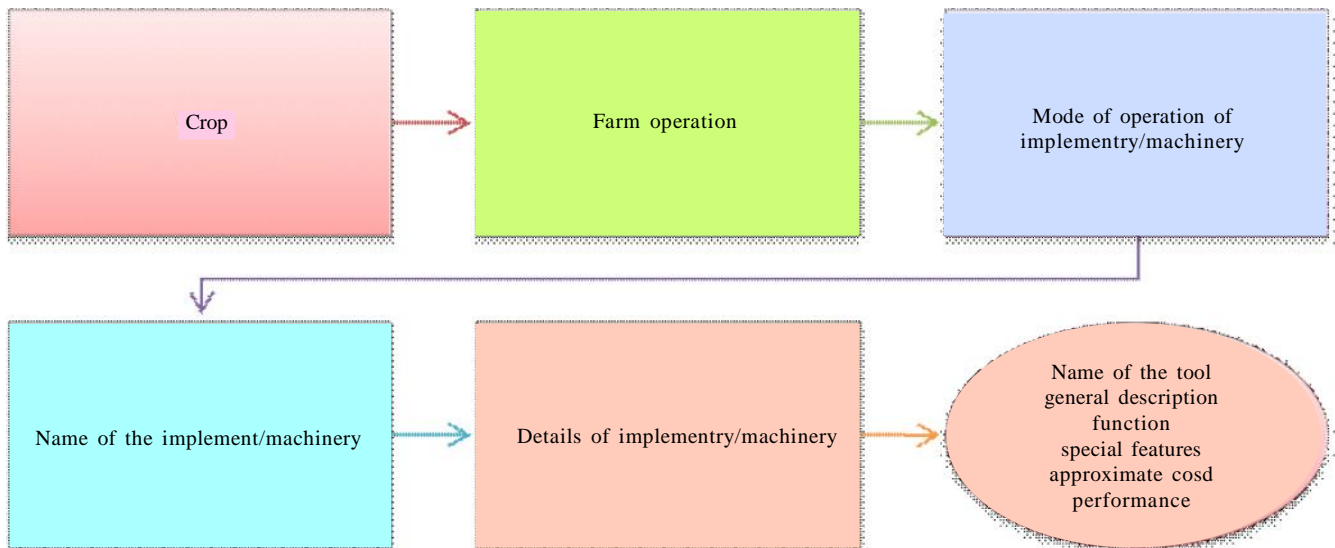


Fig. 1 : General flow chart required for Decision Support System development

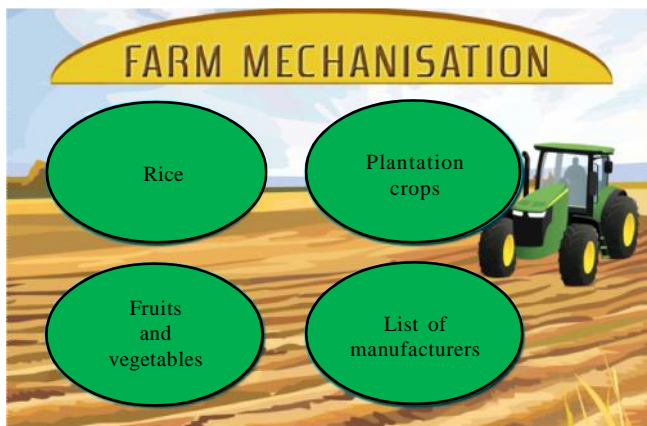


Fig. 2 : Front page or home page of the DSS



Fig. 3 : Information output sheet of coconut climbing machine

represents the four major headings through four photographic icons viz., rice, plantation crops, fruits and vegetables and list of manufacturers (Fig. 2). In successive link pages, the entire heading pertaining to each major heading will appear. From the last link page in each category which contains the list of implements or machinery in that particular category, user can reach the information output sheet (Fig. 3) which contains details about that implement or machinery. These details include general description, function, special features, approximate cost and performance of the implement. Also a link was given from this page to the list of manufacturers in the home page.

The development of the software was done in such a way so as to work in personnel computer. The user side interface layer was designed using Hyper Text Markup Language (HTML). On opening the software, the end user will be directly taken to the home page of the system. From there the user can navigate to any page inside the system through the corresponding photographic icons.

Conclusion :

A DSS of farm implements and machinery used in rice, plantation crops, fruit and vegetable crops of Kerala was developed. The design and development of decision support system was done through seven stages identified based on the opinion of resource personnel and through referring various literatures. These stages include: a) Development of basic guidelines for presentation, b) Preparation of general outline for the content, c) Naming of the decision support system and its components, d) Preparation of information output sheets, e) Preparation

of graphical elements, f) Development of page layouts and g) Development of the software component. As the decision support system deals exclusively with the farm implements and machinery used in selected crops viz., rice, plantation crops, fruits and vegetables, the system was named as “Farm Mechanization”. Malayalam version of the Decision Support System developed for farmers was named as “*Karshika yanthravalkaranam*” which means farm mechanization in Malayalam.

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