Animal Health Information System: An ICT Based Model For Information Dissemination

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ABSTRACT

Knowledge and Information are essential for people to successfully respond to the opportunities and challenges of social, economic and technological changes. But to be useful, knowledge and information must be effectively communicated to people. There are several models/methods of communication and information dissemination; however the challenge is to determine which method/ combination of methods is most appropriate. Previous studies have noted that farmer's preferences for informational delivery methods depend on a variety of demographic characteristics such as age, income, formal education, farm size etc. (Iddings & Apps, 1992). The presently used models of communication and information dissemination have number of lacunae due to which the information does not reach to the end users. Information and communication technologies (ICTs) have potential to overcome some of these lacunae and have played an important role in promoting extension and rural development during the last few decades. ICT tools such as multimedia if used with convergence of extension approaches like participatory and bottom up approach can make qualitative difference in the way we can generate, disseminate and transfer knowledge and thus contribute to development.

***Key words:** Cyber Extension; Conceptual model; Information dissemination; Information system; Expert system; Multimedia;*

The past efforts in agriculture extension or information dissemination have generally concentrated on the spread of new technologies in terms of its geographical coverage and rarely focused on gradual improvement of productivity and hence it ignored the key issues like client's needs and problems, appropriate technology development and dissemination, ensuring input supply and information services, training of farmers and extension personnel, marketing etc. The diminishing land holding, threatening food security and opportunities of liberalization demands focus on these issues and the role of ICT cannot ignored in this process. The extension information is one of the important components of extension service needed at the village level and knowledge dissemination has a pivotal role in addressing various issues. Researcher has shown that, our conventional ways of information dissemination through folder, leaflet, pamphlet, newspapers, magazines, etc are not meeting the expectations of the farmers. The extension personnel have been disseminating the technological messages to the farmers manually. This approach has not been able to reach majority of the farmers who are spread across the whole country due to scarcity of expert human resource, especially in terms of manpower. This gap remains a challenge for the Extension system even today. To reach over 110 million farmers, spread over 500 districts and over 6000 blocks is an uphill task. The diversity of agro-ecological situations adds to this challenge further. Previous studies have noted that farmers preferences for informational delivery methods depend on a variety of demographic characteristics such as age, income, formal education,

farm size etc. (*Iddings & Apps, 1992*). The role of ICT particularly TV and radio in information dissemination and rural education has been well documented. These technologies will continue to play a critical role but the new ICT offer various tools and techniques, which when used in combination can be used to overcome the limitations of conventional methods of information dissemination.

A Conceptual Model of Information System : One of the major drawbacks in past efforts for information dissemination is mainly supply driven rather than demand driven. The scientists from the research station decide the agenda, which is often based upon their limited exposure to real problems faced by farmers. The involvement of the extension personnel and farmers in the above process is limited and passive. On other hand the information need of livestock farmers varies from individual to individual. For example, information need of crossbred rearing dairy farmers may be related to only health management aspect because crossbreds are more prone to diseases. But the dairy farmers, who rears buffalo; their information need may not be the same since buffaloes are naturally resistant to common health problems. So there should be a system, which will fulfill the individual/group information needs.

There is a lot of information available on animal husbandry in text books and journals, but many times it is not given in local language and therefore cannot be useful even to literate farmers; what to speak about the illiterates. Moreover, scientific information available in such text books and journals is a mere „data‟ for the farmers and not the „information‟. Again if we look on our traditional information dissemination methods through leaflets, folder, pamphlets etc. These are also having their own limitations of not arousing the learner's interest. Can be there any method? or system? Which will convert this data into meaningful information and also hold learner's attention and interest. The information available through such system should be simple, relevant, precise and that to in local language.

Though, mass media particularly, radio and television are playing important role in information dissemination and has crossed illiteracy barrier. But still it has a weakness that, the user does not have any choice and control over it. For example, a veterinarian is giving radio talk on health management of dairy animals, but the dairy owner needs specific information on vaccination schedule of particular disease amongst the whole information and in such case, he may not want to sit and listen to the whole talk and may sometimes move away. Further if the livestock owner wants to take notes or listen to the same thing repeatedly it is not possible in such information media. So there should be facility of user's control over the information dissemination system, so he can use it as per his convenience and speed.

Further, the field level trial is essential step for the development of any technology. Therefore, such systems or method also have enough scope for testing and refining by incorporating suggestions of its end users. Finally, it should have not any distance barrier for its use. The computer based systems such as; Expert System and Information System have a great scope of incorporating such interactive features which are more users friendly.

Concept of Expert System : Expert System is a major sub discipline of the field of Artificial Intelligence. An Expert System is a computer application that guides the performance of ill structured tasks which usually require experience and specialized knowledge i.e. expertise (*Davis and Olson, 2000*).

It can partially represent human knowledge and utilize the same to solve complex problems within a specific domain. Expert system attempts to capture knowledge and experience of human expertise in order to make their expertise available on demand. It has a store of knowledge consisting of facts and rules. By promoting the right questions and then considering the users reply, it decide which element of its knowledge i.e. which facts and / rules, to use as the basis for furthering questions until a specified goal is reached. It operates in the same manner as a human expert. Using an expert system, even a non – expert can achieve performance comparable to an expert in that particular problem domain.

Concept of information System : *"An information system can be defined technically as a set of interrelated components that collect (or retrieve), process, store and distribute information to support decision making and control organization."* (*Chauhan, J. 2006*)

Fig. 1. CONCEPTUAL MODEL OF INFORMATION SYSTEM
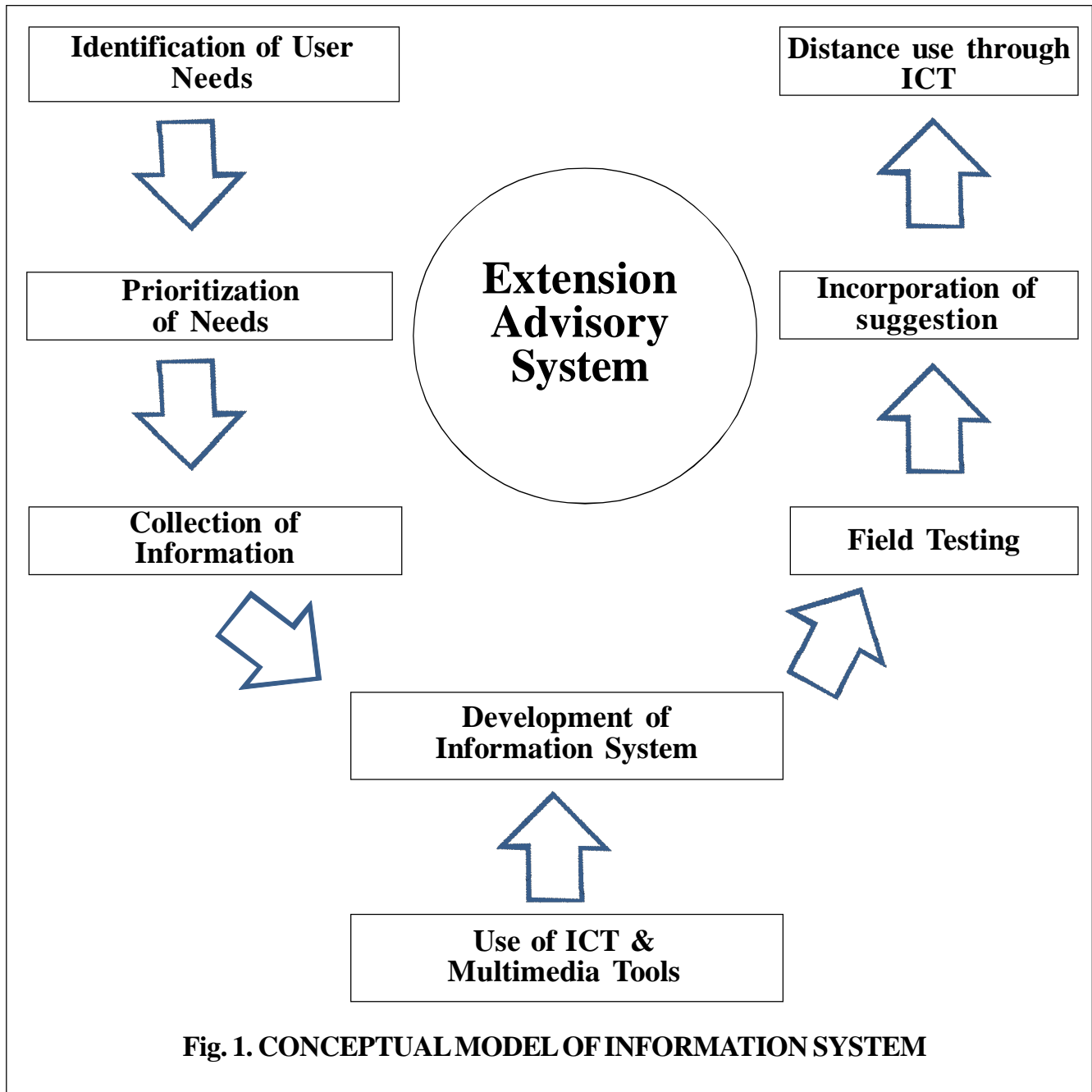
The information system helps mainly in three types of activities:

i. To present relevant the information for taking right decision in the organizations

ii. The control, implementation, analysis of any problem in the organization.

iii. To impart necessary information for producing new products.

The above activities can be distributed into three parts- Input, Processing and Output. Under the inputs; unevaluated facts, figures are collected. i.e data. Under processing, the collected data are changed into meaningful and useful information using text, graphics, and animations with the help of multimedia tools and under the output, the information is transferred to individual or where it is needed, so it may help in decisions making.

Though, both; the expert system and information system are decision support systems, but there is a major difference in terms of their role in decision making. Information system imparts the comprehensive scientific information on particular topic which will be helpful to

users for solving a problem by choosing appropriate options available in his situation. On the contrary the expert system provides the readymade solutions (may one or few) on particular problem which are suggested by the expert. Thus expert system can be considered an instance of decision support system. But still it is up to user's whether to follow or not the expert advice; as sometime it may not be feasible or difficult to follow in user's situation. For example suppose a calf is suffering from diarrhea due some parasitic infestation and expert system advise user to give particular anti-parasitic drug, which may not be available to user, while at the same time suppose information system has given a scientific information on above problem with respect to its causes, first aid and preventive measures and all possible means to combat the problem. In such case, it may be possible that, user's find information on indigenous drug (juice of *neem* leaves) which may useful to him due to its availability. Then, in such situation information system is better than the expert system.

In the field of animal husbandry we need information system rather than the expert system particularly on animal health management aspect. Animal disease management is complex task and entirely different from crop management. In case of animal diseases particularly acute diseases the role of users (livestock owner) is to identify the disease tentatively in the initial stage of disease and to take quick decision to call veterinarian, as user is not a veterinarian and not suppose to treat his animal by himself. In such situation if at all the expert system diagnosed the particular disease and advised a particular drug with respect to its dose and route of administration, then also user will not be in position to treat his animal as he doesn t have the required skill of drug administration. Further if anyhow the user manages to give the recommended drugs to his animal, still there are chances of wrong diagnosis by the expert system because a confirmative disease diagnosis can be done only through laboratory tests. So here is the need of expert or trained person (veterinarian) who can take appropriate decision by examining the animal and not the expert system which deliver experts advice but is located distantly from the user situation.

METHODOLOGY

The present research was conducted in Maharashtra state particularly in two districts namely Pune and Ahmednagar were chosen purposively, since these are the highest milk producing centers in the state. An information system entitled "Animal Health information system" (AHIS) based on above mentioned conceptual model of „information system was developed using various multimedia tools and computer language. The development process mainly included identification and prioritization of animal health information needs in the research area, collection of scientific information from reliable sources, storage, processing, classification, and display of the information using multimedia tools. It is developed in local language (Marathi) and all the information is given in the form of text along with supported by the voice backup, photographs and animations so the illiterate farmers can understand easily. A total of 60 dairy farmers were selected as respondent for assessment of effectiveness and perceived utility of AHIS in transmitting the information to the target audience through laptop computer. The applicability of AHIS was measured by following criteria i.e. Effectiveness in enhancing knowledge, Relevance and Preciseness of content, Simplicity in understanding, Visual and Audio quality, Arousal of curiosity and interest, Perceived utility, Problems in accessibility, Willingness to pay and Desired price for information system (CD).

RESULTS AND DISCUSSION

Effectiveness of AHIS in enhancing knowledge : Table 1 indicates that, 56.67 per cent respondents perceived 'Animal Health Information System' (AHIS) to be very effective in enhancing the knowledge regarding animal health management, while 43.33 per cent reported it is effective. Not a single respondent felt that, it is not effective for knowledge enhancement.

Table 1. Opinion of respondents about effectiveness of AHIS in enhancing knowledge (N=60)

Category	No.	%
Very Effective	34	56.67
Effective	26	43.33
Not Effective	0	0.00

Opinion of respondents about content of AHIS: During the data collection respondents were asked their opinion on following aspect of content of the 'Animal Health Information System' (AHIS)

It is indicated through Table 2 that, 61.67 per cent of respondents were of the opinion that the content of

Table 2. Opinion of respondents about content of AHIS (N=60)

Category	No.	%
Relevance of contents		
Appropriate	37	61.67
Relevant	21	35.00
Not Relevant	2	03.33
Preciseness of contents		
Very Precise	4	06.67
Precise	53	88.33
Not Precise	3	05.00
Simplicity of contents		
Very Simple	37	61.67
Simple	20	33.33
Difficult	3	05.00
Visual quality of contents		
Very Good	54	90.00
Good	6	10.00
Poor	0	00.00
Audio quality of contents		
Very Good	36	60.00
Good	22	36.67
Poor	3	03.33
Arousal of curiosity and interest of contents of AHIS		
Very Effective	11	18.33
Effective	49	81.67
Not Effective	0	00.00

the 'Animal Health Information System' (AHIS) is appropriate to the topic presented, followed by 35.00 per cent who said it was relevant. But only 3.33 per cent respondent felt it was not relevant to the topic, which may be due their higher knowledge level and their need for more detail information about certain aspect of the topic. *K. Keniston (2001)* reported that, the development of locally relevant content is essential; whatever the mode of communication, the need to present locally relevant information intelligibly both in terms of language and in terms of the level of explanation is imperative.

Majority of the respondents (88.33%) felt that, the content of 'Animal Health Information System' (AHIS) had been presented in a precise way, while 6.67 per cent felt itis very precise i.e not enough to understand the topic and seek more information. Similarly 5.00 per cent respondents were of opinion that, the content can be further precise.

In order to understand the subject, the content should be present in simple and common language. The respondents were asked their opinion about the simplicity of the content of 'Animal Health Information System' (AHIS). The result in table 2 shows that, 61.67 per cent of respondents felt that, it was very simple to understand and 33.33 per cent of respondent told it is simple. But only 5.00 per cent of them reported it is difficult and needs more simplification. *T. Raju (2006)* has developed, Poultry Expert System (PES) and its perceived complexity was tested among the 60 Veterinarians and Veterinary students through laptop computer. He reported PES was easy in its operation, navigation and understanding of the content through simple language, compared to traditional way of using knowledge system.

A visual appeal is necessary to hold attention and interest of the learner. About the 'Animal Health Information System' (AHIS) 90.00 per cent respondents told that, it has very good ability to hold interest and 10.00 per cent considered it is good. Not a single respondent reported that, it is not enough to hold attention. *T. Raju (2006)* reported that, user centered design of PES has ensured the users to identify themselves with the system which is developed for them only. User instructiveness of the PES satisfied the end users' basic instinct to interact, be the computer or human beings.

The content of the 'Animal Health Information System' (AHIS) is supported by the voice backup in local language (Marathi), so that even illiterate users can also understand. The respondents were asked about the audibility of voice in terms of its clarity; pitch and pronunciation. Table 2 reveals that, 60.00 per cent of respondent told the voice quality of 'Animal Health Information System' (AHIS) is very good, followed by 36.67 per cent who informed as good but still 3.33 per cent respondents reported it needs improvement.

Table 2 shows 81.67 per cent respondent reported that, 'Animal Health Information System' (AHIS) has ability to arouse curiosity and interest which is mainly due to use of animations and graphics in the system, while 18.33 per cent felt it is very effective. *Rafea et. al. (1995)* reported that, integration of multimedia tools such as graphics, images, animations, video clips, sound backup are essential component for the development of expert systems on diseases diagnosis.

Perceived utility of 'Animal Health Information System' (AHIS) : "Animal Health Information System" (AHIS) is developed with the intention to provide

information on health aspects of animal, particularly on diseases to the dairy owners, so that he can make tentative diagnosis at his level and take decision as early as possible to avoid economic losses. It also covers the topics like preventive and first aid measures on various common animal diseases and disorders. After showing the system to the respondent, their opinion was asked about the overall utility of AHIS. The result shows (Table 3) that, 85.00 per cent respondents perceived AHIS as very useful, and 15.00 per cent told it is useful to them for decision making. No one felt it as useless.

T. Raju (2006) has developed „Poultry Expert System (PES) and its perceived utility was tested among the 60 Veterinarians and Veterinary students through laptop computer. He reported that, PES was perceived more useful in taking poultry farming decisions, especially when experts are not available; result in saving of time, money and efforts.

Table 3. Opinion of respondents about perceived utility of AHIS (N=60)

Category	No.	%
Very Useful	51	85.00
Useful	9	15.00
Not Useful	0	00.00

Perceived problems in accessibility of 'Animal Health Information System' (AHIS): Dissemination of knowledge through modern communication technologies demands availability of secondary inputs such as television, video player, computers and electricity and also knowledge of handling of these electronic devices on part of users. Taking in to account the respondents were asked their perception about these problems.

Table 4 shows that, 21 .67 per cent respondents know how to operate computer and 10 per cent have computer at their home, which is obvious, hence the computer is a new technology for rural masses and to gain proficiency there will be need of formal training. However, 96.30 per cent respondents were reported that, they don t have any problem for accessing the AHIS, which is mainly due to private milk processing units and dairy cooperatives, which have huge network of milk collection centers in the villages; equipped with computers for recording of daily milk collection. Similarly most of the villages *Grampanchayat* (Local administrative unit) have computers in their offices, where respondent can access the information with help

of trained persons. Moreover this situation is favorable to overcome the problem of computer illiteracy as it is being operated by technical persons and these could be reason that, 96.30 per cent respondent reported they don t have any problem.

A *panchayat model of Gyandoot* ICT project in Madhya Pradesh *Gram Panchayat* provides the physical space, and pays for the hardware and other infrastructure and electricity costs (*C. Conroy, 2006*).

A report of task force on information kiosks emphasized, assured power supply in the villages, Right to Information and enhancing the human capital of the stakeholders should be viewed as preconditions to ensure optimal usage of the info kiosks/ knowledge centers in rural India. (*Swaminathan, 2004*)

Table 4. Opinion of respondents about accessibility of AHIS (N=60)

Opinion	No.	%
Do you know the how to operate computer?	No.	%
Yes	13	21.67
No	47	78.33
Do you have computer in your home?		
Yes	06	10.00
No	54	90.00
If no, then how you will access the AHIS?		
Grampanchyat office	16	29.63
Cooperative Society office	13	24.07
Private milk collection centers	23	42.59
Problem in accessibility	02	03.70

Willingness to pay and desired price for 'Animal Health Information System' (AHIS) : During the assessment of 'Animal Health Information System' (AHIS) respondent were asked their opinion about willingness to pay and desired price they can afford voluntarily to purchase the Compact Disk (CD) of AHIS. It was found that, all the respondents were ready to pay for the CD (Table 5) at different prices ranging Rs. 10 to 1000.

"Gyanadoot" experiences in Madhya Pradesh proved that, rural people are willing to pay for the information services, provided the services are a little more exhaustive and are beneficial to them. *(http://www.dgroups.org).*

It was observed that, prices offered by the dairy owners were associated with their income from dairy farming. Considering this point respondents were asked about their opinion for desired price for CD.

Ahuja et. al. (2003) pointed out that, the demand for veterinary services depends on the price of milk, the price of veterinary care, household income, and the herd size.

Table 5. Opinion of respondents about willingness to pay & desired price for AHIS (N=60)

Category	No.	%
Yes	60	100.00
No	00	00.00
Rs. 10 to 50	38	63.33
Rs. 100 to 500	18	30.00
Rs. 500 to 1000	04	06.67

Table 5 clearly bring to light that, the respondent having income up to 2.5 lakh/ year were ready to pay Rs. 10- 50 per CD, and it was observed that, most of respondent (63.33%) fell in this category. while an income group of respondent between 2.5 lakh – 5.00 lakh was offered Rs. 50- 500, who were 30.00 per cent of the total respondent. It was also noted that, some of the respondents (6.67%), who were earning more than 5 lakh rupees from dairy business were willing to pay Rs. 500-1000 for 'Animal Health Information System' (AHIS).

During the evaluation of 'Animal Health Information System' (AHIS) some of the respondent suggested that, village dairy cooperatives should make available such information to them as inputs. Hence the enquiry was made to see the feasibility of suggestion of respondent and it was found that, 2 dairy cooperatives were ready to provide information through their extension network and offered price between Rs. 2000 to 3000 for 'Animal Health Information System' (AHIS).

CONCLUSION

The present study was undertaken with objective to develop of need based interactive Animal Health Information System (AHIS) for dairy owners and to evaluate its perceived utility. Majority of respondent expressed their opinion that, the content of AHIS is appropriate, precise and simple to understand. They felt it will be very useful and effective in dissemination of information. Though only 21 .67 % respondent knows how to operate computer and 10 % have computer at their home, However, 96.30 per cent respondents were reported that, they don't have any problem for accessing the AHIS, which is mainly due to private milk processing units who provide computers at their milk collection center in villages. Similarly it was found that, most of the villages Grampanchayat and dairy cooperatives have computers in their offices, where respondent can access the information with help of trained persons. In fact this is the way to take cyber extension at the door step of farmers. It can be concluded from the study that, the demand driven approach of development of information content in form of computer based interactive information system will be the most convenient, cheapest and effective future mode of information dissemination. The multi-media tools of ICTs possess high capabilities for presentation of information particularly on diseases in formats that are more appropriate and meaningful to end users (farmers). But the help of grass root level agencies like Grampanchyat and dairy cooperatives to ensure secondary inputs viz. computers, power supply and human resources will play a big role in popularity of the cyber extension.

Information and communication technology (ICT) can be used for empowering people through information and therefore it must be disseminated in a manner that best facilitates its reception. ICT tools such as multimedia if used with convergence of extension approaches like participatory and bottom up approach can make qualitative difference in the way we can generate, disseminate and transfer knowledge and thus contribute to development.

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