



An information technology enabled animal health information system (AHIS) : Perceptions of dairy owners

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ABSTRACT

Public sector extension is being criticized for not being relevant, ineffective, time consuming and expensive. Similarly information dissemination through folders, leaflets, pamphlets, newspapers etc. have challenge of illiteracy and don't have much scope for inclusion of interactivity, so fails to develop interest for active involvement of the users in learning process. On other side, continuing rapid development of telecommunications and computer-based information technology seems to provide a promising solution for delivering of extension services. It can be utilized effectively to fulfill the "Information needs" through computer based "Information System Software's", which have much scope for inclusion of interactivity, user's control and could become readily accessible at village level agencies. "Animal Health Information System" (AHIS); is one such need based, interactive software developed for dairy owners, using various multimedia tools and JAVA language. The field testing of AHIS revealed that it has greater perceived utility and effectiveness in transmitting the information. The study concludes that, IT enabled Information Systems can be utilized for faster dissemination of expert advice in multiple locations by using the infrastructure of grass root level village agencies.

Key words: Animal Health Information System (AHIS), Information systems, Multimedia, Marathi, Perceived utility, Simplicity, Preciseness

The agricultural extension system has been traditionally funded, managed and delivered by the public sector in India. However, it suffered a series of attacks beginning from 1980's when government and economists began to express concern with the cost of public extension. Subsequently the expenditure on public extension system began to decline. Further, public sector extension is being criticized for not being relevant, ineffective, time consuming and expensive. (Chauhan 2006). The conventional methods of information dissemination through folders, leaflets, pamphlets, newspapers etc. don't have much scope for interactivity, so fails to develop interest for active involvement of the users. Again if we consider illiteracy in India, then almost, 25% of male and 50% of female are illiterate (as per 2001 census), so these conventional methods are not useful. Though, mass media particularly radio and television are playing important role in information dissemination and have also crossed the barrier of illiteracy. But one of the major drawbacks of

mass media is, the user does not have any choice and control. On other side continuing rapid development of telecommunications and computer-based information technology has brought enormous changes in the service delivery of many sectors like banking, transportation, commerce etc. and much has been said about the potential use of ICT by government agencies to transform relations with rural masses. Any ICT intervention that improves livelihood of poor rural families is likely to have significant impacts (direct and indirect) on enhancing production, marketing and post-harvest activities – which, in turn, can contribute further to poverty reduction (2006). Though there are many possibilities for the potential application of the ICT in livestock sector, but one promising way of utilization of ICT in animal husbandry extension is addressing the "Information Needs" of the livestock owners through developing computer based – "Information System Softwares". 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 2006). The present study was undertaken with the objective to develop such computer based information system called Animal Health Information System (AHIS) for dairy owners and to

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explore the scope of use of AHIS by field level testing. AHIS has been developed using multimedia tools and JAVA language and have capability to overcome the problems of our traditional information dissemination system. It provides scientific information on animal health management particularly diseases in the form of text in local language supported by audio backup, photographs and animations. It attempts to address four dimensions of cattle diseases i.e. What is it?, Symptoms, What to do ? and Prevention in simple manner so the illiterate farmers can also understand easily and help them for timely decision making. It can be made available at villages Grampanchayat offices, milk collection centers and dairy cooperative, where computers are available and information can be accessed with the help of trained persons; also it can be circulated through online portals.

MATERIALS AND METHODS

The present research was conducted in Maharashtra state. Two districts namely Pune and Ahmednagar were chosen purposively, since these are the highest milk producing centers in the state. The research was carried out in four steps i.e. (a) Pilot study for identification of information needs of respondent on dairy farming, (b) Assessment of specific information needs on animal health management, (c) Development of need based “Animal Health Information System” (AHIS), and (d) assessment of effectiveness and perceived utility of AHIS among the dairy owners. A pilot study was undertaken, where 40 respondents were interviewed, which; revealed that “Animal Health Management” was most important aspect in dairy farming on which dairy owners need information. For the assessment of specific information needs on animal health management a random sampling procedure was followed for the selection of respondent. From each district, two blocks were selected, further from each block two villages were selected and finally from each village 15 dairy owners were selected randomly. A total of 120 respondents were interviewed and the responses was recorded on three point continuum i.e. needed, most needed and least needed. Finally for the development of AHIS, diseases and disorders under “Most Needed” category was considered. An interactive “Animal Health Information System” (AHIS) has been developed using various multimedia tools such as Adobe Photoshop, Adobe Illustrator, Coral Draw, Adobe Soundbooth CS5 and Flash. The programming was done in JAVA 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 two languages mainly English (Universal language) and Marathi (local language). All the information is given in the form of text in local language (Marathi) and supported by the voice backup, photographs and animations

so the illiterate farmers can understand easily. It is compatible to all operating systems such as, Windows- 98, Microsoft XP- 2000, 2003, 2005, 2007, Windows- Vista and Linux and can be run in any version of flash media player, and even with some modification it will be compatible to multimedia mobile phone also. The information system so developed was demonstrated to 60 respondents, out of 120, by the investigator through a laptop computer for evaluation of its perceived utility and effectiveness in transmitting the information. 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 AHIS

RESULTS AND DISCUSSION

Socio-personal profile of the respondents: Socio-personal profile of the 120 respondents who were selected for the assessment of specific information needs on animal health management reveals that majority (64.17%) of the respondents belonged to middle age group having agriculture as main occupation and dairy farming as subsidiary occupation in both districts. Most (35.83%) of them had at least primary education, followed by high schooling (33.33%). Among the milch animals, crossbred was found most popular species in Pune district, since about 62.28% respondents had at least 10 crossbred animals, while in Ahmednagar district 52.73% respondent's reared buffaloes as a dairy animal. Regarding milk productivity, 78.08% respondent reported it between 2000–3000 liter per lactation in crossbred cattle, while 70.91% respondent stated, it 1000–2000 liter per lactation for buffalo in both districts. About information source utilization mass media sources like television and radio (100.00%) were popular, followed by newspaper (21.67%) while among the interpersonal sources veterinarians (100%) were found the prime source of information, followed by milk cooperatives (95.83%) and private business firms (59.17%) mainly milk processing units in both districts. Majority of respondent (59.17) were earning up to ₹ 2.5 lakh annually from sale of milk.

Assessment of information needs on animal health management aspect: It was observed in study area that the information needs on cattle diseases and disorders particularly, mastitis, babesiosis, milk fever, theileriosis and ketosis were very common, which is attributed to large population of crossbreds in study area particularly in Pune district. Moreover, the information demand on reproductive disorders like Anoestrous, Repeat Breeding and Retention of Placenta was found common in Ahmednagar district due to more buffalo population. Similarly, the diseases like Foot & Mouth disease, Hemorrhagic Septicemia, Anthrax and Black Quarter are worldwide problems in cattle herds and the study area also reflecting similar picture. Bloat and

Tetanus occur very commonly in field condition due to various reasons and sometimes may be fatal to the animals; therefore dairy owners were interested to know about the disease.

Assessment of perceived utility of “Animal Health Information System” (AHIS): AHIS was demonstrated to the dairy owners through laptop computers for evaluation of its perceived utility and effectiveness in transmitting the information.

Effectiveness of AHIS in enhancing knowledge: Among the 60 respondents, 56.67% perceived AHIS to be very effective in enhancing the knowledge regarding animal health management, while 43.33% reported it as effective. Not a single respondent felt that, it is not effective for knowledge enhancement.

Opinion of respondents about the attributes of AHIS

Relevance: The AHIS content was evaluated for its relevance to identified information needs of respondents. It was noted that, 61.67% of respondents were of the opinion that the content of the AHIS is appropriate to the topic presented, followed by 35.00% who said it was relevant. But only 3.33% respondent felt it was not relevant to the topic, which may be due their higher knowledge level and their need for more details information about certain aspects of the topic. 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 (Keniston 2001). Dissemination of the content on a package of practices, recommendations, locally relevant technologies, weather information, etc. through ICT is more effective for information dissemination (Kameswari 2011).

Preciseness: Preciseness is one of the important characteristics of extension information content. The opinion regarding preciseness of AHIS revealed that 88.33% of respondents felt that the content of AHIS had been presented in a precise way, while 6.67% felt it not too precise i.e not enough to understand the topic and need more information. Similarly 5.00% respondents were of opinion that, the content can be further precised.

Simplicity: 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 AHIS. The result shows that 61.67% of respondents felt, it was very simple to understand and 33.33% of respondent told it as simple. But only 5.00% of them reported it is difficult and need more simplification. 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.

Visual quality: A visual appeal is necessary to hold attention and interest of the learner. About AHIS, 90.00% respondents told that it has very good ability to hold interest and 10.00% considered it good. Not a single respondent reported that, it is not enough to hold attention. 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 interactiveness of the PES satisfied the end users’ basic instinct to interact, be the computer or human beings.

Audio quality: The content of the 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. It was found that 60.00% of the respondent told the voice quality of AHIS is very good, followed by 36.67% who informed as good but still 3.33% respondents reported it needs improvement.

Ability to arouse curiosity and interest: One of the principle involved in interactive learning is arousal of curiosity of learner, which stimulates learning process. AHIS was assessed for the same attribute, 81.67% respondent reported that AHIS has ability to arouse curiosity and interest which is mainly due to use of animations and graphics in the system, while 18.33% felt it is very effective. 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 (Rafea *et al.* 1995).

Perceived utility of AHIS: AHIS is developed for dairy owners with such features so they can understand easily. Therefore it will educate them mainly on tentative diagnosis of animal diseases at their level. This will ultimately help farmers to take decision such as application of first- aid measures and to call veterinarian immediately in case of acute diseases. Which, will ultimately result in saving on economic losses. It also covers the topics like preventive measures on various common animal diseases and disorders. After showing the system to the respondent through laptop computer, their opinion was asked about the overall utility of AHIS. The result shows that 85.00% of respondents perceived AHIS as very useful, and 15.00% told it is useful to them for decision making. No one felt it as useless. The similar system i.e. ‘Poultry Expert System’ (PES) was developed and tested by Raju (2006) reported that, PES was perceived more useful in taking poultry farming decisions, especially when experts are not available; results in saving of time, money and efforts.

Perceived problems in accessibility of 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 the part of users. Taking this into account the respondents were

asked their perception about these problems which revealed that 21.67% respondents knew how to operate computer and 10% had computer at 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% respondents reported that they do not 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 daily milk collection. Similarly most of the villages Grampanchayat (local administrative unit) have computers in their offices, where respondents can access the information with the help of trained persons. Moreover this situation is favourable to overcome the problem of computer illiteracy as it is being operated by technical persons and this could be the reason that 96.30% respondent reported they don't have any problem. A panchayat model of Gyandoot ICT project in Madhya Pradesh Grampanchayat provides the physical space, and pays for the hardware and other infrastructure and electricity costs (Czech 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)

Willingness to pay and desired price for AHIS: During the assessment of 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 at different prices ranging ₹10 to 1000. 'Gyanadoot' experiences in Madhya Pradesh proved that rural people are willing to pay for information services, provided the services are a little more exhaustive and are beneficial to them (Sasidhar 2006). 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. The demand for veterinary services depends on the price of milk, the price of veterinary care, household income and the herd size (Ahuja *et al.* 2003).

It was found that, the respondents having income up to 2.5 lakh/year were ready to pay ₹10–50/CD, and it was observed that most of respondents (63.33%) fell in this category. while an income group of respondents between 2.5 lakh and 5.00 lakh offered ₹50–500, who were 30.00% of the total respondents. 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 ₹500–1000 for AHIS. During the evaluation of 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

respondents and it was found that two dairy cooperatives were ready to provide information through their extension network and offered price between ₹2000 to 3000 for AHIS.

Conclusion and policy implications

Present study was undertaken with the objective to develop need based interactive Animal Health Information System (AHIS) for dairy owners and to evaluate its perceived utility. Majority of respondents 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 the know how to operate computer and 10% have computer at their home. However, 96.30% respondents were reported that, they do not have any problem for accessing the AHIS, which is mainly due to private milk processing units who provide computers at the milk collection center in villages. Similarly it was found that most of the villages Grampanchayat and dairy cooperatives have computers in their offices, where respondents can access the information with the help of trained persons. Though a silent revolution is taking place in the communication systems of rural India and farmers are browsing the net for getting general, technical and marketing information from the information kiosks and village knowledge centers, set up by a number of pioneers across the country. About 10,000 knowledge centers are in function in India, out of which 5,000 are managed by ITC Ltd. By adding 7 new E-*Chaupals* a day, ITC plans to scale up to 20,000 E-*Chaupals* by 2010 covering 100,000 villages in 15 states, serving 25 million farmers. (<http://www.dgroups.org>) Nearly fifty grassroots ICT's projects are functioning for rural development in India. Similarly, the Government of India has already put "IT Policy" in place and almost all the states have developed "IT Strategy" to establish village knowledge centre based on broadband internet connectivity in each of the 600,000 villages across India. These centers are supposed to disseminate relevant information relating to agriculture, animal husbandry, fisheries, health, education, rural enterprises and disaster management. But the big challenge is cost of "last mile connectivity" and time required for wiring these villages. The present research has shown utility of need based, location specific approach of development of information contents in the form of interactive computer based software's for dissemination of information by using the existing infrastructure of villages Grampanchayat offices, dairy cooperatives and private milk collection centers. The policy makers should emphasize to strengthen such grass root level agencies by ensuring secondary inputs viz. computers, power supply and human resources, which will ultimately play abig role in reaching cyber extension at farmers doorstep.

REFERENCES

Ahuja V, Dina U D and Cees D H. 2003. Market structure and the

- demand for veterinary services in India. *Agricultural Economics* **29**: 27–42.
- Chauhan J. 2006. *Communication and Extension Management*. 1st edn. Anjali Prakashan, Kanpur (UP), India **9 (1)**: 1–3.
- Czech C. 2006. Telecentre initiatives in rural India: Failed fad or the way forward? Working Paper 4. available at: <http://india.is-watch.net/node/1085>
- ICTs – Transforming Agricultural Extension? 2006. Report of the 6th Consultative Expert Meeting of CTA's Observatory on ICTs Published by: The ACP-EU Technical Centre for Agricultural and Rural Cooperation (CTA) Available at http://www.anancy.net/documents/file_en/WD8034.pdf
- Kameswari V L V. 2011. ICTs for agricultural extension: a study in the Indian Himalayan region. *Electronic Journal of Information Systems in Developing Countries* **48(3)** 1–12
- Keniston K. 2002. Grassroots ICT projects in India: Some preliminary hypotheses. *ASCI Journal of Management*, **31(1)**. Available at http://web.mit.edu/~kken/Public/PDF/ASCI_Journal_Intro__ASCI_version_.pdf
- Rafea A, Azhari S and Hassan E. 1995. Integrating multimedia with expert systems for crop production management. Proceedings of the second international IFAC workshop on artificial intelligence in agriculture, Wageningen, Netherlands. Available at http://www.arc.sci.eg/NARIMS_upload/CLAESFILES/3679.pdf
- Sasidhar P V K and Sharma V P. 2006. Cyber livestock outreach services in India: a model framework. *Livestock Research for Rural Development*, **18 (1)** Available at <http://www.lrrd.org/lrrd18/1/sasi18002.htm>
- Swaminathan M S. 2004. Information kiosks in every village by 2007: Myth or reality. A vision document of Task Force on info kiosks in May 2004. available at http://www.mission2007.in/files/Information_Kiosks_in_every_village_by_2007.pdf
- Raju T and Sudhakar R B. 2006. An information technology enabled poultry expert system: Perceptions of veterinarians and veterinary students. *International Journal of Education and Development using Information and Communication Technology* **2(2)**: 100–107. Available at <http://www.dgroups.org>