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Role of information and communication technology (ICT) in livestock development in rural India

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Abstract
Information and communication technology (ICTs) have played a critical role in society's growth. India has been experimenting with expanding the scope of ICTs to rural areas in order to bring growth to these areas for many years. A variety of projects are currently in the works. ICTs have immense capacity for retaining and spreading aboriginal wisdom, which can increase people's prospects and serve as a significant source of empowerment, especially for the socially and economically vulnerable. The proliferation of knowledge and technology, as well as access to electronic media, has opened up new possibilities for information production and distribution. The role of ICT in developing livestock science, education, and extension to improve the quality of life of poor livestock farmers in rural areas is well known. ICT can assist a traditional Indian farmer in collecting pertinent knowledge about livestock processing and management technology, animal husbandry systems, animal health care and treatment, animal insurance, consumer support, and livestock finance and management. Livestock extension programs are largely relying on ICT to deliver relevant and location-specific technology to farmers in order to provide prompt and knowledgeable advice. Not only can ICT be used to establish cyber livestock extension, but it can also be used to extend the livestock science and education infrastructure.

Keywords: ICTs, livestock science, animal health care and treatment

Introduction

In India, livestock is an important part of the agriculture production system, as well as the national economy and the socioeconomic growth of millions of rural households. India's livestock sector has seen substantial growth in production and productivity, accounting for 57% of world buffaloes, 16.5 percent sheep, and 16.2% goats and 5% poultry [1]. Globalization and growing competition have accelerated the need for knowledge intensive work performance in all the sectors of economy. One of the most important inputs in agricultural technology transfer is the rapid distribution of technical knowledge from the Agricultural Research System to farmers in the region, as well as the reporting of farmers' feedback to the research system.

Information and communication technology (ICT) has arisen as a ray of light, with a huge effect on meeting particular social and economic growth targets in national societies, with facilitators filling the passenger seats [2]. Communication consists of electronic and automated means of recording, encoding, exchanging, saving, and extracting information for broadcasting through radio and televisions, delivery of speech data and photographs via telephones, faxes, e-mail, and internet via fixed wireless and satellite networks [3]. The National Agriculture Policy has also emphasized on the use of Information Technology (IT) to achieve a rapid development of agriculture in India. In pursuance thereof, the Department of Agriculture and Cooperation (DAC) is in the process of preparing a National e-Governance Plan in Agriculture (NeGP-A) for a more focused implementation of e-governance activities in agriculture sector and efforts are being made at various levels to improve the information communication infrastructure in India. India leads the region in the number of ICT and internet-enabled projects for rural areas, accounting for 57% of all Asian projects. Rural India began using ICT in the late 1990s as a pilot project to link rural communities to the internet. In India, the number of internet connections has exceeded 10 million, and the number of mobile connections has surpassed 100 million [4].

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The National Institute of Rural Development (NIRD) in Hyderabad has established 61 ICT projects that are primarily focused on agricultural production across India, with a few of these projects also integrating livestock development. These programs are either geographically confined to particular regions or have a high success rate of reaching out to individuals at all stages of the social pyramid [5]. Development networking and mass media, such as radio and print media, have long been a part of the extension framework, but they have gained inadequate coverage and remain underutilized. Access to vital knowledge in an understandable format for timely decision-making remains a challenge for the rural community. The bridging of digital divide is able to solve the problem of rural poverty, inequality and giving an opportunity to bridge the gap between the information rich and information poor and support sustainable development in rural livestock sector. But the challenges are not only to improve the accessibility of communication technology to the rural population but also to improve its relevance to local development [6].

The development of an e-extension framework to establish a reliable database in respect of livestock products and productivity, increasing the implementation of technical interventions for higher production, and rapid genetic upgradation of livestock enhancement in the supply of inputs and services to farmers are all crucial areas in the livestock farming field [7].

Several research studies conducted on extension organization have revealed that the delivery of goods or information is effective when the grass root extension covers a small area of jurisdiction with multiple purposes. The effectiveness of many existing ICT-based programmes however, is limited due to several factors including biasness in provision of information toward smallholders most in need, providing one-way information and denying opportunities for input or feedback, lack of formal evaluation of programme design quality, extent of adoption, impact, outcomes, costs and benefits and lack of funds, infrastructure, educational and technological expertise in designing, delivering and evaluating the ICT-based programmes

Documentation of ICT initiatives
According to Ghosh (2001) [6], the use of information and communication technology has begun in the distribution of services in rural India, including milk collection by dairy cooperatives (NDDB), the M S Swaminathan Research Foundation's Information Village Awareness Project, and the IIM Ahemadabad's Honey Bee Knowledge Network. According to Maru (2003) [8], Asia has 37% ICT enabled projects, Africa has 29%, Latin America has 17%, and the rest of the world has 17% ICT enabled projects. In Asia, India had the most ICT ventures (57 percent), led by Pakistan (4 percent), Thailand (4 percent), Malaysia (4 percent), and China (3 percent).
According to Sharma and Rao (2005) [9], the Warna Wired project started as a cooperative movement with the simple aim of using information technology as a medium for growth and bringing government to the doorsteps of village farmers. Milk sourcing, which had been difficult prior to the project's inception, became easy, and cooperative dairies started selling goods online, with milk collection centers being converted to cyber cafes.

Knowledge and communication infrastructure efficiency
When reviewing the internet for agricultural extension, Gelb

and Bonati (1997) [10] acknowledged some of its advantages, including the availability of up-to-date and detailed information, the availability of new forms, similar and competing information resources, one-stop information shopping, ease of information sharing, and better collaboration or access to mentors, other growers, and experts. ICT helps people to communicate effectively, overcomes the limitations of time and space, empowers people by providing information and knowledge, provides income generating and learning opportunities, increases government transparency and efficiency and enables people to express their concerns and to actively participate in decision making processes. Since computerization, there was an increase in the distribution of information relating to past milk prices, milk production, farmer preparation, and the number and type of cattle owned. With the implementation of IT, the milk union was able to offer loans to farmers for the purchase of animals within a week.

The timely distribution of information by payment slips was found to have a substantial effect on milk producers' empowerment. During each farmer's visit to the society, data on feeding, breeding, management, and health care were also given to keep each farmer's awareness and service delivery up to date. Milk producers viewed the information gathered from the website as extremely accurate. People and social order were transformed as a result of computer-based new knowledge, which was used to monitor organisation at the societal level. An individual milk producer was able to sustain loan monitoring, financial forecasts, and information management thanks to computerization and the resulting smart card and information through the internet. Dairy farmers were given trainings on computer operation, milk inspection, and clean milk production 2-3 times a month, which were found to have a major effect on milk producers' empowerment. A good use of IT in the dairy cooperative society was observed as an important part of a training program organized using IT that helped to transform the skill, expertise, and attitude of milk producers [11].

ICT aims to enhance agricultural science by providing for the electronic transfer and exchanging of research data and knowledge at a global level, as well as managing agricultural research more efficiently and effectively. Improved agricultural research helps in the rapid advancement of agricultural production, which benefits the farmer [12]. Among the numerous means for knowledge communication available, Chauhan (2010) [13] found satellite-based internet communication to be very effective, reliable, fast, and somewhat cheaper in the field of disseminating information from research systems to farmers. Online contact has entered nearly all of our country's districts, primarily at the village level. Internet offered a means for bridging the gap between developmental professional, rural people and agricultural producers through the initiation of interaction and dialogue.

By addressing their information needs, information communication technology (ICT) has enabled much-needed group empowerment and growth. ICT is also a vital enabler in study operations, helping researchers to perform projects more easily, accurately, and effectively. It has as much scope for agricultural production as any other field in India [14].

Knowledge criteria viewed by technology users
According to Meera et al. (2004a) [15], the majority of farmers in the Gyandoot ICT project considered market knowledge, land record facilitation, question-answer facilities, and information regarding rural development initiatives as the

most relevant and basic needs. Farmers perceived question answer services as most important information need whereas farmers from private initiative i.e. iKisan ICT project in Nagarjuna district of Andhra Pradesh perceived early warning system, information on rural development programs, question answer services and planning of best practices as the most essential and important information needs. They further reported that agricultural farmers had high involvement in goal commitment in both Gyandoot and Warana project in which about 60 per cent of farmers had a middle level of commitment and 37.5 per cent were highly committed. In *iKisan* project, about 87.50 per cent farmers had a medium level of commitment and only 7.5 per cent were highly committed. According to Sharma and Rao (2005) [9], the bulk of farmers' questions were about agricultural product market prices (60 percent), weather details (13 percent), cropping and soil monitoring activities (8%), and the rest were about health and education. A farmer's average time spent on a single question was about 15-20 minutes. Most of the farmers (81%) were satisfied with the answer provided by Village Knowledge Centre and majority of them desired to have more services on agriculture information, market rates and online crop advices.

According to Narula (2010) [16], the majority of farmers claim that knowledge about agri-inputs is the most significant need, followed by agriculture development, demand and supply chain, and government schemes. Around 40% of farmers said that information on agricultural inputs is highly important, while another 30% said it is a vital information requirement. Around 80% of farmers classified these as highly significant among production-related needs. Animal husbandry needs, on the other hand, were found to be important (50.00%) and most important (20.00%) among farmers. The most important knowledge was weather and climate, followed by animal husbandry, as revealed by the respondents.

Livestock market, rivalry among numerous ICT service providers
The predictive assertion of the e-business climate attribute of e-readiness was considered less relevant by the experts in the panel and earned consensus in the Delphi technique's final third round. The statement's estimates indicate that realization will rise from 5% in the next five years to 15% in 2020, with a limit of 25% by the end of 2025. The continuous growth of livestock economy realizes the importance of livestock sector in national GDP to policy makers that would be enabled to formulate the livestock development based policy and programmes for the best use of ICT in livestock sector. Moreover, the use of ICT in livestock sector is in its early stage which would require at least two to three decades more for occur the increased number of service providers and competition among them to provide information service to livestock farming community.

Conclusion
ICT programs in livestock production have expanded in number as a distinct agency for the dairy and livestock industry as a whole, where livestock extension programs are geared up through ICT initiatives that support the agricultural population. The successful implementation of information and communication technology projects by state, corporate, cooperative, and non-governmental organisations revolutionized animal husbandry and veterinary services, enhancing the overall life of the livestock farming population by social and economic gains, and enabling the livestock industry in India to share the profits. In terms of frequency of use, the increased demand for current information services was found to be more for agriculture, followed by livestock information in aAQUA, although very little use of dairy information services resulted in the Warana Wired Village project, also at no cost.

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