

Use of ICT Tools and Mobile Applications for Bio-security Awareness among Farmers in Assam

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Abstract

Bio-security is increasingly significant in livestock sector of Assam. Traditional livestock rearing systems in Assam, including backyard poultry, smallholder dairy farms and open grazing (khuti) based on buffalo, are still at risk for bio-security because of regular outbreaks of diseases, yearly flooding, and limited access to veterinarians. Modern technologies such as AI chat bots, social media, Smartphone apps, SMS, and Interactive Voice Response (IVR), provides effective ways for the Assamese farmers to cope with regular and beneficial updates on suitable bio-security measures for their farms. Information and communication technologies (ICTs) and mobile applications have emerged as efficient tools for educating farmers, disseminating information, also promoting the implementation of preventive measures. These digital platforms aim to mitigate risk, empower the farming community, and encourage sustainable agricultural growth by bridging the knowledge gap. This article highlights challenges such digital literacy, connectivity challenges, and gender inequality while emphasizing mobile-based guidance platforms, community radio, interactive voice response (IVR), and social media as beneficial platforms.

Keywords: Bio-security, ICT, mobile applications, livestock health, farmer awareness, backyard poultry, flood resilience

Introduction

Assam's livestock sector with dairy, poultry, piggery, goatery and buffalo (in the form of Khuti herding) serving as major livelihood sources and contributes extensively to the rural livelihoods. Assam, with over 70% of its population reliant on agriculture and livestock rearing activities as their daily sources of income. These livestock species extensively face relentless bio-security challenges. Bio-security has emerged as an essential constituent of modern farming systems, especially in the livestock and poultry sectors, where the risks of disease outbreaks pose severe threats to animal health, farm productivity, and farmer livelihoods. In states like Assam, farmers are highly susceptible to a variety of infectious diseases because of the factors such as inadequate

disease surveillance, limited access to veterinary services and a lack of awareness about preventive measures to be taken during the time of diseases. The conditions are worsened by yearly occurring floods in the rivers (Brahmaputra, Barak and its tributaries) and porous geographical borders of the state. Different diseases like Foot and Mouth disease, Hemorrhagic septicemia, Avian Influenza, African and classical Swine Fever are very prevalent in Assam due to the lack of knowledge about bio-security among the farmers. Traditional extension service systems struggle to reach the livestock farmers due to the shortage of manpower, geographical barriers, and resource constraints (Saravanan, 2010). In this regard, knowledge about bio-security measures and practices at the grass root level are very important and this being strengthened by the use of Information and Communication Technology (ICT) technologies. ICT comprises of a wide range of digital tools and platforms that encourage real-time communication, rapid dissemination of the information and sharing of scientific knowledge. Some of the examples such as web portals, social media platforms, SMS services, mobile applications and decision-support systems (Sife *et. al.*, 2010). These ICT tools are helping the livestock farmers to become more knowledgeable about science and bio-security measures through providing them with facilities like instant announcements, advisory services and instructional training modules on prevention of transmissible diseases and hygiene measures to be taken in the farms (Barman *et.al*, 2023). This is becoming possible because of the rapid expansion in Smartphone connectivity and dissemination of the internet services across the rural regions of the state. For instance, instant emergency alerts can be sent to the farmers in case of any disease outbreak in a particular area through messaging services while interactive voice response systems as well as WhatsApp groups permit farmers to access advices from the experts and share experiences within the farmer communities. In Assam, these ICT tools are particularly relevant for flood-prone areas where rapid dissemination of bio-security measures is vital for the farmers. The different ICT tools can help in delivering I formation about the

treatment, vaccination, disease prevention and sanitation, quarantine practices. Moreover, awareness initiatives through ICT can encourage participatory learning, where farmers not only receive information from different sources but also engage in collective discussions, which can enhance the rate of adoption of bio-security measures in the livestock farms (Lele *et al.*, 2010). The traditional constraints of distance, illiteracy, and lack of infrastructure have been effectively resolved through the incorporation of ICT in extension services, boosting the accessibility as well as affordability of bio-security education. Thus, the application of ICT tools represents a transformative approach to safeguard health of the animals as well as farming community of the rural livelihoods. By providing farmers the right information at the right time, these digital technologies can contribute significantly to a sustainable livestock production, reduced risks of diseases and improved health of the people.

Importance of ICT Tools in Bio-Security Awareness

ICT tools serve as a critical component in bridging the gap between the scientific farming techniques and traditional livestock farming practices of the farmers. Some of the advantages are

Timely information delivery: through the use of ICT tools, the farmers can get the information related to the farms very quickly and in efficient manner. Moreover, it is easier and convenient for the extension services and people associated with veterinary field to disseminate information about the disease outbreak alerts, information about the vaccination schedules and hygiene practices to be followed in the farms in day-to-day activities (ICT handout, MANAGE 2015).

Localized content: digital ICT tools as well as community radio stations can deliver the relevant information about bio-security or other farm activities in the local language of that area. Like in Assamese, Bengali, Bodo and other regional languages spoken in Assam. This will ensure the adaptation of the required information in an efficient manner (ICT handout, MANAGE 2015).

Inclusivity: through ICT tools like SMS and IVR, the AI assistant, community radio platforms, the information can be accessed by the non-Smartphone users which are critical in the time of a disease outbreak. Again, after a particular time period, these ICT based systems can reach to a larger number of audiences with a minimal operational cost. The multimedia content like videos, audio-dramas, interactive sessions with farmers through questions help the farmers to better understand the bio-security measures and adopt it (ICT handout, MANAGE 2015).

Overall health of animals: Assam is endemic to various diseases like FMD, Brucellosis, Avian Influenza, ASF, CSF

and several parasitic infections that lead to huge amount of economic losses every year. Assam is again a flood prone area. Annual flood from Brahmaputra and Barak rivers displace large numbers of animals, contaminate the water resources and increase the chances of occurrence of vector-borne diseases. Assam also has a high density of backyard poultry and piggery farming system where proper bio-security measures are not maintained. Through implementation of proper and adequate bio-security measures in the time of disease can prevent the losses of the farmers due to the outbreak of various diseases. Farmers rearing commercial poultry, dairy animals and piggery require healthy stocks which can be procured with the help of ICT enabled platforms to get the correct traceability (ICT handout, MANAGE 2015).

ICT Tools Used for Bio-Security Awareness in Assam

SMS and USSD: Short messaging service (SMS) is one of the most convenient and widely used tools for sharing information on short bio-security tips in Assamese and other local languages spoken by the people of Assam. Flood alerts related to prior animal shelter management can be sent to the farmers for taking various preventive measures for the animals. Vaccination reminders during FMD, HS campaigns can be sent to the farmers through the SMS services. Assam government use SMS service for FMD and other vaccine reminders. During the time of outbreak of a zoonotic disease, these messaging services are useful for disseminating information. USSD (unstructured supplementary service data) is another useful tool which allows the farmers to seek information without requirement of internet access (Baruah *et. al.*, 2023).

Interactive Voice Responses (IVR): IVR services are very useful for the farmers with low literacy levels. Toll-free numbers allow the farmers to access pre-recorded IVR messages about bio-security tips and other farm related information in Assamese, Bodo, Mishing, Karbi and various other dialects spoken in Assam. During the time of emergencies like disease outbreaks and floods, farmers can dial the number and listen to veterinary updates related to that disease and step-by-step disease prevention tips (Baruah *et. al.*, 2023).

Community Radio: Community Radio Stations can broadcast different programs related to health of the livestock, vaccination schedules and farm hygiene measures to aware the farmers about bio-security. Radio drama can be performed on topics like safe carcass disposal and quarantine importance to aware the farmers. Moreover, dramas and skits, interview with veterinary personals, call-in session programs can make radio communication a influential

medium for spreading awareness about bio-security (Baruah *et. al.*, 2023).

Social Media Platforms: Whatsapp and Face book pages operated by veterinary professionals and veterinary universities can be used for busting the myths related to disease rumors during outbreaks of diseases like we have seen in case of Avian Influenza. These platforms can also use in disseminate regular and useful information about the outbreaks and necessary steps to be taken. These platforms also help to disseminate flood time hygiene measures in different flood-prone areas of Assam (Vigyan Varta Editorial Board, 2024)

Mobile Applications: Weather based apps supports indirectly the livestock farmers by providing warning about weather which can favor the spread of the diseases. Mobile applications which are customized for livestock could include records of vaccination, purchasing history, checklist of bio-security measures and outbreak reporting systems. Mobile applications like Kisan Rath launched by Assam govt. and National Informatics Centre (NIC), can join the farmers with customers and traders, getting information on logistics, market prices etc. Another application developed by Assam student, named as Agspeak which uses artificial intelligence and IoT to give personalized information on health, disease detection and prevention.

CSCs and Digital Kiosk, AI chat bots, virtual assistants: Common service centers (CSC) are widely popular as hubs to access information regarding bio-security in the rural areas. Farmers can also consult the digital kiosk to get information about the prevention of the diseases, vaccination details and disposal of waste in a farm. AI chat bots are getting popularity which can be used to answer simple queries of the farmers in local languages. They can provide information on vaccination, procedures of isolation and sanitation (Vigyan Varta Editorial Board, 2024).

Limitations of ICT Tools in Assam:

Despite the potential it holds, there are some limitations to the raise bio-security awareness through ICT tools.

Digital divide: in recent times the mobile phone penetration is high enough but the ownership of mobile is not even between males and females of the rural areas. Moreover, the internet connectivity to most of the flood-prone and tribal rural areas remains poor. Many women are not aware of features of smart phones apart from calling which can limit the utility of app features. This can limit the reach of bio-security advisories to a larger audience. The farmers in many hilly tribal areas prefer their own language, so language barrier could be another problem in disseminating the

technologies in the field condition to the farmers (Shehrawat *et. al.*, 2023).

Technical barriers: During the time of emergency situations like flood and other disasters, the power supply can be discontinued. As a result, the connectivity may be totally disrupted and the effectiveness of the ICT tools can be hampered. In rural areas, the internet connectivity is not much proper to be accessible by a large number of rural people to procure the information about bio-security related issues. Another constraint is that the lack of funds of the farmers to buy smart phones to use the ICT tools which ultimately hinders the equitable access to the technologies. Tribal farmers in rural areas prefer audio-visual support than literature level technologies. Content of the applications, messages should be customized according to the geographical need of a particular area (Shehrawat *et. al.*, 2023).

Risk of misinformation: Now days, the social media platforms are a good medium for rapid spread of misinformation about different aspect of farming systems like vaccine technologies, symptoms of diseases. In Assam it is seen in case of Avian Influenza, where people were boycotting chicken meat which led to huge loss of the poultry farmers. The spread of misinformation can create panic among the farmers and discouragement or slower growth can be seen in case of vaccine uptake among the farmers (Shehrawat *et. al.*, 2023).

Future Prospects of ICT Tools:

For effectively promoting the bio-security through ICT tools, certain strategies can be implemented.

Capacity Building: for effective dissemination of ICT tools among the farmers, regular training programs, awareness campaigns as well as workshops on use of ICT tools can be organized. This will increase the use of these tools among the rural people and decrease the gender gap in using the technologies.

Local content creation: for better implementation of the ICT tools among the rural areas, content should be created on the local languages of a particular area. Focus should be given in the livestock or poultry prevalent in that area and content advisories should be made in respect to the diseases common in that particular region (Bansal *et. al.*, 2022).

Public-private partnership: collaboration can be fostered among the government, research institutions, developers of the applications and local extension personnel or agencies to expand the reach of ICT tools for effective management of bio-security. Government can also invest in strengthening the mobile internet connections in rural areas and support affordable access to smart phone connectivity and digital

services among the farmers of the rural areas (Bansal *et. al.*, 2022).

Integration with farmer's cooperatives: milk cooperatives as well as livestock producer groups (piggery and poultry) can integrate the ICT tools in the systems which can help the organized farms to get proper information on bio-security measures which help them to maintain a healthy stock of animals ultimately improving the productivity of the animals (Bansal *et. al.*, 2022).

Technological advancements: ICT tools can be integrated in the early warning systems of the government. Disease surveillance and meteorological data can be incorporated with ICT tools to provide prior alerts of high-risk periods particularly during monsoon season. Low-cost IoT devices could be deployed in the farms which can give information about temperature, humidity, water quality and other alerts through mobile applications. State supported applications with bio-security information; geo-tagged vaccination records tailored in local languages is a boon to the farmers to maintain the farms scientifically (Barman *et. al.*, 2024)

Conclusion

ICT tools along with mobile applications have a immense potential to enhance the bio-security scenario of farms in Assam. Digital tools like SMS, USSD, IVR services along with mobile applications, AI Chatbot services, and social media platforms can bridge the gap between traditional livestock farming and modern-day farming technologies with providing timely, adequate and localized extension services (Baruah *et. al.*, 2023). Moreover, limitations such as gaps in digital literacy, poor connectivity of the digital tools in rural areas, and the risk of spreading misinformation need to be addressed for proper dissemination of the ICT tools in desired areas. The future lies in incorporating the ICT tools with early warning systems, promotion of public-private partnerships, and developing comprehensive digital platforms personalized to Assam's socio-cultural context. ICT-driven agricultural extension in Assam offers a promising future because of the growing digital literacy, innovative mobile application concepts, and community-based knowledge-sharing platforms, although there are still challenges to overcome, particularly within the fields of gender and infrastructure.

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