Bangladesh Journal of Extension Education *ISSN 1011-3916*
Volume 27, No. 1&2, 2015: 103-112 *Research Article*

Uses of ICT as a Management Tool for Livestock Extension Services in Bangladesh: A Review of Present Status and Potentials

M. M. Hossain[1] and A. J. M. Ferdaus[2]

Abstract

This paper reviews the contribution of livestock in food security and livelihood improvement of farmers. The paper also reviews the uses of ICT as a management tool for livestock extension services in Bangladesh. Data on livestock resources, livestock population were reviewed from Bangladesh Economic Review. Policy information was taken from National Livestock Extension Policy prepared by Department of Livestock Services. Data related to present status and potentials of ICT tools and their uses in livestock extension services were reviewed from internet, journals and published paper. The motto of livestock extension services in Bangladesh are production oriented through the following initiatives: (i) Improvement of quality and productivity of livestock by strengthening research- extension-farmers linkages; (ii) Ensure development of animal health care services, particularly for the control of parasitic and infectious diseases; (iii) Investment assistance for expansion of marketing network for production technologies, input supply, improved technology for preservation and marketing of livestock products; (iv) Support development and expansion of technologies for the resource-poor people. ICT tools suggested to use in the institutionalization of livestock extension policy are computer, fax, phone, internet, website, e-mail. ICT tools for research-extension-farmers linkage are computer, fax, internet, website, e-mail, GPS, video conference, multimedia, CDs, TV, Radio and mobile phone. In addition, mobile phone, Radio, TV, Computer, internet, website, e-mail, multimedia and CDs could be used for advisory services on livestock farm management and health care services. The potentials of the uses of ICT tools by the livestock value chain actors are discussed. It can be concluded from the review that uses of ICT as management tools will increase the knowledge of livestock stakeholders in livestock extension services thus improve the production of milk, meat and egg for human consumption.

Keywords: *ICT, management tools, livestock extension, Bangladesh.*

Introduction

The livestock is a thrust as a sub-sector for economic development of Bangladesh. Livestock is an integral component of the complex farming system in Bangladesh not only a source of meat protein but also a major source of farm power services as well as employment. The livestock sub-sector provides full time employment for 20% of the total population and part-time employment for another 50%. The poultry meat alone contributes a substantial 37% of the total meat production in Bangladesh (Begum *et al*., 2011). The GDP contribution of this sub-sector has been a modest 2.6% annually in the 1990s (IMF, 2005) which was lower than the previous estimates of 5% of total and 10% of agricultural GDP during the 1970s and 1980s (FAO, 1990; Planning Commission, 1990). However, the sector's actual contribution has been

[1]Department of Animal Science, BAU, Mymensingh, (mmh_bau2009@yahoo.com) [2]Department of Livestock Services, Ministry of Fisheries and Livestock, Bangladesh

consistently underestimated as the value added in draught power used in farm operation, threshing, sugarcane and oilseed crushing, local transport, dung for cooking fuel and manure for fertilization of crop fields were not taken into account. An estimate of the uncounted sectored contribution of livestock indicates a foregone value of three times the amount of official GDP attributed to this sector (FAO, 1990). Moreover, livestock products, namely, leather and leather products, hides and skins are important exportable items contributing about 13% to total foreign exchange earnings during the 1970s and 1980s (Rahman and Bhuiyan, 1991).

Therefore, given versatile nature of the potential contribution offered by the livestock sector are livelihood development tools for poor and pro poor, employment and income generation and poverty reduction, nutrition, food security and safety, and social safeguards, export earnings, rising demand and scope of increased productivity, renewable energy and soil health, value addition and supply chain development. Poultry and dairy farming has some comparative advantages over crop, fishery and forestry as they require less land, small capital and is least influenced by seasonal changes. According to the estimate of the Department of Livestock Services (DLS), the population of livestock and poultry were 535.90 lakh and 3,041.72 lakh respectively i+n FY2013-14.The production of animal protein like milk, meat (beef, mutton, chicken) and eggs have been increasing over the past several years. As a result, per capita availability of animal protein is rising.

Bangladesh is an agricultural oriented country because the majority of her population is based in the rural areas and these people heavily depend on livestock as a source of animal protein and their livelihood. Information and knowledge are indispensable tools for empowering livestock producers so that they will be able to make informed decisions. Globally, the development of ICT has proven its potentials for enhancing development efforts, but also virtually reduced the distance and turned the world into a global village (O'Farrell, 2003). Worldwide, ICTs are playing a vital cross-cutting enabler role to address many problems. It should be noted that several types of ICT (Radio, TV, internet, wired/wireless network, mobile phones, GPS, computer, fax, multimedia CDs, video/tele conferencing, instant messaging, magazine, newspaper etc.) have contributed positively to the development of this country as a source of information in commerce, industries, agriculture, education, health, sports, culture and tourism and even religion. The proposed National ICT Policy-2008 states that ICT is one of the most important tools to achieve economic prosperity of a country through improving the management and efficiency in every sphere of life.

There is no study on uses of ICT in livestock extension services in Bangladesh. Few activities are conducted in public sector through DLS. So, keeping this in view the proposed study was aimed at the following objectives:

1. To identify the ICT tools for livestock extension services.
2. To identify the livestock development issues/sectors for intervention of ICT tools.

Methodology

Data on livestock resources, livestock population and were taken from Bangladesh Economic Review (2015). Policy information was taken from National Livestock Extension Policy (Mia, 2013) prepared by DLS. Agro-based TV program and time schedule were collected from different electronic and print media. Website of different magazine and important public organization related to livestock were collected from print media and internet. Other relevant information from internet, journals, articles, and published paper by researcher has been used in preparing this article. All of the secondary data were documented, characterized, visualized, assessed and summarized to explore the potentialities of ICT tools for livestock extension services in Bangladesh. Intervention of ICT tools for better implementation of livestock extension policy is presented in Table 1. Popular Agro-based TV program in Bangladeshis is shown in Table 2. Important website related to livestock in Bangladesh is given in Table 3.

Table 1 Intervention of ICT tools for better implementation of livestock extension policy

Livestock development Issues	**Intervention of ICT tools**	**Responsible organization**	
		Public	**Private**
Institutionalization of livestock extension policy	Computer, fax, phone, internet, website, e-mail	MOFL, DLS	-
Preparation of guidelines for coordination and supervision	Computer, fax, phone, internet, website, e-mail	MOFL, DLS	NGOs and private entrepreneurs
Enabling environment for both public and private sectors	Computer, fax, phone, internet, website, e-mail	MOFL, DLS	
Farmers' organization Producers' organization	Computer, fax, phone, internet, website, e-mail	MOFL, DLS	NGOs and private entrepreneurs
Research – extension –farmers' linkage	Computer, fax, internet, website, e-mail, GPS, video conference, multimedia CDs	MOFL, DLS, BLRI, Agril. Universities	NGOs, Donor agencies, Producers organizations
Cross cutting issues in livestock extension services	Radio, TV, internet, website, e-mail, GPS, video conference, multimedia CDs, Print media	Public sectors	NGOs, Investors, Entrepreneurs
Training & skill development	Computer, internet, website, e-mail, multimedia CDs	DLS, Universities, DYD	NGOs, private sector, poultry worker, livestock volunteers
Advisory services on farm management and husbandry practices	Mobile phone, Radio, TV Computer, internet, website, e-mail, multimedia CDs,	DLS, BLRI, BRDB, DYD, Universities	NGOs, private entrepreneurs
Advisory services on primary healthcare	Mobile phone, Radio, TV, Computer, internet, website, e-mail, multimedia CDs	DLS, BLRI, DYD, BRDB, Universities	Pharmaceutical companies, vaccinator, paravets, NGOs
Commercial inputs and machineries supply	Computer, internet, website, e-mail, multimedia CDs, Mobile phone, fax	MOFL, DLS,BLRI	Pharmaceutical companies, NGOs, Input suppliers.

Table 1 (Contd.)

Livestock development Issues	**Intervention of ICT tools**	**Responsible organization**	
		Public	**Private**
Credit delivery	Computer, internet, website, e-mail, Mobile phone, fax, instant messaging	DLS, DYD, BRDB, Social Welfare	NGOs and private sector
Breeding material	Computer, internet, website, e-mail, multimedia CDs	DLS, BLRI.	NGOs, Private sector
Quality control of vaccines and feeds	Computer, internet, website, fax, e-mail, multimedia CDs, phone	MOFL, DLS, BLRI	-
Marketing of livestock products	Mobile phone, Radio, TV, Computer, internet, website, e-mail, multimedia CDs	MOFL, DLS, BLRI, etc.	NGOs, Private sector
Hides and skin, Slaughter house by products	Radio, TV, Computer, internet, website, multimedia CDs, phone	MOFL, DLS, MOI.	Private Investors.
International trade management	Computer, fax, phone, internet, website, e-mail	MOFL, DLS, DAM, (LG) Milk Vita	NGOs and Private sector
Public Private Partnership (PPP)	Computer, fax, phone, internet, website, e-mail	MOFL, DLS, BLRI	NGOs, Private investors

*MOFL- Ministry of Fisheries and Livestock, DLS- Department of Livestock Services, BLRI- Bangladesh Livestock Research Institute, DYD- Department of Youth Development, MOI- Ministry of industry, DAM- Department of Agricultural Marketing

Table 2 Popular Agro-based TV program in Bangladesh

TV Channel	Program and time schedule
B TV:	1.Mati o Manush (Sunday, 7.00 pm) 2.KrishiDibanishi (Monday, 7.00 pm)
Channel I:	1.HridoyeMati o Manush (Saturday, 9.35 pm; Thursday, 3.05 pm) 2.KrishiShangbad (Daily, 5.20 pm)
Bangla Vision	Shamol Bangla (Monday, 6.30 pm; Thursday, 7.05 pm
Boishakhi Television	Krishi o Jibon (Sunday, 8.20 pm)
G TV	Shobuj Bangla (Friday, 8.10 pm))
ATN Bangla	Matir Shubash (Monday, 4.20 pm)

Table 3 Important website related to livestock in Bangladesh

Organization/ Magazine	URL
Ministry of Fisheries and Livestock	http://www.mofl.gov.bd
Department of Livestock Services	http://www.dls.gov.bd
Bangladesh Livestock Research Institute	http://www.blri.gov.bd
Agriculture Information Services	http://www.ais.gov.bd
Krishi Barta	http://www.krishibarta.org
Agro Bangla	http://www.agrobangla.com
Krishi Bangla	http://www.krishibangla.com
Krishi Market	http://www.krishimarket.com
e- Krishi	http://www.ekrishi.com

Findings and Discussion

Present status of ICT uses in livestock of Bangladesh: With a view to making DLS IT enable, a Management Information System (MIS) has been established in DLS and a total of 470 internet connection has been given to exchange information quickly between the head quarter and field offices. Local Area Network (LAN) has been established in DLS. All computers in DLS have been brought under this LAN. One high powered Mbps internet connection for 80 computers has been taken on lease from BTCL. Apart from this, extension of Web-enable Geographical Information System (GIS) based MIS software development up to upazila level is in progress. SMS gateway system is continuing for diseases control.

Scope of ICT in proposed National Livestock Extension Policy: The development issues of National Livestock Extension Policy (NLEP) are many and some of them are directly linked to the implementation of the policy. But there are many cross-cutting issues also within the broader spectrum of agricultural development of the country. The important development issues considered are:

Food Security and Malnutrition: Development of livestock could enrich the main protein source of milk, meat and egg for balancing and nutritious foods. Boosting up of livestock and poultry production, of course, enrich food basket and can be considered as an important frontier towards augmenting overall food production in the country. The motto of livestock extension services should be production oriented through the following initiatives: (i) Improvement of quality and productivity of livestock by strengthening research-extension-farmers linkages; (ii) Ensure development of animal health care services, particularly for the control of parasitic and infectious diseases; (iii)Investment assistance for expansion of marketing network for production technologies, input supply, improved technology for preservation and marketing of livestock products; (iv) Support development and expansion of technologies for the resource-poor people.

Food Safety Issues: Presence of health hazardous components either microbiological or chemical residues in food products of animal origin is a major concern of present time. Informally marketed animal origin food items in Bangladesh are frequently tested not up to the standard of food safety management. At the level of pre and post production of meat, milk and egg as well as value added products; the focus should be on food safety. Food safety on the farm addresses the issue on chemical, microbiological and drug residues in food of animal origin.

Veterinary Public Health Issues: Animal diseases can have a major impact on public health, national economy and international trade, food security and livelihood of households particularly of poor segments. There is a need for enhancement of veterinary infrastructure in public, private and NGO sector and their capacity for disease surveillance, diagnosis and epidemiological activities and public health awareness. Prevention and control of trans-boundary animal diseases requires regionally harmonized and effective early warning system to prevent the spread of diseases. The extension departments in collaboration with local government and other stakeholders should prepare guidelines and distribute it to the farmers regarding the effects and evils of public

health and sanitation. In the training manual, there should be public awareness program on improvement of sanitation.

Zoonosis, Emerging and Re-emerging Issues: Animal has the potential to transmit diseases to human known as zoonosis. Some of the zoonotic diseases such as Bird flu, Anthrax, Nipa, Rabies, and Tuberculosis etc. are caused through faulty husbandry practices, movement of infected animals, handling of animals and clinical equipment, management of animal wastes and dead animals, poor surveillance and unrestricted encrossment of borders of neighboring countries etc. Livestock diseases are not regularly reported and investigation into their epidemiology not fully introduced. DLS has preparedness and response guideline for the field officials and farmers to follow for control of the emerging and re-emerging diseases. Inter-ministerial national coordination is needed to be formed to combat the spread of fatal infectious diseases. Proper pathways can be utilized for awareness creation among the general public regarding zoonotic diseases.

Bio-security: Bio-security is those practices designed to prevent the introduction of harmful agent to livestock and poultry operation. Bio-security at the farm level is the management practices and enabling producers to prevent the movement of disease causing agents. Therefore, bio-security involves many aspects of farm management such as disease control and prevention, feed management and visitor control. Other sources of contamination are closing goods, equipments and vehicles. The designing of planning process in view of the improved bio-security should include location, construction of houses, traffic off and on the farm, pest management, designing of house cleaning and disinfection, personal hygiene, flock and herd health care and monitoring, husbandry practices and compliance with the regulations.

e-livestock:ICT can play a key role in providing extension services with all information needed for the farmers work including livestock production, inputs supply, disease control and improving market access, and availability of technology dissemination. It is vital to strengthen capacities of farmers, their organizations and rural communities. It is necessary to use ICT in the frontline offices of DLS in upazila and union parishad for linking livestock marketing and production through web and mobile based technology advisory services for farmers. Through these mobile and web based messages early warning of diseases and natural disasters as well as dissemination of information may be included in the extension procedure establishing gateway system.

Diseases Surveillance, Epidemiology and Reporting System: Close intensified door-step monitoring of animal production cycles, strong surveillance for diseases and their epidemiological scenario along with organized reporting for further immediate action should be a regular practice. A database of livestock and poultry production, animal health care services, disease incidence related statistics should be established and improved for forward work planning.

Specific Livestock Development Service Areas: With the increase of commercialization of livestock the traditional livestock is declining, but yet large number of dairy and poultry still exists and contributes to the national production. Commercial entrepreneurs are taking care of feeds and fodder, health services and marketing, but traditional dairy and poultry are left for public care. So, special attention to develop the traditional dairy and poultry

and to improve their health care should be the thrust activities of DLS.

Organic Farming: Organic farming is recently getting popularity among the consumers because of their system where material detrimental to human health and environment is not used. Organic farming strictly confines the use of growth regulator such as hormones, antibiotics, food additives and genetically modified organisms and nano-materials. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic livestock farming combines tradition, innovation and science to benefit the shared environment and promote fair relationships and quality of life for all involved. The characteristics feature of organic products is costlier and environment friendly. Paramount importance should be given to disseminate bio-rational based management systems in the farms to ensure productivity and products' safety and quality standard maintaining collaboration with stakeholders and publicity through electronic and print media for mass awareness.

Value Chain Development: Value chain is a high-level of businesses receives raw materials as input, add value to the raw materials through various processes, and sell finished products to customers. Value-chain consist bundle of activities accomplished by firm to design, produce, market, deliver and support its products. These value chain activities are the discrete building blocks of the competitive advantages. Thus the analysis of value chain encompasses wider issues than supply chain which only shows physical flow of products or services through immediate stages of value addition. Constraints hindering value chain development should be identified by government machineries to provide enabling environment, opening opportunities, reducing risks and vulnerability for harnessing full potential of livestock sector.

Natural Disaster Management and Livestock Production: Bangladesh is prone to natural disasters viz. heavy rainfall, floods, draught, cyclone, tidal surges and intrusion of saline water, etc. Livestock population is the first to be affected in that situation because of transportation of feed and fodder become more difficult to the affected areas including fresh drinking water. At that time, all efforts are made to safe human life. Due to unusual and difficult situation massive spread of epidemic diseases occurs during the post disaster period. In order to tackle this situation effectively, it is vital that disaster sustainable development and climate policy are integrated including livestock based interventions in terms of sustaining the livelihoods and resilience of the poor. Disaster Management Policy 2008 has a post and pre period disaster management and preparedness and response guideline can be followed in the affected area.

Technological Knowledge Gap on Hides, Skin, Horn and Bone: Leather and leather goods are the third most important export earner items in Bangladesh. The value of hides and skin depends on its quality which in turn depends on techniques of flaying the skin and on the status of health & nutrition of animals. Little work is done on flaying technique. The main constraints is the poor flaying, improper method of curing, poor health and disease management, poor breed quality and age of the livestock species. On the contrary, valuable horns, hoofs and bones are mostly unused in spite of having usability and value addition. Mechanized slaughterhouse, storage facilities are also limited. DLS should introduce training program of the butcher on flaying and

grading of meat cut, preservation of skins through curing. For quality control and certification of hides and skin, DLS may setup a wing and if necessary through promulgation of an act. DLS may also work on to prepare a comprehensive marketing policy for hides and skin.

Strengthening Infrastructure and Facilities for Livestock Services: DLS being the public sector principal organization mandated for livestock extension should reach to the lowest tier of local government i.e. Union Parishad for better service delivery. There should be extension worker in the mainstreaming of DLS organizational setup like DAE. Provide adequate fund for effective delivery of livestock extension services. Ensure satisfactory logistics support in terms of transport, extension kits for effective extension service delivery.

Animal Health Care Services: Disease prevention through vaccination campaigns, reduction of mortality and morbidity losses, and meat hygiene have remained priorities considering public health concern. The working patterns of animal health worker and delivery of services tend not similar to regular mass extension rather mainly primary healthcare, vaccination, de-worming, diagnosis and treatment. A case can be made for complementing animal health services with a parallel livestock extension service, possibly operating from the animal health clinics and hospitals, but staffed separately.

Cross Cutting Issues: Livestock development is influenced by a number of issues that are either partially or entirely outside the mandate of MOFL and DLS. The issues include environment, gender, public health sanitation, diseases, population growth, and education.

a. **Environment and Social Safeguard Issues:** Livestock production activities should be carried out in a sustainable manner keeping in mind the environment conservation issue. The department will promote livestock production especially ruminants (cattle, buffalo, goat and sheep) according to ecological standpoint of the areas. Department will document and distribute materials with best practices in a grazing management in order to conserve the environment. For instance, promoting exploration of methane fermenting cattle dung, poultry droppings and farm waste, utilizing urine as a tool of pest management.

b. **Women in Livestock Extension**: Women and youths access to production resources and generating income from their work when compared to that of men is not negligible at all. Socio-cultural attitude that put youth in an inferior position in a society should be changed through social mobilization. In this respect especially in public sector in collaboration with other stakeholders with all livestock extension providers to ensure: (i)Mainstreaming gender issues into livestock farming communities; (ii) Promote gender sensitive labor saving technologies; (iii) Empower underprivileged groups to access livestock farming resources; (iv) Livestock keepers should have access to marketing information and marketing network and develop farmers group.

c. **Knowledge Gap and Education**: The large number of population of Bangladesh suffers from illiteracy. Bangladesh in near future may suffer from insecurity of food and nutrition. While implementing livestock extension services, side by side, there should be a thrust for awareness on adult education. A course on zoonotic

diseases may be included in school level.

d. **Climate Change**: Impacts of climate stressors on animal agriculture is reflective. The uncertainty of climate change and how change will influence on animal production on a global as well as regional scale is largely unspecified. In Bangladesh, by contrast, the bulk of livestock have no protective structures and they graze off the land. There is every reason to expect that livestock in Bangladesh will be sensitive to climate change. Early warning system and response measures in order to protect livestock and environment during natural calamities, technologies adoptable to climate tempted vulnerabilities and long term resilient strategy will be upheld.

e. **Competition of Livestock and Crop Production on Land:** In accordance with massive population growth food grain requirement is increasing and with rapid urbanization cultivable land is shrinking every day, as a result, increased pressure on land for crop production for human consumption is traditionally getting priority over livestock production. State priority of crop production depriving the livestock population through squeezing the opportunity of grazing in pasture. No land especially is ear-marked for animal grazing and fodder production consequences a serious dearth of feeds and fodder. However, intervention of ICT tools for better implementation of livestock extension policy is shown inTable1. Popular agro-based TV program and time schedule is given in table 2. In addition, important Livestock and agricultural website is presented in Table 3.

Conclusion

ICT tools suggested to uses in the livestock extension services are computer, fax, internet, website, e-mail, GPS, video conference, multimedia, CDs, TV, Radio and mobile phone. In addition these tools could be used for advisory services on livestock farm management and health care services. It can be concluded from the review that uses of ICT as management tools will increase the knowledge of livestock stakeholders in livestock extension services thus improve the production of milk, meat and egg for human consumption.

References

Begum, I.A., M.J. Alam, J. Buysse, A. Frijaand and G. VanHuylenbroeck. 2011. A Comparative Efficiency Analysis of Poultry Farming Systems in Bangladesh: A Data Envelopment Analysis Approach. *Applied Economics*, 44:3737-3747

FAO. 1990. Bangladesh Smallholder Livestock Development Project.*Appraisal Report*, FAO, Rome.

IMF. 2005. Bangladesh Poverty Reduction Strategy Paper. *IMF Country Report* No. 04/410. Washington, D.C.

Mia, M. A. R. 2013. National Livestock Extension Policy (Final draft). DLS, Ministry of Fisheries and Livestock.

O'Farrell, C. 2003. Global Trends and Major Issues Of ICT Application in Agriculture Paper Presented at APO Seminar on Information and Communication Technology (ICT) for Improved Agricultural Productivity and Competitiveness, Held in Yogyakarta, Indonesia, During 8-12 September 2003.

Rahman, S. and S. R. Bhuiyan. 1991. Fisheries Planning Performance and Fourth Five-Year Plan. *Farm Economy*, 8: 109 – 121.