

# International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 3, Issue 5, May 2014

## AREAS OF UTILIZATION OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) TOOLS BY VARIOUS ANIMAL HUSBANDRY (A.H.) ORGANIZATIONS IN ANDHRA PRADESH

Dr. P.Sireesha<sup>1</sup>, Dr.B.Sudhakar Rao<sup>2</sup>, Dr.D.Thammi Raju<sup>3</sup>

Assistant Professor, Department of Veterinary & Animal Husbandry Extension, College of Veterinary Science, Korutla, Andhra Pradesh, India<sup>1</sup>

Retired Professor & Head, Department of Veterinary & Animal Husbandry Extension, College of Veterinary Science, Rajendranagar, Andhra Pradesh, India<sup>2</sup>

Principal Scientist, Education Systems Management Division, NAARM, Hyderabad, Andhra Pradesh, India<sup>3</sup>

**Abstract:** Data was collected from 33 organizations which were actively involved in Animal Husbandry activities and elicited through a questionnaire following an exploratory research design on “Utilization of Information and Communication Technology (ICT) tools by various organizations in Animal Husbandry – A study in Andhra Pradesh.” The findings on the areas of Animal Husbandry where ICT tools were regularly used revealed that Information dissemination, Administration and Planning were found to be the major areas. 100% of Private Organizations regularly use ICT tools for marketing because their primary motive is the marketing of their products. In the area of project proposal writing, 75% of Educational and Research Organizations were found to use ICT tools regularly. 62.5% of Educational and Research Organizations reported regular use of ICT tools in the area of development programmes. 60% of Service Providers and Private Organizations were found to be regularly using ICT tools for animal management. Regarding the area of animal health care, 60% of Private Organizations reported regular use of ICT tools. In the area of animal feeding, 50% of Private Organizations reported regular use of ICT tools. 40% of the Service Providers and Private Organizations regularly use ICT tools for breeding. Regarding the area of disaster management, 25% of the Educational and Research Organizations were found to be regularly using ICT tools. 50% of Financial Organizations were found to be involved in other areas of A.H. that is providing credit facilities to beneficiaries.

**Keywords:** ICT, Areas of Animal Husbandry, Animal Husbandry organizations

### I. INTRODUCTION

Information Technology has connected the world globally and is now changing our lifestyle. There is no area of human life that has been untouched by IT sector. Agriculture and Animal husbandry has also been influenced by IT in the present scenario of IT revolution although the share of IT in agriculture is only 1.3% (Chargotra, 2006). ICTs are a diverse set of technological tools and resources to create, disseminate, store, bring value addition and manage information.

In order to transform livestock sector into information driven, modern and competitive sector, the role of Information and Communication Technology (ICT) cannot be overruled. They provide faster and newer ways of delivering and accessing

# International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 3, Issue 5, May 2014

information. The people working in the livestock sector are least equipped with proper tools to deal with rapidly changing livestock production scenario and international competitive environment. At present, the ratio of the farmers to the

extension workers is 1000:1(Kumar, 2005), also the existing transfer of technology mechanisms and extension programmes run by the government departments are slow and in many cases ineffective in view of the vast gaps between the research and farmers linkages. This is partly due to inadequate use of new areas of information dissemination in various development programmes. The introduction of ICT helps in upgrading the information at least cost.

Information technology has demonstrated its utility and advantages in all elements of human life and especially in vocations of agriculture and allied sectors enhancing the productivity either directly or indirectly. The existing “technology divide” can be addressed effectively through the use of ICT, especially when the present system is no longer relevant and able to meet the increasing demands of our farming community. In a fast changing global environment, livestock production has to be more dynamic so as to harness the latest technologies and emerging opportunities due to globalization.

## OBJECTIVES OF THE STUDY

1. To identify the different areas of Animal Husbandry where ICT tools are utilized by these organizations.

## II. METHODOLOGY

The study was purposively conducted in Hyderabad and Rangareddy districts of Andhra Pradesh as most of the Animal Husbandry organizations are located in these two districts. A total of 33 organizations which are actively involved in Animal Husbandry activities were selected for the purpose of study. Several organizations involved in the livestock development either directly or indirectly in Andhra Pradesh were ascertained in consultation with various sources viz. consultation with experts, secondary sources such as reports, literature, documents etc. The questionnaire for the organizations was developed in consultation with experts in the field of Animal Husbandry extension and those involved in computer applications. Rapport with the representatives of organizations is very essential so as to get accurate responses. In the present study the investigator established initial rapport with the organizations selected for the study and got acquainted with the officials personally. Later after the development of the questionnaire the investigator handed over the questionnaire to the concerned officials of the selected organizations and elicited their responses through the questionnaire. Questionnaire was prepared in English and data was collected from 33 organizations. It was made sure that all the questions in the questionnaire were self explanatory. Statistical tools used for analysis of data included frequency and percentages.

## III. RESULTS AND DISCUSSION

A total of 33 organizations which are actively involved in Animal Husbandry activities were selected for the purpose of study. Based on the nature of work, functions, type of administration, the organizations considered for the study were grouped into five categories for better presentation of the results and subsequent discussion. They are:

1. Service Providers
2. Financial Organizations
3. Educational and Research Organizations
4. Non Governmental Organizations and Cooperative Organizations
5. Private Organizations

The different organizations were categorized into the above five categories are detailed below.

### I. Service Providers:

1. State Animal Husbandry Department
2. Commissionerate of Rural Development -Rural Livelihood project

# International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 3, Issue 5, May 2014

3. Andhra Pradesh Livestock Development Agency (APLDA)
4. Andhra Pradesh Meat Development Corporation (APMDC)
5. State Management Institute for Livestock Development in Andhra Pradesh (SMILDA)

## II. Financial Organizations:

1. National Bank for Agriculture and Rural Development (NABARD)
2. Andhra Pradesh Cooperative Bank (APCOB)
3. State Bank of India - Agri business unit (SBI)
4. Bharatiya Samruddhi Investments and Consulting Services Limited (BASIX)

## III. Educational and Research Organizations:

1. National Institute of Rural Development (NIRD)
2. National Academy of Agricultural Research Management (NAARM)
3. Project Directorate on Poultry (PDP)
4. Central Research Institute for Dryland Agriculture (CRIDA)
5. National Research Centre on Meat (NRC ON Meat)
6. Sri Venkateswara Veterinary University -College of Veterinary Science, Hyderabad (SVVU)
7. Veterinary Biologicals Research Institute (VBRI)
8. Indian Immunologicals

## IV. Non Governmental Organizations and Cooperative Organizations:

1. JK Trust Gram Vikas Yojana
2. ANTHRA
3. Watershed Support Services and Activities Network (WASSAN)
4. InterCooperation Social Development
5. Andhra Pradesh Dairy Development Cooperative Federation (APDDCF)
6. National Egg Coordination Committee (NECC)

## V. Private Organizations:

1. Venkateswara Hatcheries
2. Suguna Poultry
3. IndBro Research and Breeding farms
4. Poshak Feeds Private Limited
5. Vimala feeds Private Limited
6. Miracle Feeds Private Limited
7. Intas Pharmaceuticals Limited
8. Neospark drugs and chemicals Limited
9. Sarabhai Zydus Animal Health Limited
10. Natural Remedies Private Limited

## DIFFERENT AREAS OF ANIMAL HUSBANDRY WHERE ICT TOOLS ARE UTILIZED BY THE ORGANIZATIONS

The following are the areas of Animal Husbandry where ICT tools were used by the Animal Husbandry organizations:

1. Animal breeding
2. Animal feeding
3. Animal management

# International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 3, Issue 5, May 2014

4. Animal health care
5. Development programmes
6. Project proposal writing
7. Marketing
8. Disaster management
9. Administration
10. Information dissemination
11. Planning
12. Any other areas in A.H.

## Areas of A.H. where ICT tools are used by A.H. organizations

Table 1 clearly indicated that SMILDA among Service Providers, BASIX among the Financial Organizations, PDP, SVVU, Indian Immunologicals among the Educational and Research Organizations, ANTHRA among NGOs and Cooperative Organizations and among Private Organizations, Venkateswara hatcheries, Suguna Poultry and IndBro Research farms reported to be utilizing ICT for all A.H. areas.

Among Service Providers, State A.H. Department reported to be utilizing ICT tools for all the A.H. areas except for marketing because marketing is not their mandate and the organization is mostly service oriented. Rural Livelihoods Project of Commissionerate of Rural Development was using ICT tools in limited areas like development programmes, project proposal writing, disaster management, administration, information dissemination, planning. APLDA reported to be utilizing ICT tools for A.H. except for areas like feeding, health care and disaster management. The main aim of APLDA is production activities particularly breeding and the other areas are not in their mandate. APMDC was found to be utilizing ICT tools only for some A.H. areas like development programmes, project proposal writing, marketing, administration, information dissemination, planning only. APMDC is involved in the establishment of modern abattoir houses as such the ICT tools are mostly used for this purpose. Hence it is concluded that all the above organizations are service oriented and ICT tools are used in these areas.

Among Financial Organizations, BASIX uses ICT tools mainly in the capacity building of farmers through training and educating them. NABARD, a financial institution is involved in lending credit facilities and so is involved mainly in areas like development programmes, project proposal writing, administration, information dissemination and planning as such the ICT tools are of immense use in the above areas. Similarly, APCOB and SBI (Agri Business unit) also provides direct credit facility to the beneficiaries reported to be using ICT for areas like mainly finance and administration, information dissemination, planning.

Among Educational and Research Organizations, CRIDA was found to be using ICT for all areas of A.H. except breeding. NAARM reported to be utilizing ICT for areas like management, health care, development programmes, project proposal writing, marketing, administration, information dissemination and planning. NRC on Meat reported that they do not use ICT for A.H. areas like breeding, feeding and disaster management. VBRI was found to be not using ICT for areas like breeding, feeding and marketing. NIRD was found to be utilizing ICT for some areas like development programmes, project proposal writing, administration, information dissemination, planning. The Educational and Research Organization's main frame of activity is to conduct research. So they will be utilizing ICT tools according to their areas of research and interest like PDP, SVVU, NRC on Meat, Indian Immunologicals and CRIDA. The main focus of institutions like NIRD and NAARM are mostly training, so they may not be involved in other areas of A.H. The main activity of VBRI is to manufacture vaccines and to conduct epidemiological studies. So their main sphere of activity in A.H. is health care and so they may not be participating in other areas of A.H. and ICT tools are used in their respective activities.

Among Non Governmental Organizations and Cooperative Organizations, JK Trust Gram Vikas Yojana reported to be utilizing ICT for all A.H. areas except for marketing and disaster management as their main activity is cattle breed improvement. ANTHRA mainly involves in the livestock development and Transfer of Technology as such ICT tools are used for those activities. Intercooperation Social Development was found to be utilizing ICT for all A.H. areas except

## International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 3, Issue 5, May 2014

disaster management. WASSAN reported that they were using ICT only for limited areas like development programmes, project proposal writing, administration, information dissemination and planning. APDDCF was found to be utilizing ICT for areas of development programmes, project proposal writing, marketing, administration, information dissemination and planning. APDDCF is an organization which involves in marketing of milk and milk products and use of ICT tools mostly revolves in these areas. NECC reported that they were using ICT for A.H. except for areas like breeding and feeding. NECC is also a cooperative organization and is involved in deciding market price of egg and monitoring of the egg levels hence other areas of are not of much importance to them.

Among Private Organizations, it was found that Poshak feeds Private Limited was not using ICT tools for areas like breeding, health care, development programmes, disaster management. Vimala Feeds was found to be utilizing ICT tools for areas of breeding, feeding, management, project proposal writing, marketing, administration, information dissemination

and planning. Miracle Feeds Private Limited reported that they do not use ICT tools for areas like breeding, health care, development programmes, disaster management and administration. It was found that Intas Pharmaceuticals, Neospark Drugs and Chemicals Limited, Sarabhai Zydus Animal Health Limited were not utilizing ICT tools for areas like breeding, feeding, health care, disaster management. Natural Remedies was utilizing ICT tools for A.H. except for areas of breeding and feeding.

Private organizations are commercially oriented and mainly focus on marketing of their products. So they utilize the ICT tools for their activities like Feed companies mainly involve in areas like feed manufacture and its marketing. Likewise pharmaceutical companies are concerned with animal health care and marketing of their products and so their utilization of ICT tools vary in different areas. Poultry is a well organized sector, so the organizations concerned with poultry like Venkateswara hatcheries, Suguna Poultry are mainly concentrating on all areas like poultry breeding, hatching, management and even marketing. IndBro Research and Breeding farms mainly concentrate on research and development of coloured (croiler) birds hence not involved in other areas of A.H. and ICT tools are used in these areas only.

These are in accordance with the findings of Sharma *et al.* (1991).

# International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 3, Issue 5, May 2014

**Table 1: Areas of A.H. where ICT tools are used by A.H. organizations**

Organizations	Animal Breeding	Animal Feeding	Animal Management	Health care	Development programmes	Project proposal writing	Marketing	Disaster management	Administration	Information dissemination	Planning	Any other
<b>Service Providers</b>												
State A.H. Department	√	√	√	√	√	√	-	√	√	√	√	-
Commissionerate of Rural Development	-	-	-	-	√	√	-	√	√	√	√	-
APLDA	√	-	√	-	√	√	√	-	√	√	√	-
APMDC	-	-	-	-	√	√	√	-	√	√	√	-
SMILDA	√	√	√	√	√	√	√	√	√	√	√	-
<b>Financial Organizations</b>												
NABARD	-	-	-	-	√	√	-	-	√	√	√	-
APCOB	-	-	-	-	-	-	-	-	√	√	√	√
SBI	-	-	-	-	-	-	-	-	√	√	√	√
BASIX	√	√	√	√	√	√	√	√	√	√	√	-
<b>Educational and Research Organizations</b>												
NIRD	-	-	-	-	√	√	-	-	√	√	√	-
NAARM	-	-	√	√	√	√	√	-	√	√	√	-
PDP	√	√	√	√	√	√	√	√	√	√	√	-
CRIDA	-	√	√	√	√	√	√	√	√	√	√	-
NRC-Meat	-	-	√	√	√	√	√	-	√	√	√	-
VBRI	-	-	√	√	√	√	-	√	√	√	√	-
SVVU	√	√	√	√	√	√	√	√	√	√	√	-
Indian Immunologicals	√	√	√	√	√	√	√	√	√	√	√	-

Table Contd...

# International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 3, Issue 5, May 2014

Organizations	Breeding	Feeding	Management	Health care	Development programmes	Project proposal writing	Marketing	Disaster management	Administration	Information dissemination	Planning	Any other
<b>NGOs and Cooperative Organizations</b>												
JK Trust Gram Vikas Yojana	√	√	√	√	√	√	-	-	√	√	√	-
ANTHRA	√	√	√	√	√	√	√	√	√	√	√	-
WASSAN	-	-	-	-	√	√	-	-	√	√	√	-
Intercooperation Social Development	√	√	√	√	√	√	√	-	√	√	√	-
APDDCF	-	-	-	-	√	√	√	-	√	√	√	-
NECC	-	-	√	√	√	√	√	√	√	√	√	-
<b>Private Organizations</b>												
Venkateswara Hatcheries	√	√	√	√	√	√	√	√	√	√	√	-
Suguna Poultry	√	√	√	√	√	√	√	√	√	√	√	-
IndBro Research & Breeding farms	√	√	√	√	√	√	√	√	√	√	√	-
Poshak Feeds Private Limited	-	√	√	-	-	√	√	-	√	√	√	-
Vimala feeds Private Limited	√	√	√	-	-	√	√	-	√	√	√	-
Miracle Feeds Private Limited	-	√	√	-	-	√	√	√	-	√	√	-
Intas Pharmaceuticals Limited	-	-	-	√	√	√	√	-	√	√	√	-
Neospark drugs and chemicals Limited	-	-	-	√	√	√	√	-	√	√	√	-
Sarabhai Zydus Animal Health Limited	-	-	-	√	√	√	√	-	√	√	√	-
Natural Remedies Private Limited	-	-	√	√	√	√	√	√	√	√	√	-

# International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 3, Issue 5, May 2014

## Areas of A.H. where ICT tools were used regularly by various categories of organizations

From table 2, it was evident that majority of the organizations were regularly using ICT tools for the areas of information dissemination and administration. Cent percent of the Service Providers, Financial Organizations, NGOs and Cooperative Organizations, Private organizations and 87.5% of Educational and Research Organizations were regularly using ICT tools in the area of information dissemination in view of its relevance of faster mode of communicating information to the users.

For administration purpose, cent percent of Service Providers and NGOs and Cooperative Organizations, 90% of Private Organizations, 75% of Financial Organizations and Educational and Research Organizations were regularly using ICT tools. This could be attributed to the fact that in the present era of information technology, organizations have recognized the importance of ICT tools as the administration could become better and flow of information could be faster and help in effective decision making and result oriented use. 83.3% of NGOs and Cooperative Organizations, 80% of Service Providers and Private Organizations, 62.5% of Educational and Research Organizations and only 25% of Financial Organizations were regularly using ICT tools in the area of planning where ICT tools help them in the planning of their activities and effectively managing the same.

It was also observed that 62.5% of Educational and Research Organizations, 60% of the Service Providers, 49.9% of NGOs and Cooperative Organizations, 40% of Private Organizations and 25% of the Financial Organizations were regularly using ICT tools for developmental programmes where in ICT tools help in evolving, monitoring and evaluation of various development programmes (Deveraj and Chaturvedi, 2003).

Cent percent of Private Organizations, 60% of Service Providers, 37.5% of Educational and Research Organizations, 33.3% of NGOs and Cooperative Organizations and only 25% of Financial Organizations were utilizing ICT tools regularly for marketing depending on their areas of interest. Private Organizations were involved because they are commercially oriented and marketing of their products is of primary importance to them (Meenambigai and Tamilselvi, 2005). In the area of project proposal writing, 75% of Educational and Research Organizations, 66.6% of NGOs and Cooperative Organizations, 50% of Financial Organizations, 40% of Service Providers and 10% of Private Organizations were regularly using ICT tools as they could have realized the importance of ICT tools in this area that these tools help in betterment of their work.

It was also found out that in the area of animal breeding, 40% of Service Providers and Private Organizations, 37.5% of Educational and Research Organizations, 33.3% of NGOs and Cooperative Organizations, 25% of Financial Organizations were regularly using ICT tools. In the area of animal management, 60% of Service Providers and Private Organizations, 50% of Educational and Research Organizations, 33.3% of NGOs and Cooperative Organizations and none of Financial Organizations were regularly using ICT tools (Kumar *et al.*, 2005). 60% of Private Organizations, 50% of Educational and Research Organizations, 40% of Service Providers, 33.3% of NGOs and Cooperative Organizations and none of Financial Organizations were regularly using ICT tools for the area of animal health care (Kumar *et al.*, 2005). 50% of Private Organizations, 40% of Service Providers, 37.5% of Educational and Research Organizations, 33.3% of NGOs and Cooperative Organizations and none of Financial Organizations were regularly using ICT tools in the area of animal feeding depending on the organization's mandate (Maru, 2005).

In the area of disaster management, 25% of Educational and Research Organizations, 16.6% of NGOs and Cooperative Organizations, 10% of Private Organizations and none of Service Providers and Financial Organizations were regularly using ICT tools depending on their area of activity since disaster management is needed only when disasters occur. Only 50% of Financial Organizations were regularly using ICT tools in other areas (finance) and the other categories of organizations were not utilizing ICT tools for other areas of A.H since the major activity of Financial Organizations is lending credit facilities to beneficiaries.



## International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 3, Issue 5, May 2014

**Table 2: Areas of A.H. where ICT tools were used regularly by various categories of organizations**

S.No.	Category	Service Providers n=5	Financial Organizations n=6	Educational and Research Organizations n=8	NGOs and Cooperative Organizations n=4	Private Organizations n=10
i	Animal Breeding	2 (40)	1 (25)	3 (37.5)	2 (33.3)	4 (40)
ii	Animal Feeding	2 (40)	-	3 (37.5)	2 (33.3)	5 (50)
iii	Animal Management	3 (60)	-	4 (50)	2 (33.3)	6 (60)
iv	Animal Health care	2 (40)	-	4 (50)	2 (33.3)	6 (60)
v	Development programmes	3 (60)	1 (25)	5 (62.5)	3 (49.9)	4 (40)
vi	Project proposal writing	2 (40)	2 (50)	6 (75)	4 (66.6)	1 (10)
vii	Marketing	3 (60)	1 (25)	3 (37.5)	2 (33.3)	10 (100)
viii	Disaster management	-	-	2 (25)	1 (16.6)	1 (10)
ix	Administration	5 (100)	3 (75)	6 (75)	6 (100)	9 (90)
x	Information dissemination	5 (100)	4 (100)	7 (87.5)	6 (100)	10 (100)
xi	Planning	4 (80)	1 (25)	5 (62.5)	5 (83.3)	8 (80)
xii	Any other (Finance)	-	2 (50)	-	-	-

Figures in parantheses indicate percentage

### IV. IMPLICATIONS OF THE STUDY

1. The Government and policy makers should strive for the effective implementation of ICT for A.H. programmes for various organizations.
2. Adequate budget allocation and infrastructure be made available for wide use of ICT tools in A.H. sector.
3. Regular and updated knowledge on ICT tools applications in A.H. should be made through regular training for the personnel in the use of ICT tools.

# International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 3, Issue 5, May 2014

## REFERENCES

1. Sharma M C, Lal S B and Bhaumik Anup 1991 Computers- an aid to diagnosis and surveillance of animal diseases. Poultry Guide XXVII (7) : 28-33.
2. Cebeci Z and Aykut G 2003 Information and Communication Technology in Turkish Agriculture (The Problems, Expectations and Suggestions). [http://scholar.google.cm?hl=en&lr&q=cache:xbw.vomzduxwj:cebeciz.cukurova.edu.tr/documents/ICT in Turkish Agriculture \(itafe 03\).doc+ICT+Agriculture..](http://scholar.google.cm?hl=en&lr&q=cache:xbw.vomzduxwj:cebeciz.cukurova.edu.tr/documents/ICT_in_Turkish_Agriculture(itafe_03).doc+ICT+Agriculture..)
3. Deveraj and Chaturvedi K K 2003 Internet for transfer of Agriculture technology. Agricultural Extension Review 15 (2): 3-6.
4. Prakash K 2003 Fiji: ICTs transforming agricultural extension. [www.cta.int/observatory2003/proceeding2003.pdf](http://www.cta.int/observatory2003/proceeding2003.pdf).
5. Nuru A 2004 Importance of Information and Communication Technology for economic development of Ethiopia Second International Conference on the Ethiopian Economy 3<sup>rd</sup> to 5<sup>th</sup> June, [www.eeacon/EEA/conferences/papers/Amiru%20%20\\_%20ICT %20paper.doc](http://www.eeacon/EEA/conferences/papers/Amiru%20%20_%20ICT%20paper.doc).
6. Buiten A V, Dekkers W A, Hengeveld A and Holster H C 2005 Use and Development of ICT in the Dutch Agricultural sector. [www.efita.net/apps/accessbase/dbsomnaire.asp?d=539&t=0&identobj=bruqNwgy&uid=57305290&sid=57&idk=1](http://www.efita.net/apps/accessbase/dbsomnaire.asp?d=539&t=0&identobj=bruqNwgy&uid=57305290&sid=57&idk=1).
7. Kumar D 2005 Information and Communication Technology in Indian Agriculture .Disseminating Information to Farmers. <http://129.3.20.41/eps/get/papers/0503/0503002.pdf>.
8. Manhas J S, Meena B S, Charak A S and Sharma V P 2005 Potential IT tools for transfer of Technology. Agricultural Extension Review 17 (2) : 36.
9. Maru A 2005 Potential contributions from use of New Information and Communication Technologies (ICT) for Livestock Production and Services in India. [www.devstud.org.uk/conference\\_05/abstracts/livestock.htm](http://www.devstud.org.uk/conference_05/abstracts/livestock.htm).
10. Meenambigai J and Tamilselvi G 2005. Role of Communication Technologies in Rural Development. Journal of Communication studies Vol XXIII (1) : 1-11.
11. Chargoira M and Kanwat M 2006 Use of Information Technology in Agriculture. Agriculture Today IX (7) :17-19.
12. Frempong (2006) Challenges and Prospects of Infusing Information and CommunicationTechnology (ICTs) in Extension for Agricultural and Rural Development in Ghana AIAEE 22<sup>nd</sup> Annual Conference Proceedings, Clearwater Beach, Florida. <http://www.aiee.org/2006/Accepted/036.pdf>.