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Investigation of ICT Tools in Poultry Brooding System

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Abstract:
The study assessed the level of ICT (information and communication technology) tools involvement in poultry brooding system among poultry farmers in Ido Local Government Area of Oyo State, Nigeria. 30 respondents were randomly selected for the study. Structured questionnaire and interview schedule was used to collect data (primary data) from the selected poultry farmers, also Journals, Magazine, Federal Office of Statistic Bulletins as well as the internet served as source of secondary data.

Data collected was analyzed with aid of frequency counts and percentages as descriptive statistical tools, while Chi-square (χ^2) analysis was used as inferential statistical tool. The results of analysis showed that majority (76.7%) of the respondents are male, between the ages of 21-30 years(43.3%), mostly single (60%) and well educated (70%) with good years of brooding experience. Epileptic power supply, poor mobile network, lack of availability of ICT tools, and High cost of ICT tools at percentage level of 40%, 23.3%, 20.0%, and 16.7% respectively are the major constraints encountered by the respondents in the use of ICTs in the area. The result of the Chi-square analysis (χ^2) shows that age ($r = 0.021$; $P<0.05$), religion ($r = 0.00304$; $P<0.05$), and sex ($r = 0.0035$; $P<0.05$) exhibited positive and significant relationship with the use of ICT tools while educational background ($r=1.74E-07$; $P<0.05$) and ethnic group ($r=1.39E-14$; $P<0.05$) are not significant. The study recommends among others that government should encourage the use of ICTs among the poultry farmers in the area and in Nigeria at large through its inclusion in the agricultural extension programme curriculum of different states.

1. Introduction

A major task in agricultural development is the transfer of improved technologies to farmers. According to Salau and Saingbe (2008) cited in Olaniyi (2013) the farmers are constrained to obtain information from various sources of information. Given the urgent need for current agricultural knowledge and information system (AKIS) by farmers, the use of conventional communication methods such as farm and home visits and the use of contact farmers for extension information delivery is counterproductive. This therefore calls for the use of new emerging information and communication technologies by agricultural information providers for the benefit of farmers. Information and communication technology (ICTs) is often viewed as the "wheel" of economic activities since it facilitates the economic growth Olaniyi (2013). According to Osuagwu (2001), Information and Communication Technology (ICT) has become, within a very short time, one of the basic building blocks of modern society. Many countries now regard understanding of ICT and mastering the scientific, technological and engineering disciplines and the management technologies use in the handling of information, processing and application related to computers.

Several authors, Warren (2001), CTA (2003), Omotayo (2005) had earlier enumerated that Information and Communication Technology (ICT) is commonly used to embrace a multitude of media including telephone, television, video, telex, voice information systems and fax as well as those requiring the use of personal computers fitted with a modem or supply technologies that facilitate communication processing and transmission of information by electronic means ranging from radio, television, telephone (fixed or

mobile) and internet. However, ICT has been classified into two namely: conventional ICT (radio, television) and contemporary ICT (telephones, computer/internet) (Adejo and Haruna, 2010).

According to Melody et al. (1986) Information and communication technology (ICT) is a broad subject which deals with technology and other aspects of managing and processing information, especially in large organizations. It can be considered a sub-discipline of computing. Particularly IT (information technology) is applied computing and employs the use of electronic computers, storage media, network administration, server maintenance and computer software to secure, convert, store, protect, process, transmit, and retrieve information . ICT is often used as an external synonym for information technology (IT), but is a more specific term that stresses the role of unified communication and the integration of telecommunication (telephone line and wireless signals) computers as well as necessary enterprise software, middleware, storage and audio-visual systems, which enable users to access store transmit and manipulate information (FOLDOC, 2013). ICT tools are devices and objects used in information and communications technology (Daintith, John, ed. 2009).

According to Olaniyi (2013) one of the ways to bring about improvement in poultry production in Nigeria is the provision of the right information through appropriate channel that is accessible to farmers whose such information are meant for. Poultry production in Nigeria has undergone tremendous changes over the past decades in terms of genotype, management and technological advancement. In the pre-independence era, poultry enterprise was mainly in the family backyard characterized by low productivity and primitive technology. This was gradually improved by the colonial master from the low output to a better performance through the introduction of various poultry schemes (Olaniyi, 2013).

The western government changed from the traditional method to the present modern poultry keeping with the introduction of breeds of layers and broilers lines to meet the increasing demand for egg and meat for consumption in the country. The poultry industry specifically, has been described as the fastest means of bridging the protein gap prevailing in Nigeria (Apantaku et al., 1998). The rationale for the production of poultry is predicated on the fact that it can be rapidly expanded to replace red meat in the countries with high population growth rate, it improves human nutrition, generates regular income for women, children and other disadvantaged groups, supplies input (e.g manure) for crop production and is generally accepted by the majority of the population (Steinfield et al., 2003). The poultry industry in Nigeria can take advantage of the potentials of the development of ICTs for optimum poultry production by applying its tools to poultry production.

The objective of this study is to investigate the level of ICT (information and communication technology) tools involvement in poultry brooding system among poultry farmers.

1.1. Computer Networking

Sutton (2012) noted that computer networking is the scientific and engineering discipline concerned with communication between two or more computer systems-a computer network involving at least one being a general purpose computing platform such as a PC. Computer networking is considered Sub-discipline of telecom and often also of computer science, information technology and computer engineering, especially where these are concerned with parallel processing.

A computer network or data network is a telecom that allows computers to exchange data. In computer networks, networked computing devices (network nodes) pass data to each other along data connections. The connections (network links) between nodes are established using either cable media or wireless media (Sutton, 2012).

A computer network is, literally, a network of computers (BUZZLE, 2013). Each computer in the network is connected through a transmission medium such as ethernet cable wiring. There are many different kinds of computer networks, such a LAN, MAN or WAN. There are also many different types of network topologies (a.k.a backbone network structures). A LAN (local area network) typically consists of a fewer number of computers (hundred or even less). The computer network in any single establishment or building will have a local area network. A metropolitan area network (MAN) is a network of many LAN's. When all these networks are connected together, a WAN (wide area network) is formed. There are also ethernet protocols (such as TCP/IP, according to which communication in a computer network takes place). When all the above issues are taken care of, then a smooth running computer network is established (Buzzle, 2013).

Wireless network refers to any type of computer network that is not connected by cables of any kind (Adewumi et al., 2013). It is a method by which homes, telecommunications networks and enterprise (business) installations avoid the costly process of introducing cables into a building, or as a connection between various equipment locations (David, 2004). Wireless telecommunications networks are generally implemented using a transmission system called radio-waves. This implementation takes place at the physical level (layer) of the OSI model network structure (Adewumi et al., 2013).

1.2. Computer Hardware

According to Thiruvasagamani (2008) cited in IT acumens Hardware is a comprehensive term for all of the physical parts of a computer, as distinguished from the data it contains or operates on, and the software that provides instructions for the hardware to accomplish tasks. The boundary between hardware and software is slightly blurry - firmware is software that is “built-in" to the hardware, but such firmware is usually the province of computer programmers and computer engineers in any case and not an issue that computer users need to concern themselves with.

A typical computer (Personal Computer, PC) contains in a desktop or tower case the following parts:

- Motherboard which holds the CPU, main memory and other parts, and has slots for expansion cards
- power supply - a case that holds a transformer, voltage control and fan

- Storage controllers, of IDE, SCSI or other type, that control hard disk , floppy disk, CD-ROM and other drives; the controllers sit directly on the motherboard (on-board) or on expansion cards
- Graphics controller that produces the output for the monitor
- The hard disk, floppy disk and other drives for mass storage
- Interface controllers (parallel, serial, USB, Firewire) to connect the computer to external peripheral devices such as printers or scanners (Thiruvasagamani, 2008).

1.3. Close Circuit Television Camera (CCTV Camera)/Surveillance Camera

CCTV Camera is defined by Smith (2007) as a television system in which a signal is transmitted from a television camera to the receiver by cables or telephone links forming a closed circuit as used in security system. It is a telecommunication system that transmits images of object (stationary or moving) between distant points (Smith, 2007). They are video cameras used for the purpose of observing an area, often connected to a recording devices or IP network (Roberts, 2010).

In agriculture, according to Harris (2011), a comprehensive system of surveillance cameras can help protect your farm, protect costly farming resources, livestock, your poultry and equipment, reduce security cost, stop unauthorized access and ensure workers safety as well as help you remain competitive in a growing market. Over time theft or damage of facilities, equipment or livestock can mean a huge set back financially to you but surveillance cameras can be placed around the farm to help monitor your employees and to ensure operations run smoothly in the farm enterprise (Harris, 2011)

1.4. Alarm Device or System

Wikipedia (2013) defined an alarm as a device which gives an audible visual or other form of alarm signal about a problem or condition. According to Farmalarm (2013), Alarm system in the poultry farm is a unique monitoring system designed specifically to help protect your poultry barn from mortality loss. Farm alarm can monitor; power, temperature, water ventilation controller, curtain, feed over run, generator, and customized settings by the farmer.

1.5. Temperature Sensor/Thermometer

Boghossian (2006) defined temperature sensors as devices used to measure the temperature of a medium. There are 2 kinds on temperature sensors: Contact sensors and Noncontact sensors. However, the 3 main types are thermometers, resistance temperature detectors, and thermocouples. All three of these sensors measure a physical property (i.e. volume of a liquid, current through a wire), which changes as a function of temperature. In addition to the 3 main types of temperature sensors, there are numerous other temperature sensors available for use.

- **Contact Sensors**: contact temperature sensors measure the temperature of the object to which the sensor is in contact by assuming or knowing that the two (sensor and the object) are in thermal equilibrium, in other words, there is no heat flow between them. Examples include; thermocouples, resistance temperature detectors (RTDs), full system thermometers, bimetallic thermometers.
- **Noncontact Sensors**: most commercial and scientific noncontact temperature sensors measure the thermal radiant power of the Infrared or Optical radiation received from a known or calculated area on its surface or volume within it. An example of noncontact temperature sensors is a pyrometer (Boghossian, 2006).

1.6. Poultry Production Phases

- **Brooding Phase**: brooding refers to the period immediately after hatch when special care and attention must be given to the chicks to ensure their health and survival. Bramwell (2010), notes that during the brooding phase, damage can be caused in the first two weeks of life that may not noticed until later. During this stage the chick has a developing immune system and inefficient temperature regulation and exposure to stressful situation could lead to the loss of uniformity in the flock. Creating 'comfort zone' for the chicks, allowing access to heat, feed and clean water at all times, is essential (Bramwell, 2010).
- **Rearing Phase**: this is the remainder of life after brooding until sexual maturity. During rearing phase, feeder space must be considered, as it is crucial that all males eat simultaneously to maintain uniformity among the flock. Placement density must be 2.5ft minimum, per male and nipple must be provided for each 8 cockerels, and 1 bell drinker for each 60 cockerels. It is also important to check 'Vaccine Takes' to maintain a good male program (Bramwell, 2010).
- **Production Phase:** this is the life of the birds when it is sexually matured and ready to produce (laying eggs and meat production), these are given from the fifth week to eighth week for broiler when they attain market weight it is known as the finishing phase (Oviedo-Rondon, 2008).

1.7. Temperature and Chick Performance

According to Fairchild 2012, one of the goals during brooding is to maintain chicks within their comfort zone, which is where they are not using energy to gain or lose heat to maintain body temperature. When birds are kept in environmental temperatures above or below their comfort zone, more energy must be expended to maintain body temperature. This extra energy will ultimately be supplied by the feed consumed. Therefore, the energy from the feed will be used to maintain body temperature instead of growth and development resulting in poorer feed conversion. Thus, the environmental temperature plays a major role in determining the cost of producing a pound of meat or a started pullet. Proper brooding not only consists of maintaining proper temperature but also the use of

good husbandry practices. Brooding temperatures will vary depending on whether the heat source is air furnace, conventional brooder or radiant brooder, when brooding chick's floor temperature is crucial. Research suggests that average floor temperature should be 90°F (32°C) on the day that chicks are placed in the house (Fairchild, 2012).

1.8. Heat Requirement for Poultry Brooding

Hamre (2008) specified that the temperature where the birds are housed should be 90^0F to 95^0F measured 2 inches off the floor under the edge of the hover for the first week. Reduce the temperature 5^0F per week until it gets to 70^0F. This is usually when your chicks are between 4-5 weeks old and pretty well covered with their new feathers. Then they shouldn't need any more heat. Provide $^1/_2$ square foot of brooding house space per chick for optimum heat. A good source of heat is a 250 watt bulb or infrared lamp, hanged 18 inches from the floor at average house temperature of 50^0F. The temperature directly under the bulb will be higher than 90^0F but the birds will adjust themselves to the area they like. Use 1 bulb for each 50 chicks in cold weather. Use 1 bulb for each 100 chicks in warm weather. When involved a few chicks in a small area, a smaller watt bulb (no lower than a 75 watt) will work. The smaller watt bulb is closer to the chicks for the appropriate warmth (Hamre, 2008).

1.9. Statement of Hypothesis

- Ho**:** Educational background has no significant effect on the involvement of ICT tools in poultry brooding system.

2. Methodology

2.1. Research Design

- Survey: The major instrument that was used for the study is the questionnaire. The Structured questionnaire was used because of its relative merit of equal chance of selection, impersonal nature, standardized wordings and instructions for recording purposes, which ensure uniformity from one measurement situation to another. Its impersonal nature provides anonymity, which is almost absent in all other forms of data collection and thus yield a higher rate of responses. This survey instrument generates quantitative data.

2.2. Study Population and Characteristics

A total of 30 respondents were used for the study comprising respondents that operates both mini and standard poultry brooding system within the study area (Ido Local Government, in Oyo state).

2.3. Sources of Data and Research Instruments

For the purpose of this study, the primary and secondary data source was used. While the questionnaire serves as the primary source of data, Journals, Magazine, Federal Office of Statistic Bulletins as well as the internet will be contacted as secondary sources of information. The 5-point scale was used in the study for this section because it allows for the intensity of perception as expressed by respondent participation. Respondents could "strongly agree or agree or undecided or disagree or strongly disagree" Oscamp (1977) postulated that the Liker method was the initial item pool. The respondents was required to simply tick (√) on the opinion which best satisfied their response.

Also, the research questionnaire was classified into section as follows:

- Section A; Socioeconomic characteristics of the poultry farmer in the study area.
- Section B; General investigation on poultry brooding system
- Section C; Awareness of ICT tools to poultry brooding system
- Section D; Perception of operator on stress management in poultry management system
- Section E; Solution to the brooding problem(s) stated

2.4. Administration of the Research Instrument

The nature of the problem necessitates combination of qualitative and quantitative methods for data collection. These include survey method for quantitative data and personal interview for qualitative data.The techniques were used in order to elicit relevant information to the study.

2.5. Method of Data Presentation

The data collected through the questionnaire was coded and analyzed using the sample Mean, Frequency, Percentage and Figures on the variables descriptively. Furthermore, this aspect of the research work explores deeply the educational level and involvement of ICT tools in poultry brooding system. The relationship in the hypothesis between the socio-economic variables [independent] and the effect of ICT tools in poultry system (dependent) variable will be tested using a descriptive and Chi square analysis for the Hypothesis respectively.

2.6. Re –Presentation of Research Question and Hypothesis

Hypothesis is one of the most powerful tools that provide dependable knowledge in a research work (Adetayo, 2001). There are two hypotheses of this study which are tested using inferential methods of analysis – Chi-square (χ^2) test of goodness of fit. A statistical hypothesis is made up of the null hypothesis (H_o) and the alternative hypothesis (H_a). The null hypothesis is one which renders an assumption insignificant while the alternative hypothesis contradicts the null hypothesis.

The procedure used for the Chi-square (χ^2) is as follows:

a. State the null hypothesis (H_0) and alternative hypothesis (H_1).
b. Construct the contingency table for the observed frequency (O) from the questionnaire.
c. Construct the contingency table for the expected frequency (E) using the formula:

$$E = \frac{sum\ of\ observed\ frequencies}{number\ of\ observed\ frequencies}$$

d. Calculate the Chi-square (χ^2) using the formula:

$$\chi^2_{cal} = \sum \frac{(O-E)^2}{E}$$

e. Determine the table value of Chi-square (χ^2) for one-sample test, at 5% level of significance with (n – 1) degree of freedom, n is the number of rows.

3. Result and Discussion

This section discussed the result obtained from the respondents chosen for the study. The result was studied in parts, critically analyzed and discussed under various subheadings to follow the study objectives.

3.1. Socio-Economic Data of Respondents

3.1.1. Age Classification of Respondents

The age distribution of the respondents is described in Table 1 below. The age range of respondents was observed to fall between 20 to 50 years. The largest group consists of respondents between the ages of 21-40 years with a total percentage of 76.6% while the lowest group consists of respondent with age between 41-50 years which were observed to be6.7% of the study population. This indicates that poultry production is being carried out by active adults in the study areas.

3.1.2. Description of Respondents by Sex Classification

The gender representation of the respondents was categorized into the male and the female.
As shown in the Table 2 below, 76.7% of the respondents were males while the remaining 23.3% were females. This indicates that men are actively involved in poultry production in the study population.

3.1.3. Marital Status of Respondent

The marital status of the respondents considered for this study indicated that 40.0%of the entire populations of the respondents are married while 60.0% are single.

3.1.4. Educational Background of the Respondents

The educational background of the respondents indicated that 6.7% of the study population has primary Education, 20.0% of the respondents attended the secondary school and 70.0% attended tertiary while other form education is 3.3%. This result implies that a high educational status of respondents was witnessed in the study area since percentage of respondents with tertiary education is high thus ICT involvement in poultry production is not affected by educational background in the study area.

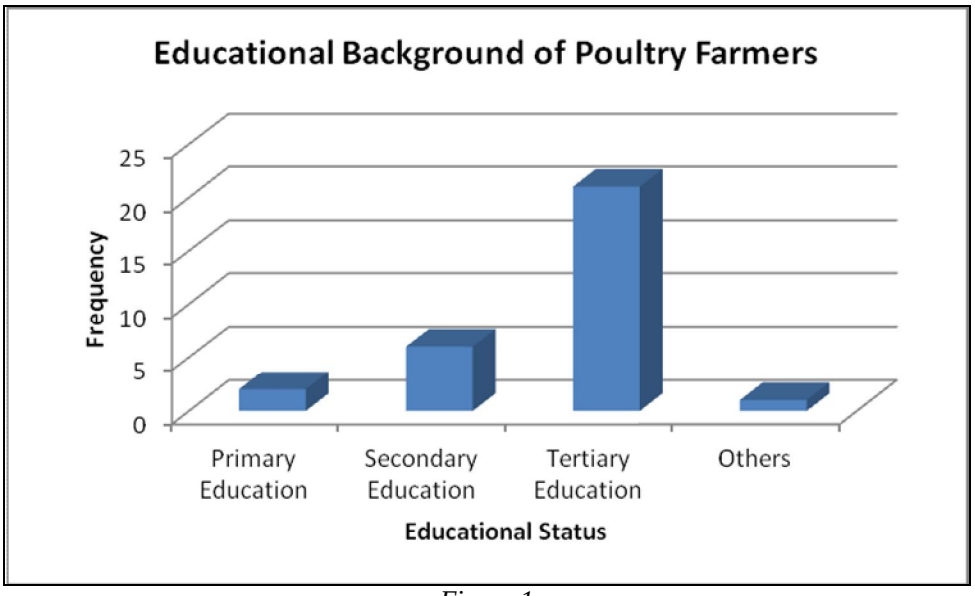

Figure 1

3.1.5. Family Size Classification of Respondents

The household size of respondents in the study area indicated that 73.3% of the respondent's have household size < 5 while other household size between 5-14 have a total percentage of 26.7%

3.1.6. Years of Brooding Experience

Table 8 below shows the brooding years' experience of the respondents. It was observed that 80% of the respondents have 5-10 years of brooding experience. This implies that most of the poultry farmers in the study area have a good brooding experience.

The table 8 below shows the equipment involved in the poultry brooding system in the study area. The result indicates that 76.7% make use of locally fabricated equipment while the remaining 23.3% utilized imported equipment in poultry production.

3.1.7. Type of Labour Used in the Poultry Brooding System

As shown in the table 9 below, it can be observed that 60% of the respondents make use of skilled labor, 16.7% uses semi-skilled labour, while 23.3% make use unskilled labour. This implies most of the poultry brooding systems in the study area make use of skilled labour.

3.1.8. Level of Mortality Recorded in the Poultry Brooding System

Table 10 below shows the level of mortality usually recorded by the respondent in poultry brooding system. The result indicates that most of the respondents faced moderate level of mortality rate in poultry brooding system in the study area since it comprises of 56.7% of the respondents.

3.1.9. The Use of ICT Tools in Poultry Brooding System

Table 9 below shows respondent's use of ICT tools in poultry brooding system in the study area. The result indicated that 70% of the respondents make use of ICT tools in poultry brooding system. This means that most poultry farmers in the study population rely on ICT tools for improved poultry production.

3.1.10. Access to the Use of ICT Tools

The finding in the table 12 below shows that 63.3% of the respondents regularly have access to the ICT tools. This implies that there is easy access to the use of ICT tools in the study area.

3.1.11. Major Constraints Faced to the Use of ICTs

Table 13 below shows that the major constraints faced to the use of ICTs among respondents in the study area. Form the result it can be observed that majority (40.0%) of the respondents face epileptic power supply as major constraint to the use of ICTs while high cost of ICT tools is the least constraint.

Perception	Agree		Strongly Agree		Undecided		Disagree		Strongly disagree /(Decision)	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Poultry system can be more profitable with the use of modern ICT tools	19	63.3	7	23.3	1	3.3	2	6.7	1	3.3/(A)
The allocation of man power can be properly monitored via ICT tools in poultry system	16	53.3	9	30.0	4	13.3	1	3.3	-	-/(A)
Involvement of ICT tools can reduce stress in poultry system	15	50.0	6	20	5	16.7	2	6.7	2	6.7/(A)
Use of CCTV camera will help to reduce drudgery in poultry system	17	56.7	7	23.3	5	16.7	1	3.3	-	-/(A)
Poultry farming should make use of CCTV camera	16	53.3	5	16.7	7	23.3	1	3.3	1	3.3/(A)
Regular training, seminars and workshop should be compulsory for all poultry farmers on the use of ICT tools.	20	66.7	7	23.3	3	10.0	-	-	-	-/(A)

Table 1

3.2. Chi-Square Analysis

The test of relationship between educational level and involvement of ICT tools in poultry brooding system among the respondent in the study area indicated that ($P > 0.05$) that is, there is significant effect between the educational level and involvement of ICT tools in poultry brooding system. The test was tested at a 94% confidence interval level. The implication of this result is that, their knowledge transcends into the practices that they are involved in and has affected their level of production.

The educational attainment of the respondents is said to be high and in turn led to their production and practices involved in.

Decision Rule: If $p< 0.05$ null hypothesis will be rejected (**S =** Significant, NS = Not significant)

Parameters	Chi-Square	d.f	Asymp. Sig.	Decision
AGE	9.73	3	0.020974	S
SEX	8.53	1	0.003487	S
Religious	16.2	2	0.000304	S
Ethnic Group	67.6	3	1.39E-14	NS
Educational Background	34.26	3	1.74E-07	NS
Are you aware of ICT?	8.53	1	0.003487	S
Which level of mortality did you usually recorded in the poultry brooding system	8.6	2	0.013569	S
CCTV surveillance camera will help to reduce number of labour in the brooding system	30.33	4	4.19E-06	NS
Use of CCTV camera will help to reduce drudgery in poultry system	18.53	3	0.000341	S

	Chi-Square	d.f	Asymp. Sig.	Decision
Poultry farming should make use of CCTV camera	25.33	4	4.31E-05	NS
Bird temperature management	14.33	4	0.006304	S
Use of temperature sensor management will help in poultry brooding system	14.67	4	0.005445	S
Regular training, seminars and workshop should be compulsory for all poultry farmers	15.8	2	0.000371	S
Poultry system can be more profitable with the use of modern ICT tools	39.33	4	5.94E-08	NS
Involvement of ICT tools can reduce fatigue in poultry system	24	4	7.99E-05	NS
Involvement of ICT tools can reduce stress in poultry system	19	4	0.000786	S
The allocation of man power can be properly monitored via ICT tools in poultry system	17.2	3	0.000643	S

Table 2

4. Conclusion

Based on the research work it could be concluded that majority of the people in the study area (Ido local Government Area Ibadan Oyo state), that are involved in the use of ICT tools in poultry brooding system are educated and have easy access to the ICT tools. Poultry farming in the study area is male dominated, and they are still in their active age and can make effective use of ICTs for improve poultry production. Also epileptic power supply is the major constraint majority of the farmers in the study area faced in the use of ICT tools and this may lead to low poultry production since most of the farmers rely on ICT tools for improved poultry production.

5. Recommendations

In order to alleviate the constraints observed from this research project in the study area, the following recommendation are hereby given: There should be regular supply of power and also provision alternate source of power to the farmers, availability of new innovated ICT tools for optimum poultry brooding system, more network provision to the area of study and provision of loans by public and private sector to farmer that can't afford the use ICT tools in poultry brooding system.

6. References

1. Adejo, P.E and Haruna, U. (2009): Access of Farmers to ICTs for Agricultural Development in Bauchi Local Government Area, Bauchi State. Proceedings of the 43rd Annual Conference of the Agricultural Society of Nigeria held in Abuja, 2009
2. Adewumi, I. O., Ijadunola, J. A., Augustus, E. O., Omoyajowo, O. A. and Oladejo, L. F. (2013). ICT & Agricultural Education: Teaching Model of Wireless Network Installation. International Journal of Applied Research and Technology. 2 (8): 193 – 201.
3. Amanda Beutler (2007), Msc. Department of Animal and poultry science college of Agriculture and Bio-Resources University of Saskatchewan.
4. Apantaku, S.O., Omotayo, A.M. and Oyesola, O.B. (1998): Poultry Farmers willingness to participate in NACIC Scheme in Ogun State. In: Oduguwa et al., (eds) Proceeding of the Silver Anniversary Conference of NSAP Gateway Hotel Abeokuta, pp.542.
5. Ardemis Boghossian (2006) "High/low temperature sensor" http://www.wikipedia.com
6. CTA (2003): ICTs- Transforming Agricultural Extension, An e-discussion, 20th August to September, 2003.
7. Daintith John, ed. (2009) "IT" A dictionary of physics, oxford university press, retrieved 1 August, 2012 (subscription required).
8. Edgar O. Oviedo-Rondon (2008). DVM, PhD., Dipl., Acpv, Extension broiler breeder and cooperative extension: "Early management sets flock performance".
9. Farmalarm (2013): "prevent catastrophic mortality loss and sleep better at night with farm alarm monitoring systems" http://www.farmalarm.com

10. FOLDOC (2013): "information and communication technology from" FOLDOC: http://www.wikipedia.com. Retrieved 2013-08-18
11. Gistarea (2013): "Poultry production-marketing problems of poultry farming in Nigeria" http://www.gistarea.com
12. Harris (2011): "Agriculture CCTV; benefits, risk and factors to consider when setting up a farm video security camera".
13. Lyon David (2001): "Surveillance society: monitory in everyday life. Philadelphia: Open University press, ISBN 987-0-335-20546-2.
14. Meluin L Hamre (2008): "The small flock for poultry meat" ww-01188. Retrieved 2008
15. Nahshon Roberts (2010): "What you should know about surveillance camera"
16. Olaniyi O.A (2013): Assessment of utilization of information and communication technologies (ICTs) Among poultry farmers in Nigeria: An emerging challenge. Transnational Journal of science and technology, June 2013 edition Vol. 3. No 6 ISSN 1857-8047.
17. Omotayo, O.M. (2005): ICT and agricultural extension: Issues in transferring agricultural technology in developing countries. Proceedings of the annual conference of AESON, Adedoyin, S. F (Ed) Ilorin, AESON pp. 159-169.
18. Osuagwu, D. E. (2001): "New technologies and services in internet businesses". Journal of Professional Administration, July - Sept, 29-41.
19. R.E Austic and M.C Nesheimlea and Febiger (1990) "poultry production"Philadelphia, PA
20. R.E. Moreng and J.S. Avens (1985) "poultry science and production" Reston publ.co. Inc., Reston, VA.
21. Roxie Smith (2007): "Surveillance camera-A perfect measure to prevent the crime. Vol. 2, Pp. 16-24.
22. Salau, E.S. and Saingbe, N.D. (2008): "Access and Utilization of Information and Communication Technologies (ICTs) among Agricultural Researchers and Extension Workers in Selected Institutions in Nasarawa State, Nigeria". Production Agriculture and Technology (PAT) 2008; 4(2): 1-11 accessed on 23 April, 2013 from http//www.patnsukjournal.com
23. Steinfield, C., Huyseman, M., Jang, C., David, K. Veld, M., Poot, J. and Mulder, I. (2003): Virtual Terms and the appropriation. Communication Technology Exploring the Concept of Media Stickiness in Computer Supported Cooperative, 12 (4):411-435.
24. Warren, M. F (2001): Adoption of ICT in agriculture: Intrinsic and Instrumental roles in Technology in Agriculture, Food and the Environment, Montpellier, Agromontpellier, Pp. 675-675.
25. William Melody et al. (1986) "information and communication technologies": Social sciences Research and training: A report by the ESRC programme on information and communication technologies. ISBN 0-86226-179-1