

## Perceived education and training needs for agricultural librarians and information personnel in the information communications technology (ICT) era; the case for Botswana, a developing country perspective

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### Abstract:

*This paper seeks to look at the education and qualifications of agricultural librarians and information personnel in Botswana's five main agricultural information sectors. It will also look at their perception of their training by their institutions and by themselves. Whether these institutions see a need to equip them with new skills for them to compete well and provide valuable information for the country's economic development. Do the institutions and the government perceive them as an important link in the transmission of agricultural information? Botswana College of Agriculture Library (BCAL) which caters for students, teachers, lecturers, extension workers and farmers, and The Meat Inspection Training Centre (which is part of BCA and trains meat inspection personnel), Department of Agricultural Research (DAR for research scientists), The National Food Technology Research Centre Library (NFTEC), The Ministry of Agriculture, Agricultural Information Division which covers the ministry Library and Information Professionals, The Veterinary Science Laboratory Library (VET LAB). Using the survey research design and questionnaire and interview as the major data collection instruments, the three research institutions, one academic library, two institutional libraries are selected for the study. The findings will be presented in the form of tables, pie charts. The recommendations from the study will inform policy makers in making training decisions for agricultural information professionals as well as budgeting purposes. This can also be a wakeup call for the information professionals to realize what they need in order to serve their clientele well.*

**Key Words:** *Agricultural information, information personnel, economic development, training, education, librarians, information professionals, information society, information communications technology.*

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## **Introduction**

The agricultural sector is the major contributor to economic development and the most relied upon by the majority in developing countries. Agricultural information is needed for the improvement of agricultural research outputs which can help developing countries achieve food security to fight hunger and alleviate poverty. The agricultural sector is also facing a number of challenges such as population growth, shortage of water, climatic changes and urbanisation that hamper food production. Agriculture science is a specialised subject with new findings coming up now and again.

Through the era of information explosion and information communications technology, the role of an agricultural librarian and information personnel has changed drastically. This has introduced new challenges because of the way agricultural information is produced, the vast volume that it comes in, the complexity of the customers and the way it is distributed to the end user. Another challenge pointed out by Stienen, Bruinsma and Neuman, (2007) is that agricultural information is scattered on different stakeholders. These stakeholders include farmers, universities, research institutes, extension services, commercial enterprises, and non-governmental organizations. Stienen, Bruinsma and Neuman, (2007) stated that the information is often poorly documented and hard to access, and that indigenous knowledge on good practices and lessons learned about innovations is generally not captured. So for this vast knowledge to reach its intended audience it has to be mined, repackaged, transferred through the right medium on time to satisfy the need. This can only be done through trained and educated librarians and information personnel. Thus the era is where librarians and information personnel are no longer information gatherers but they now have different roles such as information consultants, web managers, data base administrators, institutional repositories managers, systems librarians, knowledge managers and marketers..

Aina (1993) reported that for agricultural libraries and agricultural information centers to function effectively in their mandate of information provision to their clientele there is the need for information professionals to be equipped with necessary skills to enable them to handle agricultural information. He further stated that developing countries and their agricultural libraries need a new generation of information professionals who take that provision of information services to customers as an integral part of their profession and are competent with proper skills to use new ICT resources available to them.

## **Statement of the Problem**

Although a number of agricultural sectors are being established in large numbers, it is perceived that these development programmes or projects have not taken into consideration the education and training of agricultural librarians and agricultural information personnel as part of an important labour force. This has also been worsened by the emergence of new ICTs that the officers have to use in their day to day information provision.

## **Objectives of the Study**

- a) To determine the training and education needs of agricultural librarians and agricultural information personnel in the ICT era.
- b) To determine the level of computerization or automation of the Botswana agricultural libraries and information divisions.

- c) To determine how skillful and knowledgeable the librarians and information personnel are in the use of ICT resources.
- d) To determine the usefulness of ICT resources in agricultural libraries and agricultural information centers.
- e) To determine the challenges associated with the application of ICT by agricultural librarians and agricultural information personnel.

### **Research Questions**

- a) To what extent has ICT been used in Botswana agricultural libraries and information institutions?
- b) What is the usefulness of the information and communication technology in Botswana agricultural libraries and information institutions?
- c) How efficient and effective is the use of ICT resources in agricultural libraries and agricultural information institutions?
- d) Do the agricultural librarians and agricultural information personnel have the needed skills in using ICT resources?
- e) What are the challenges associated with the application of ICT by agricultural librarians and agricultural information personnel?

### **Purpose of the Study**

The purpose of the study is to look at the perception of agricultural librarians and agricultural information personnel in the ICT era. The research work highlights the challenges they face when using ICT resources.

### **Significance of the Study**

- a) This study is expected to inform policy makers in making training decisions for agricultural librarians and agricultural information professionals as well as budgeting purposes.
- b) It will also be a wakeup call for the information professionals to realize what they need in order to serve their clientele well.
- c) The study will also establish the existing gaps in the adoption of information and communication technology in the operations of agricultural libraries and information centers in Botswana in order for them to achieve the desired goals.

### **Scope of the Study**

This research work is on perceived training and education of agricultural librarians and agricultural information personnel using Botswana College of Agriculture Library (BCAL), Department of Agricultural Research Library (DARL), Division of Agricultural Information (AI), National Food Technology Center Library (NFTECL) and National Veterinary Laboratory Library (VETLABL) as a case study.

### **Brief on Agricultural Sector in Botswana**

Agriculture has been very important to the country as a key to economic development and as a way of life for the people. In line with the theme of the National Development Plan 10 (NDP10) which is “Accelerating Achievement of Vision 2016 through NDP 10”, the

agricultural sector has been identified as one of the areas that have a great potential to diversify the economy and create employment, especially in rural areas. According to Vision 2016 (2009) the agricultural sector faces challenges of declining productivity and the need for sustainable methods. According to Botswana National Development Plan 10 (NDP10), since independence, Botswana has been implementing social protection and empowerment programmes aimed at reducing poverty and most of these programmes are agriculture related.

## **Background of the Five Agricultural Sectors**

### **Agricultural Information Division (Ministry Of Agriculture)**

The Division mandate is to promote agricultural and rural development in Botswana. To facilitate this policy objective, Agricultural Information provides exclusive support to the Ministry's extension service e.g. disseminate information on agricultural development programmes, policies and projects to farming communities, extension staff and interested stakeholders in the country at large. As it could be attested by sister departments over many years of its being the Division of Agricultural Information and Public Relations has enjoyed considerable reputation in performing its functions hand in hand with sister departments in implementing their various extension approaches used in teaching farmers about improved agricultural technologies and how to adapt them this being through communication and educational dimensions to achieve its goals. In its effort to promote agricultural development, the division works through the extension service by supporting rural agricultural activities. It also works as the Public relations arm for the Ministry of Agriculture. Therefore, the division must be seen to provide useful information dissemination and public relations in terms of being more responsible to the needs of the Ministry of Agriculture and the farming community at large. The Division has six sections of Publication, Broadcasting, Campaigns, Audio Visual, Graphics and Photography.

### **Agricultural Research Department Library**

The overall mandate of the Department of Agricultural Research is to carry out research to generate improved crop and livestock production technologies that promote the development of a productive and environment friendly agricultural sector. The department addresses this through commodity and factor focused programmes in arable, animal and range research. The department also carries out research support services in seed production and certification, soil, plant and feed analysis and genetic resource conservation. These services are available to researchers and other clients under special conditions. The department began work sometimes in the 1930's around Mahalapye area. The library is believed to have started at this station almost the same time. The station transferred to Sebele Content Farm in 1967. It is stated that this Library is one of the first three special libraries introduced in Botswana. Ministry of Agriculture Website (2013).

### **Botswana College of Agriculture Library**

The Botswana College of Agriculture (BCA) was established on 31st May 1991 through Act no. 9 of the Parliament of Botswana. The Act abolished the then Botswana Agricultural College (BAC) which had existed since 1967. The College is a parastatal under the Ministry of Agriculture and an associate Institution of the University of Botswana. As an associate institution the College offers University of Botswana higher diploma and degree

programmes in agricultural sciences, while its responsible on its own for short courses offered by its Centre for In-service and Continuing Education (CICE). Botswana College of Agriculture (BCA) Library was set up in 1967 when the college was established. The library was situated at the centre of the campus up to 1994 when a new building was completed. The new building is situated at the end of the campus. The college is a parastatal under the Ministry of Agriculture and an associate institution of the University of Botswana. It is situated 11km north of Gaborone at Content Farm in Sebele. The library supports the teaching, learning, research and outreach activities of the College. Botswana College of Agriculture Website (2013)

### **National Food Technology Centre**

NFTRC was first established as a small project in 1984, then called Botswana Food Laboratory (BFL). BFL then evolved into the Food Technology Research Services (FTRS) in 1987, funded by the then Ministry of Commerce and Industry (MCI), but managed by Botswana Technology Centre (BOTECH). Following a comprehensive evaluation of FTRS in 1997, FTRS gained autonomy and was transformed into an independent company limited by guarantee. The company then adopted a new name, National Food Technology Research Centre. It has twelve Boards of Directors appointed by the Ministry of Communication Science and Technology. NFTRC was first established as a small project in 1984, then called Botswana Food Laboratory (BFL). BFL then evolved into the Food Technology Research Services (FTRS) in 1987, funded by the then Ministry of Commerce and Industry (MCI), but managed by Botswana Technology Centre (BOTECH). Following a comprehensive evaluation of FTRS in 1997, FTRS gained autonomy and was transformed into an independent company limited by guarantee. The company then adopted a new name, National Food Technology Research Centre. It has a board of twelve Directors appointed by the Minister. Process Design .NAFTEC library is a special library with a limited collection on research and development, on food technology, safety, chemistry, biotechnology. It was created to serve the research community though is open to public for use. It is a digital library set on open source software world. National Food Technology Center Website. (2013).

### **Botswana National Veterinary Laboratory Library**

The National Laboratory is one of the departments of the Ministry of Agriculture. The laboratory started in 1986. The laboratory provides national laboratory services through disease diagnosis, research and food quality assurance. It is situated 12km north of Gaborone. Ministry of Agriculture Website (2013).

### **Research Design**

In this study the researcher choose to use a survey as the research design. The survey was employed to collect data from a selected population using a questionnaire to determine the perceived training and education needs of agricultural librarians and agricultural information personnel.

### **Population of the Study**

The population of this study covers all the professional and paraprofessional staff of the five agricultural libraries and agricultural information division selected.

**Table 1 .Population of Study**

<b>Number</b>	<b>Library/Information Department</b>	<b>Professional Staff and para-professional</b>
<b>1.</b>	Agricultural Information Division	<b>29</b>
<b>2.</b>	Agricultural Research Library	<b>1</b>
<b>3.</b>	Botswana College of Agriculture (BCA)	<b>18</b>
<b>4.</b>	National Food Technology Centre Library (NFTEC)	<b>1</b>
<b>5.</b>	Veterinary Laboratory	<b>1</b>
	<b>Total</b>	<b>50</b>

Table 1 shows staff population in the five agricultural libraries and information divisions used for the study. As shown in the table 1 Agricultural Information has 29 professional and para-professionals, Agricultural Research Library has 1, Botswana College of Agriculture has 18, National Food Science and Technology has 1 and Veterinary Laboratory has 1 staff members. All these are professional and paraprofessional personnel in the five selected institutions. Since the number of the population is small (that is, 50) the whole population was used for this study rather than a sample.

### **Data Collection Instruments**

The main research instrument used for the research was the Questionnaire designed by the researcher. The choice of this instrument was prompted by its reliability and validity of the answers. The questionnaire was divided into four sections A-D.

**Section A:** Information on demographic personal data of the professional and Para-professional staff.

**Section B:** Information about the level of computerization/ automation and usefulness of ICT

**Section C:** Information relating to the skills in using ICT resources and challenges in using ICT resources.

**Section D:** Information on institutional commitment to training and educating agricultural librarians and information personnel.

### **Method of Data Collection**

Fifty (50) copies of Questionnaire (100% of the population) were administered to the Professional and the Para-professional agricultural library and information personnel of these five selected agricultural sectors being: Agricultural Information Division, Botswana College of Agriculture Library, Department of Agricultural Research Library, National Food Technology Center Library and National Veterinary Laboratory Library.

The researchers administered the copies of the Questionnaires to the respondents through email and personally. The sections which needed clarification were explained to the

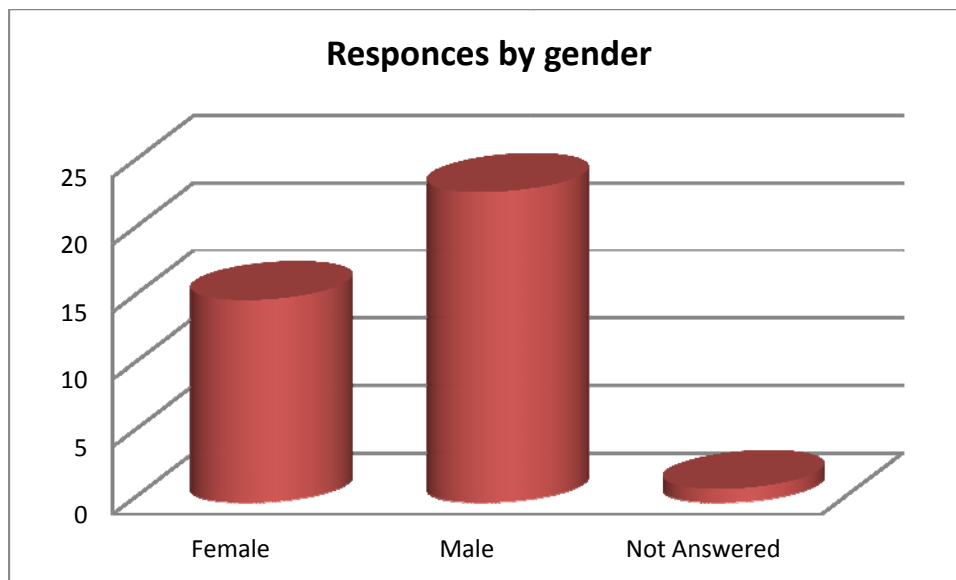
respondents. Out of the 50 copies of the Questionnaire administered, 39 (78%) were returned to the researcher at the end.

## Data Analysis, Presentation of Results, and Discussion

### Data Analysis

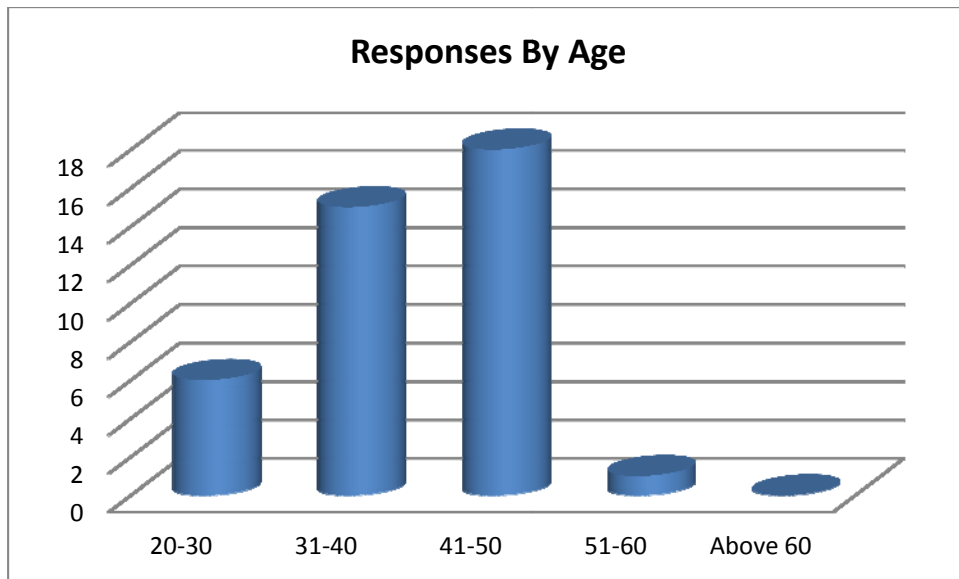
#### SECTION A: DEMOGRAPHIC DATA

Fifty questionnaires were administered to both professional and paraprofessional staff in the five institutions selected. Thirty nine (39) (78%) copies of the Questionnaires administered were returned.



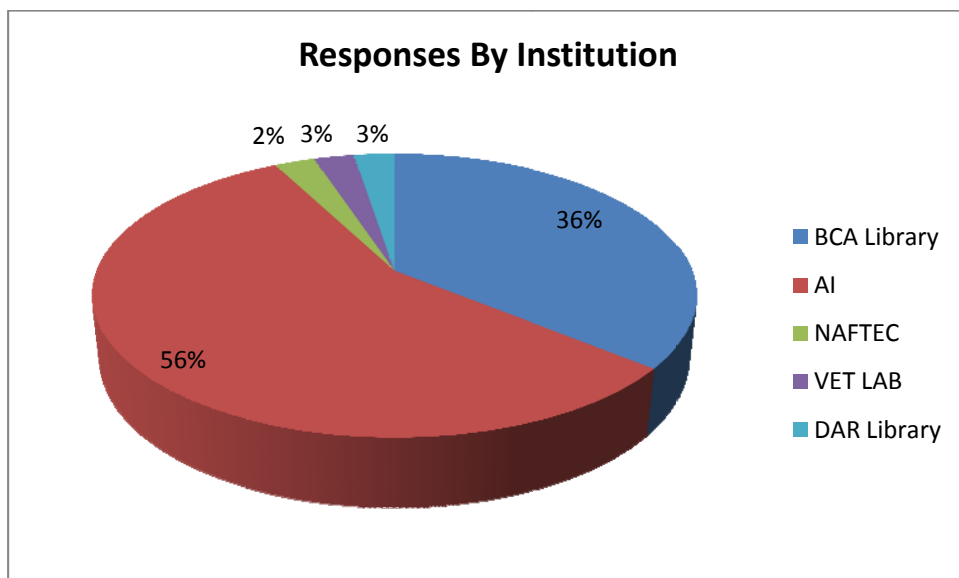
**Figure 1: Responses by gender**

The figure above shows that out of the total number of respondents from all the agricultural departments and institutions 15 (38.5%) were female while 23 (58.9%) were male and 1(2.5) of the respondent ignored the question or did not answer the question. The male staff forms the majority of the staff in both institutions understudy.



**Figure 2: Responses by age**

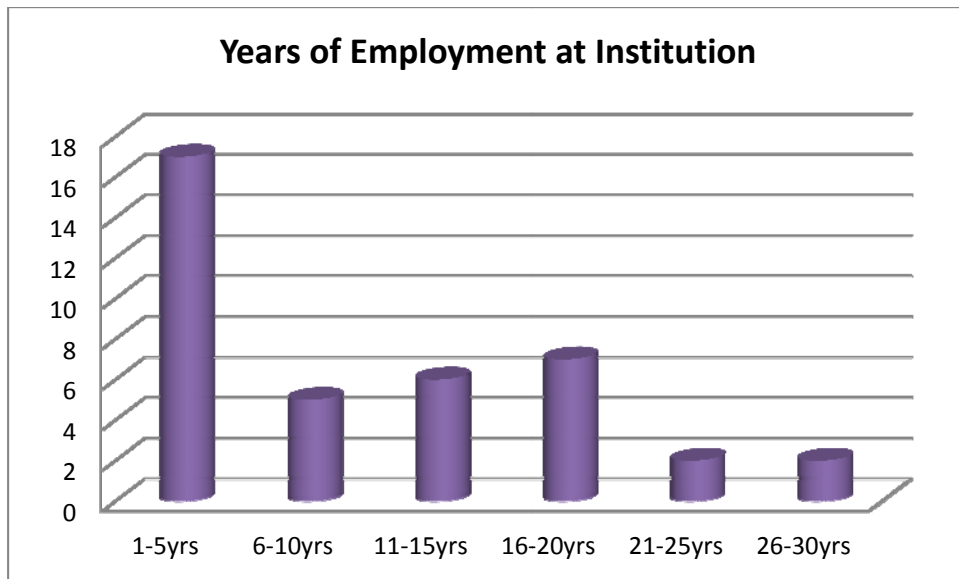
The figure above shows that most of the respondents are 41-50 years at 18 (46.15%) which form the majority of the respondents, followed by 31-40 years at 15 (38.46%), 30-35 years at 6 (15.38%), 51-60 years at 1 (2.56%) and none above 60 years.



**Figure 3: Responses by institution**

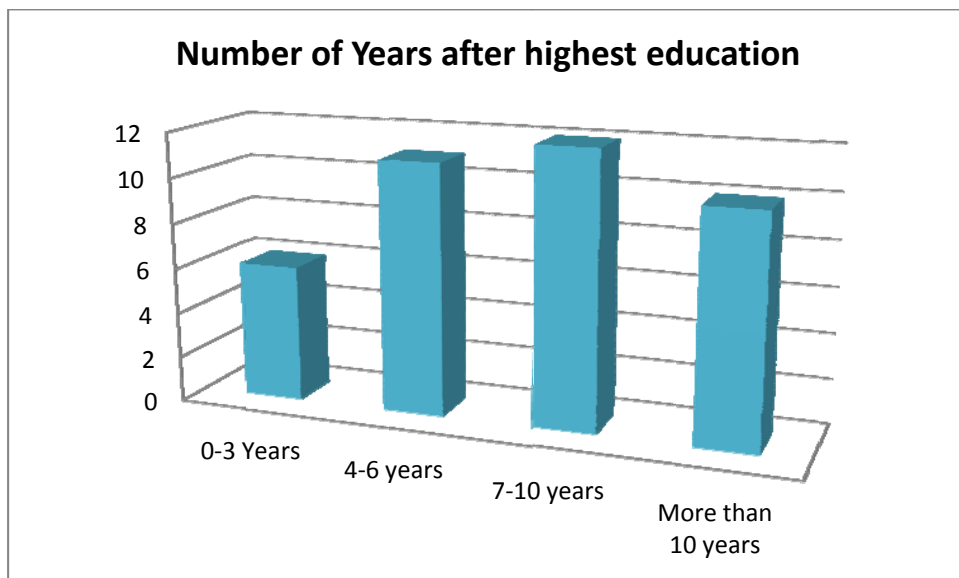
The figure above shows that most of the respondents came from Agricultural Information (AI) at 22 (56%) followed by Botswana College of Agriculture (BCA LIBRARY) at 14(38%), Department of Agricultural Research (DAR LIBRARY) with 2 respondents at 3%, National Veterinary Laboratory (VET LAB) with 2 respondents at 3% and National Food Science and Technology Center (NAFTEC) with 1 respondent at 2%.





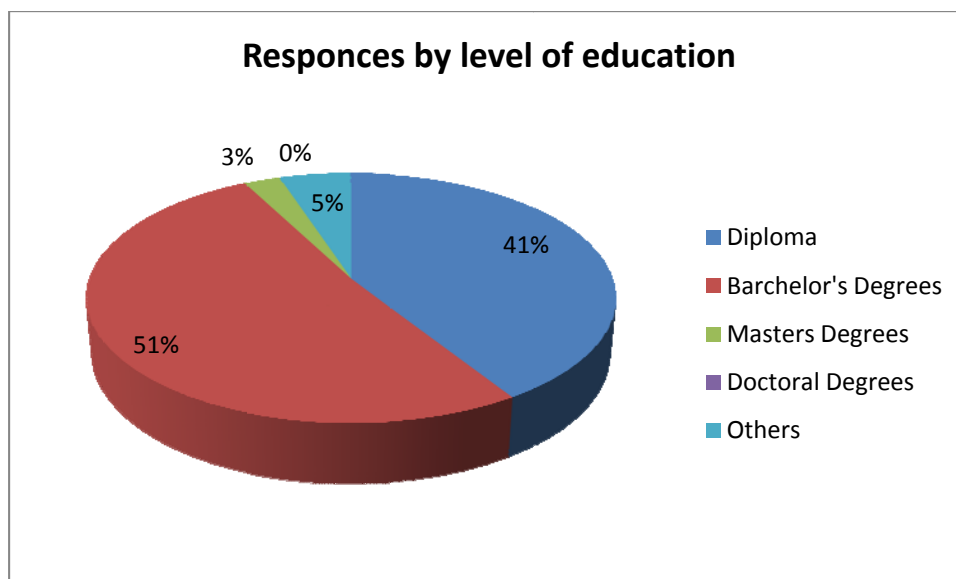
**Figure 4: Year of Employment**

Figure 4 above shows that 17 (43.6%) of respondents have been working for the past five at their institutions followed by 7 (17.9%) who have worked for 16-20 years, 6 (15.38 %) who worked for 11-15 years, 5 (12.8 %) who worked for 6-10 years and 2 (5.12 %) who worked for 21-25 years and 2 (5.12 %) who worked for 26-30 years.



**Figure 5: Number of years after highest qualification**

Figure 5 above shows the number of years since the respondents finished they acquired their professional education. Twelve have been working from 7-12 years after professional qualification, 11 have 4-6 years after qualification, 10 have been working for more than ten years after acquiring their professional qualification while 6 have been working for the last 3 years after being qualified.



**Figure 6: Responses by level of education**

Figure 6 above show responses by level of education. There highest number is a Bachelor’s Degree at 51 % (20) followed by Diploma at 41% (16), others at 5% (2) and Master’s at 3% (1) respectively. No respondents in PhD.

**Table 2: Qualification of respondents**

Qualification	Number	Percentage
Library Studies	22	56%
Media Studies	2	5 %
Journalism	1	3%
Graphic Design	9	23%
Computer Science	1	3%
Animal Science	1	3%
Others	3	7.9
<b>Total</b>	<b>39</b>	<b>100</b>

Table 2 above shows that 22 (56%) respondents have qualifications in Library Studies, 9 (23%) Graphic Design, 3 (7.9%) other training, 2 (5%) Media Studies, 1 (3%) Computer Science, 1 (3%) Journalism and 1 (3%) BSc Animal Science.

## SECTION B: AUTOMATION OF SERVICES

**Table 3: Software Used**

No.	Library/Information Department	Software Used	Software Type
1.	Agricultural Information Division	1. In Design 2. Final Cut 3. BookDB2	Commercial Commercial Open Source Software
2.	Agricultural Research Library	Not automated	Not automated
3.	Botswana College of Agriculture (BCA)	Innovative Millennium Library System	Commercial
4.	National Food Technology Centre Library (NFTEC)		Open Source Software
5.	Veterinary Laboratory		Open Source Software

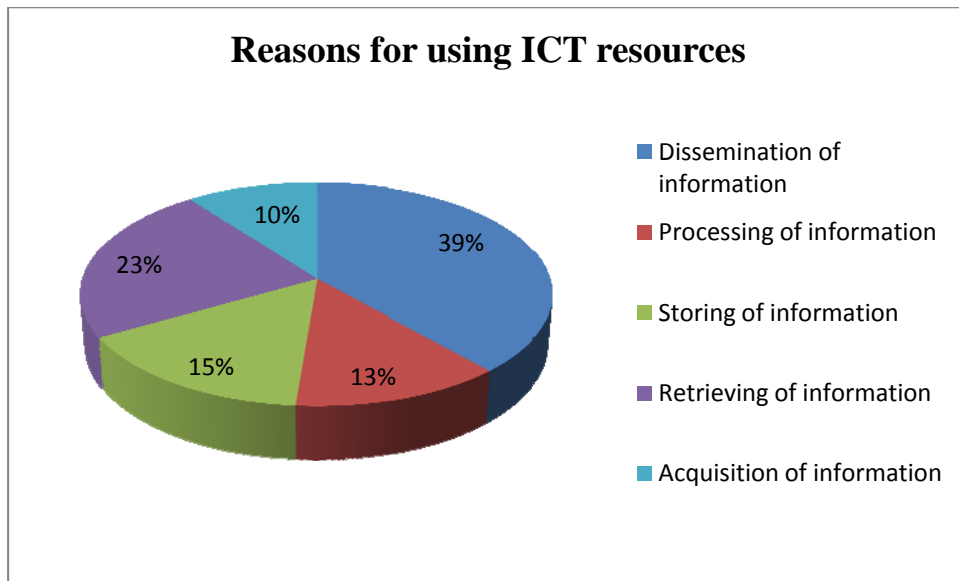
Table 3 above shows the types of softwares used by the five agricultural institutions. It shows that only four institutions are computerized being Agricultural Information Division, Botswana College of Agriculture, National Food Technology Center Library and National Veterinary Library. Two use open source softwares that are National Food Technology Centers and National Veterinary Laboratory; one Botswana College of Agriculture uses commercial software while the other, Agricultural Information is using both open source software at the library and at the call center and a commercial one at accounting and supplies.

**Table 4: Services that are automated**

No.	Library/Information Department	Automated Services
1.	Agricultural Information Division	Accounting and supplies, library services, agrinews magazine, livestock identification, permits imports and exports, livestock and horticultural produce, forms, messages to farmers (sms)
2.	Agricultural Research Library	None
3.	Botswana College of Agriculture (BCA)	Circulation, cataloguing, serials, acquisitions
4.	National Food Technology Centre Library (NFTEC)	All library services, institutional repository
5.	Veterinary Laboratory	Library collection

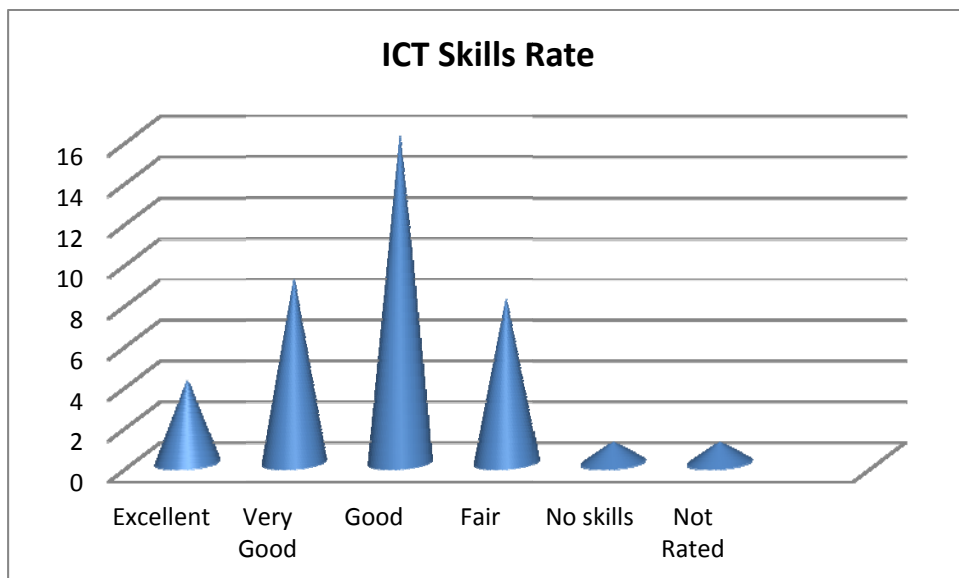
Table 4 shows that of the four agricultural institutions that are automated a number of services are automated they use ICT for different services includes all library services of acquisition, cataloguing and classification, circulation and serials. Other services are free cell phone messages to farmers, livestock identification databases, forms, the newsletter and information on imports and exports and the agricultural produce.

**Figure 7: Use of ICT Resources**



The respondents were asked what they use ICT resources for. A number of uses were given from both institutions that they use ICT resources to acquire information, process information, store information, and retrieve information and to disseminate information to their customers. On this question the majority of the respondents use ICT for retrieving information these are 17 (53.4%) followed by those who use ICT to disseminate information at 9 (23%), store information at 6 (15.38%), to process information at 5 (12.18%) and lastly to acquire information at 2 (5.1%).

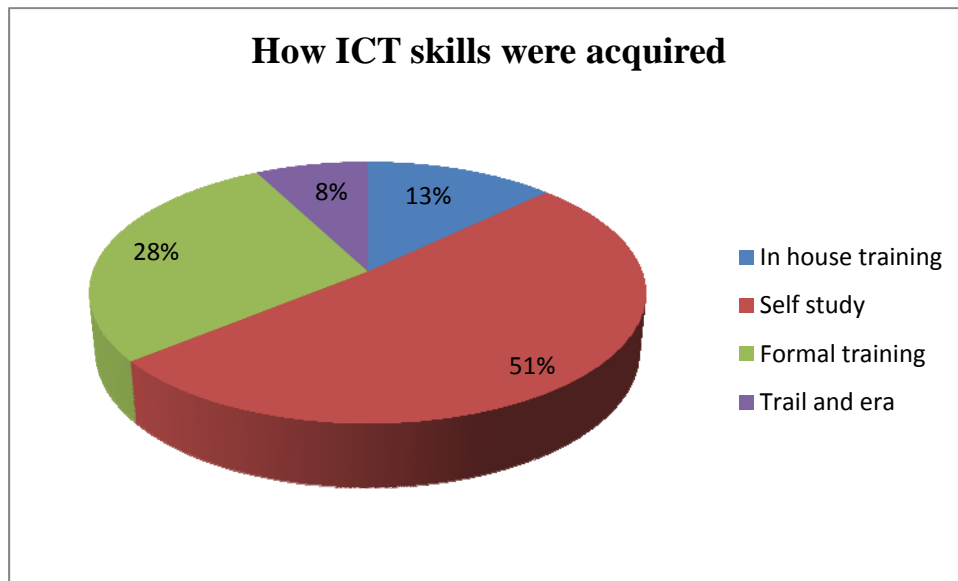
**SECTION C: PERCEIVED TRAINING AND EDUCATION ON ICT**



**Figure 8: ICT skills rate**

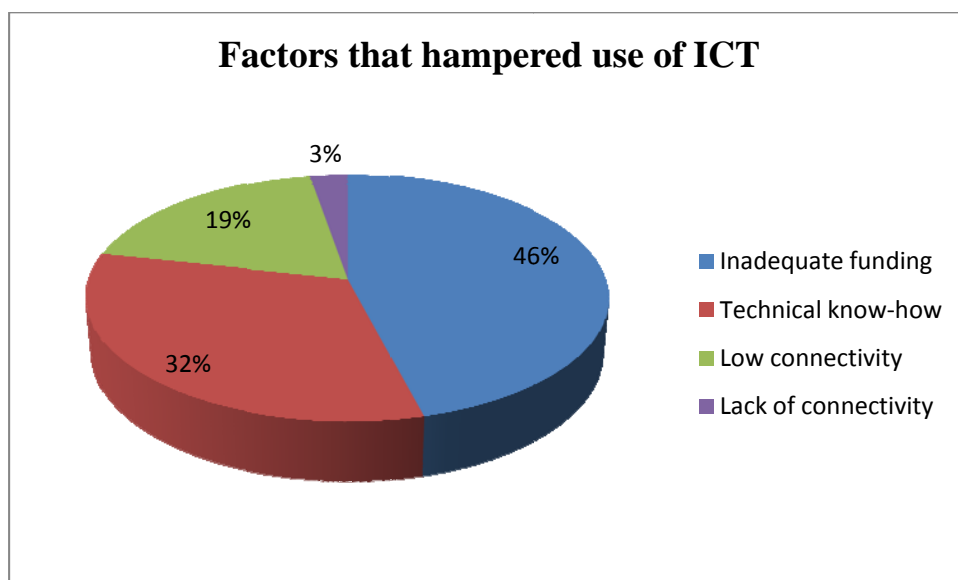
Figure 8 shows that the majority of the respondents who have good computer skills at 16 (41%), followed by those that have very good computer skills are 9 (23%) respondents, 8

(20.5%) who have fair computer skills, 4(10.4%) who have excellent computer skills, 1 (2.56%) and 1 unrated.



**Figure 9: How the skills were acquired**

The respondents were asked to say how they acquired the ICT skills. 51% (20) reported that they acquired skills through self-study followed by 28% (11) who went through formal training, then 13% (5) who went through in-house training and 8% who acquired the skills through trial and era.



**Figure 10: Factors that have hampered use of ICT**

Respondents were asked what factors hampered them from using ICT's. Lack of funding was quoted as the highest amongst at 17 (44%) followed by technical know-how at 12 (31%) then low connectivity at 7 (18%), then incomplete automation at 2 (5%) and lack of connectivity at 1(2%) respectively.

## Suggestions to improve training and education

The respondents were asked to make suggestions to improve training and education of agricultural librarians and information personnel. They made the following suggestions:

- Improve connectivity
- Purchase ICT equipment
- Allocate funds for training
- Identify relevant skills and train
- Use open source softwares
- In-house training
- Formal training
- Increase connectivity
- Open social media
- Workshop top management
- Refresher courses
- Attachments to other departments

## SECTION D: BUDGETS FOR TRAINING- FOR MANAGEMENT

**Table 5: Budget for staff training**

No.	Institution	Any Budget	If No Why
1.	Agricultural Information Division	Yes	
2.	Agricultural Research Library	No	Not a priority
3.	Botswana College of Agriculture (BCA)	No	Management does not consider it as a priority
4.	National Food Technology Centre Library (NFTEC)	No	Not a priority
5.	Veterinary Laboratory	No	Not a priority

According to table 5 above only one agricultural institution that Agricultural Information Division has a training budget for ICT skills. The rest of the institutes indicate that during allocation of funds and budgeting ICT skills training is not considered as a priority.

## Identified Skills Most Needed

The following were skills identified as urgently needed by the respondents:

- Use of illustrator in production
- Data analysis skills
- Content management skills (web-based)
- Knowledge management systems
- Metadata
- Digitization
- Classification of e-resources

- Library 2.0
- Web 2.0
- Photo editing skills, use of digital cameras

## **Discussion of Findings**

The target population was 50 agricultural librarians and agricultural information personnel from the five agricultural information centers/institutions in Botswana. The response rate was 39 (78%). The following discussion focuses on the results of the quantitative analysis of the survey data. The discussion of the results is presented according to the overall objectives of the study, and the discussion is presented section by section, with each section focusing on each of the objectives of the study.

### **Objective 1: To determine the training and education needs of agricultural librarians and agricultural information personnel in the ICT era.**

The findings show that the agricultural librarians and agricultural information personnel need training on use of ICT from the basics to the technical. The variations in the level of skills in ICT indicated that some still need training even on how to use a computer. The training could be through formal training on long or short term training. The indication is that for those who are already using ICTs they need refresher courses as new programmes emerge. This brings up the need for evaluation and identification gaps to be filled by adequate training and systems updates. The respondents highlighted the most critical skills needed as :Use of illustrator in production, data analysis skills, content management skills (web-based), knowledge management systems, metadata, digitization, classification of e-resources, library 2.0 , Web 2.0, photo editing skills and the use of digital cameras.

### **Objective 2: To determine the level of computerization or automation of the Botswana agricultural libraries and information divisions.**

The findings show that four of the agricultural libraries/institutions are computerized, Agricultural Information Library and their call center, Botswana College of Agriculture Library, National Food Technology Center and National Veterinary Laboratory Library. The first two are using commercial software while the other two are using open source softwares.

### **Objective 3: To determine how skillful and knowledgeable the librarians and information personnel are in the use of ICT resources.**

The findings show that a relatively number of the respondents' has good at 16(41%) ICT skills while only a few are excellent in using ICT resources. This is attributed to the fact that most of the agricultural librarians and information personnel have had formal training.

### **Objective 4: To determine the usefulness of ICT resources in agricultural libraries and agricultural information centers.**

It has been revealed that ICT are very useful in disseminating agricultural information as well as retrieving information on the subject. Some of the social media networks are used to communicate with the intended clientele. The use of cell phone messages has been seen as a

## **Objective 5: To determine the challenges associated with the application of ICT by agricultural librarians and agricultural information personnel**

Lack of funding or inadequate funding has been identified as the major factor that hinders the use of ICT by the respondents. This then led to other factors of low connectivity, lack of connectivity, no budgets for training to limited funds for training, incomplete automation or no automation.

### **Summary of Findings**

A number of issues came out from this study but specifically below is a summary of the findings.

1. There were more male respondents than female respondents.
2. There were more respondents between the age range of 41-50 and less below 40-20 years. This shows that a large number of the respondents are older.
3. This research has a majority of Bachelor's Degree holders mostly in Library Science
4. Four agricultural libraries/institutions are computerized while two are not. The softwares used are: InDesign and Final Cut for graphic designers and media, BookDB2 for the library, Innovative Millennium Library System.
5. Two of the agricultural libraries/institutions have computerized all their services while one has only the library collection computerized.
6. The libraries/institutions use ICT resources mostly for dissemination and information retrieval.
7. Two of the libraries have their own web site and each has an institutional repository using open source software.
8. It has been very evident that ICT training in these agricultural information libraries/institutions is not a priority looking at the respondents' answers on budgeting for ICT training. Only one has a budget for this area.
9. Most of the respondents were very aware that there are changing roles for an agricultural librarian and personnel. This calls for the re-evaluation of their training needs, re-designing of their curriculums and committing to budget for system updates and maintenances. The respondents felt that it is high time for Botswana as a developing country to now realize the importance of agricultural information in the economy of the country and commit to its access.



## **Recommendations**

The following recommendations and conclusion were made from the findings:

- a. Agricultural as the main source of livelihoods needs to be given more financial support also considering the emerging technologies which can be harnessed to enhance agricultural production.
- b. ICT skills audit should be done to identify gaps and fill them through training and education.
- c. Good ICT infrastructures and facilities should be put in place. Connectivity should be reliable and where possible be supported by generators which will help during power cuts.
- d. Full automation of library services is recommended as the services complement each other for efficient and effective service delivery.
- e. Agricultural librarians and information personnel should know that they are providers of critical information to their users. They have to keep abreast with emerging technologies and new trends in their profession thus making some efforts to acquire the ICT skills on their own. They need to prove to their organizations that they are still relevant in this ICT and information explosion era.
- f. Bench marking and staff attachments should be done to help in the sharing of ideas on ICT and systems. This could encourage more community of users of one system and cut costs and encourage resource sharing.
- g. ICT literacy skills should be an ongoing exercise.

## **Conclusion**

The conclusion reached in this research is that although a number of agricultural related sectors have been established in large number, there have been some efforts though minimal to cater for the training needs of agricultural librarians and information professionals on the use of ICTs in the provision of agricultural information.

## **Limitation of the Study**

The study left out other Botswana Agricultural information centers at Botswana Meat Commission, Botswana Agricultural Marketing Board and Botswana Vaccine Institute. This was because of the financial and time constraints the researcher had.

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