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DOCTORAL THESES OF AGRICULTURAL FACULTY OF BAU: A BIBLIOMETRIC ANALYSIS FROM 1974 TO 2014

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Abstract

This paper presents a bibliometric analysis of the doctoral theses, for the period from 1974 to 2014, awarded in the Faculty of Agriculture at Bangladesh Agricultural University (BAU), Mymensingh, in the fields of agronomy, soil science, entomology, horticulture, plant pathology, crop botany, genetics & plant breeding, agricultural extension, agricultural chemistry and bio-chemistry, bio-tech, environmental science and seed science & technology. The distributions of Ph.D. theses have been analyzed and identified year-wise, subject-wise, gender-wise and guide-wise. Findings from the present study show that 277 (91.10%) PhD holders are male and 27 (8.9%) female. A total of 86 Professors supervised 304 doctoral theses in Agriculture Faculty during 1974 to 2014. PhD scholars cited journals (37.9%) and text books (31.8%). It is also revealed that no thesis was submitted during 1975-77 and 1981-1988. BAU has been producing quality agricultural scientists and technologists to take up their places in the agricultural development of the country.

Keywords

Bibliometric, Agriculture, University, Citation, Doctoral theses, Dissertations

Introduction

Bangladesh Agricultural University (BAU), Mymensingh is the first agricultural university in the country. It was established in 1961 with the main objective of improving the standard of agricultural education. BAU is producing first rate agriculturists, agricultural scientists, and technologists to effectively contribute in the agricultural development of the country. It also aims to produce skilled manpower to

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serve the country effectively as agricultural planners and administrators, agricultural bankers, creditors and above all, as devoted teachers and researchers in their fields.

The contribution of science in a developing country has to be seen in a larger context than merely in terms of Ph.D. research programmes. As a consequence of rapid development in agriculture, a virtual information explosion has taken place all over the world. Doctoral studies comprise one subset of academic carrier advancement, which has received a great deal of attention by enhancing the scholarly productivity of researchers in the developing countries.

Bibliometric studies are used to identify the pattern of publications, authorship citations and secondary journal coverage which can give an insight into the research and development of the area under consideration (Biswas, B.C. Roy and A. & Sen, B.K., 2007). Agriculture has long been considered as the backbone of the economy of Bangladesh. As such, the role of agricultural education in this country is a prime accelerator for the economic development. As a developing country, Bangladesh is still largely dependent on the development of agriculture. In turn, the development of agriculture depends on the enrichment of agricultural education and research.

According to the Annual Report of BAU-2015 a total of 4,757 of students enrolled and completed their higher education in academic year 2014-2015 and 3,134 (66%) students entered the undergraduate programme, 1,367 (28%) engaged in MS programme and 262 (6%) of the students' enrolled in PhD.

The PhD research system of the Faculty of Agriculture has constraints and limitations at different levels. This study will help define a vision for the researchers and create awareness for research in the field of agriculture in Bangladesh.

Review of the Relevant Literature

Researchers in different subject areas have carried out bibliometric studies and covered many areas by using different methodologies. A large number of bibliometric research studies in different disciplines are conducted in different countries. However, in BAU library only a limited number of bibliometric studies are recorded in the literature. This is the first attempt to conduct a bibliometric analysis of doctoral theses of the Agriculture Faculty.

Fasae (2011) worked on PhD theses of Agricultural Economics and Extension at the Federal University of Technology Akure, Nigeria. This study focuses on determining the research materials used in Master’s theses in agricultural economics during 2005

to 2009. Journals were used extensively in their citations (32%). One third of the cited articles (31%) dated back 20 years or more. Most of the cited articles were from the Journal of Agricultural Economics with 51 citations. Researchers found 20,573 documents cited the Journal of Agronomy in BAU.

Sharma et al. (1999) conducted a research on doctoral dissertations conducted on organic chemistry during 1977 to 1997 for which 4,277 citations were collected. The results showed that a majority of the citations were from journal articles. The half-life of literature in the field of organic chemistry was 27 years. By comparison, 54,268 citations (during 1974-2014) were collected from BAU by the present researchers.

Vimala (1997) supervised a research study on doctoral thesis in Biological Sciences at the Sri Venkateswara University, Tripati, India. The researcher analyzed 39,453 citations and focused the most frequently used journals was on plant physiology. It is also found that fifty (50) percent of total citations were approximately 11 years old while books were approximately 13 years old. In this research paper, researchers analyzed 54,268 citations and found that the most frequently used journals were on agronomy.

Dhiman (2000) has done a ten-year bibliometric study on ethnobotany journals published during 1989-1998. In this paper, he examines year-wise, institution-wise, country-wise, authorship pattern, range of references cited and length of the articles. Whereas researchers have completed 40 years bibliometric study at BAU on unpublished doctoral theses during 1974 to 2014.

Harwade and Dankhade (2002) investigated 23 doctoral theses in economics during the period 1996-99 at Nagpur University. The researchers showed that, books accounted for 42.77% of citations, followed by journals (32.81%), PhD theses (14.70%), newspapers (4.50%) and others (5.22%). The results revealed that the single authored papers were the highest in number. The researchers investigated 304 doctoral theses at BAU during 1974 to 2014.

Hiremath and Sangen (1988) carried out a citation analysis of doctoral dissertations in Chemistry. The result revealed that more than 89% of citations were less than 29 years old, 11% of the citations pertain to English language journals and that 56% of the literature cited were from the USA. In comparison, 37.91% journals on agronomy and 0.71 % government publications were cited by the researchers from BAU.

Lo (2010) in his study of genetic engineering research observed that, "During the past several decades, plenty of studies were done to show the productivities and research impact. There are quite an amount of studies which applied the methods adopted from bibliometrics while periodical articles were used for analyzing."

Objectives of the study

- To identify the distribution of theses during 1974 to 2014;
- To determine the major subject allocation of theses;
- To focus on the gender-wise distribution of theses;
- To find out the status of professors' supervision of theses;
- To calculate the number of citations used by researchers within the theses;

Research Methodology

A total of three hundred and four (304) researchers were awarded PhD degree from BAU during 1974 to 2014. All relevant doctoral theses have been collected and valuable data was gathered from each thesis. All data has been tabulated and recorded very carefully to evaluate the theses in detail. The collected data was sorted manually, arranged systematically by year and fed on excel sheet for extensive analysis and after that, interpretation was done. Bibliometric tools have been applied to determine the characteristics of the references used by the research scholars.

Significance of the Study

In this study, bibliometric analysis analysis has been used by the researchers to identify the user requirements. Bibliometric techniques are used for a variety of purposes like the determination of various scientific indicators, the evaluation of scientific output, the selection of journals for libraries and even the forecasting of potential Nobel Laureates (Zafrunnisha, 2012). Doctoral theses play a vital role in research environment as they present valuable information based on original research. Periodicals also are one of the main indicators and channel of literature growth for transmitting knowledge. Researchers are always seeking real facts with informative data and this study will play an important role for further research.

Limitation of the Study

There are six Faculties at Bangladesh Agriculture University, of which, the Faculty of Agriculture is the largest. The researchers have analyzed and evaluated 304 doctoral theses to fulfill the objectives of this study. A study involving other Faculties would provide a more comprehensive picture of the research outputs and impacts of the BAU.

Analysis and Discussion of Data

Table -1: Distribution of theses during 1974 to 2014

Year	Distribution theses	Percentage of	Cumulative Distribution	Cumulative Percentage	Rank
2014	11	3.62	-	-	8th
2013	10	3.92	21	6.91	9th
2012	18	5.92	39	12.83	6th
2011	23	7.56	62	20.39	5th
2010	25	8.22	87	28.61	3rd
2009	27	8.88	114	37.49	2nd
2008	18	5.92	132	43.41	
2007	25	8.22	157	51.63	3rd
2006	24	7.89	181	59.52	4th
2005	29	9.54	210	69.06	1st
2004	14	4.61	224	73.67	7th
2003	07	2.30	231	75.97	
2002	09	2.96	240	78.93	10th
2001	08	2.63	248	81.56	
2000	06	1.97	254	83.53	
1999	03	0.99	257	84.52	
1998	02	0.66	259	85.18	
1997	02	0.66	261	85.84	

1996	03	0.99	264	86.83	
1995	07	2.30	271	89.13	
1994	11	3.62	282	92.75	8th
1993	02	0.66	284	93.41	
1992	04	1.32	288	94.73	
1991	02	0.66	290	95.39	
1990	04	1.32	294	96.71	
1989	06	1.97	300	98.68	
1988	01	0.33	301	99.01	
1980	01	0.33	302	99.34	
1978	01	0.33	303	99.67	
1974	01	0.33	304	100	
	304	**100**			

Table 1 revels that chronological distribution of Ph.D. theses in 2005 is the highest at 29 (9.54%); 2009 is the second highest at 27 (8.88%), while 2010 and 2007 are the third highest at 25 (8.22%). 2006, 2011, 2012, 2004, 2014, 2013 and 2002 occupy the fourth to tenth highest positions. From 1993 to 1974 submission of Ph.D. theses was very low. 1981 to 1987 no theses were submitted at all. Only a single thesis was submitted in 1978. It is to be noted that, from 1999 to 2011, the rate of submission has substantially increased, which again started decreasing in 2012.

Table–2: Major subject allocation of theses

Year	Agro	Soil Sc.	Ento	Hort.	Plant Path	Crop Botany	GPB	Agril Ext.	Agril Chem	Bio Chem.	Bio Tech	Env. Scie.	Seed Scie.	Total
2014	0	0	1	0	2	3	1	1	0	0	2	0	1	11
2013	0	0	5	0	0	3	2	0	0	0	0	0	0	10
2012	4	2	1	0	0	2	4	0	0	0	3	1	1	18
2011	7	0	1	1	4	0	4	3	1	0	0	2	0	23

Year	Agro	Soil Sc.	Ento	Hort.	Plant Path	Crop Botany	GPB	Agril Ext.	Agril Chem	Bio Chem.	Bio Tech	Env. Scie.	Seed Scie.	Total
2010	4	3	3	3	0	0	4	1	0	0	4	3	0	25
2009	2	1	1	10	2	2	4	4	0	0	1	0	0	27
2008	8	1	1	2	2	0	1	2	0	0	1	0	0	18
2007	10	4	2	5	2	0	0	1	1	0	0	0	0	25
2006	3	1	1	4	3	1	5	2	4	0	0	0	0	24
2005	10	3	1	8	3	0	2	2	0	0	0	0	0	29
2004	4	2	0	2	3	0	1	2	0	0	0	0	0	14
2003	3	0	0	1	2	0	1	0	0	0	0	0	0	07
2002	1	2	0	3	0	0	1	2	0	0	0	0	0	09
2001	1	1	1	3	1	0	0	1	0	0	0	0	0	08
2000	3	0	0	0	1	0	1	1	0	0	0	0	0	06
1999	0	0	1	1	1	0	0	0	0	0	0	0	0	03
1998	1	0	0	0	0	0	1	0	0	0	0	0	0	02
1997	0	0	0	0	1	0	0	0	0	1	0	0	0	02
1996	0	0	0	2	1	0	0	0	0	0	0	0	0	03
1995	3	0	1	2	1	0	0	0	0	0	0	0	0	07
1994	6	0	1	0	1	0	0	3	0	0	0	0	0	11
1993	2	0	0	0	0	0	0	0	0	0	0	0	0	02
1992	2	0	0	1	0	0	1	0	0	0	0	0	0	04
1991	1	0	0	0	0	1	0	0	0	0	0	0	0	02
1990	1	0	0	0	0	0	1	2	0	0	0	0	0	04
1989	2	0	1	0	0	1	2	0	0	0	0	0	0	06
1988	0	1	0	0	0	0	0	0	0	0	0	0	0	01
1980	0	1	0	0	0	0	0	0	0	0	0	0	0	01
1978	1	0	0	0	0	0	0	0	0	0	0	0	0	01
1974	0	0	0	0	0	0	0	0	1	0	0	0	0	01

Year	Agro	Soil Sc.	Ento	Hort.	Plant Path	Crop Botany	GPB	Agril Ext.	Agril Chem	Bio Chem.	Bio Tech	Env. Scie.	Seed Scie.	Total
	79 (25.99%)	**22 (7.24%)**	**22 (7.24%)**	**48 (15.79%)**	**30 (9.87%)**	**13 (4.28%)**	**36 (11.84%)**	**27 (8.88%)**	**07(2.30%)**	**01(0.33%)**	**11(3.62%)**	**06 (1.97%)**	**02(0.66%)**	**304**

Table 2 reflects that out of 16 departments only 13 departments have awarded 304 Ph.D. degrees. Agronomy 79 (25.99%) has the greatest rates of awarding PhD, followed by Horticulture 48 (15.79%), GPB 36 (11.84%), Plant path 30 (9.87%), Agricultural Extension and Education 27 (8.88%), Soil Science 22 (7.24%), Entomology 22 (7.24%), Crop Botany 13 (4.28%) and Bio-tech 11 (3.62%). Most of the theses were submitted in 2005. In 1974, Agricultural Chemistry was the first department to award a PhD. From 1975 to 1977 not a single thesis was submitted and again, no thesis was submitted from 1981 to 1988. It is observed that awarding PhD degrees has gradually increased from 2000. At present 262 researchers are enrolled for Ph.D. work in the Faculty of Agriculture at BAU.

Table - 3: Gender-wise contribution of theses

Sl. No.	Subjects	Male	%	Female	%
01.	Agronomy	75	24.67	04	1.32
02.	Soil Science	20	06.57	02	0.66
03.	Entomology	18	05.92	04	1.32
04.	Horticulture	46	15.13	02	0.66
05.	Plant Pathology	27	08.88	03	0.99
06.	Crop Botany	12	03.95	01	0.33
07.	Genetics & Plant Breeding	30	09.87	06	1.97
08.	Agricultural Extension & Education	24	07.89	03	0.99
09.	Agricultural Chemistry	06	01.97	01	0.33
10	Biochemistry	01	0.33	-	-

Sl. No.	Subjects	Male	%	Female	%
11	Biotechnology	10	03.29	01	0.33
12	Environment Science	06	01.97	-	-
13	Seed Science	02	0.66	-	-
	Total	**277**	**91.10**	**27**	**8.9**

Table 3 reveals that research facilities are available for both genders and there is no gender discrimination in research and development programmes at Bangladesh Agricultural University, Mymensingh. According to admission record of BAU, more than 40% female students were enrolled in PhD progtramme in the 2007-08 and 2008-2009 periods. Table 3 depicts that, in the study period, 91.10% of the candidates who were awarded PhD degree were male, while females constituted only 8.9%. Data also revealed that there were no female students in Biochemistry, Environmental and Seed Science departments. It also reveals that the number of female students was always less from male students. It indicates that, on the whole, female students are less inclined to achieving a PhD degree than their male counterparts.

Table 4: Supervisors' distribution of theses

Sl. No.	Subjects	Number of Supervisors'	No. of PhD Scholars
01.	Agronomy	13	79
15	Soil Science	11	22
03.	Entomology	06	22
04.	Horticulture	09	48
05.	Plant Pathology	08	30
06.	Crop Botany	08	13
07.	Genetics & Plant Breeding	11	36
08.	Agricultural Extension & Education	09	27
09.	Agricultural Chemistry	04	07
10.	Biochemistry	01	01
11.	Biotech	03	11

Sl. No.	Subjects	Number of Supervisors'	No. of PhD Scholars
12.	Environmental Science	02	06
13.	Seed Sc. Tech	01	02
	Total	**86**	**304**

Table 4 indicates that 86 supervisors guided 304 PhD Scholars. The maximum number of PhD scholars (79 out of 304) were enrolled in the Department of Agronomy and second highest (48) enrolled in the Department of Horticulture. The table also shows the most productive guides discipline-wise. It may be noted that, only one (01) PhD Scholar was produced in the department of Biochemistry at BAU.

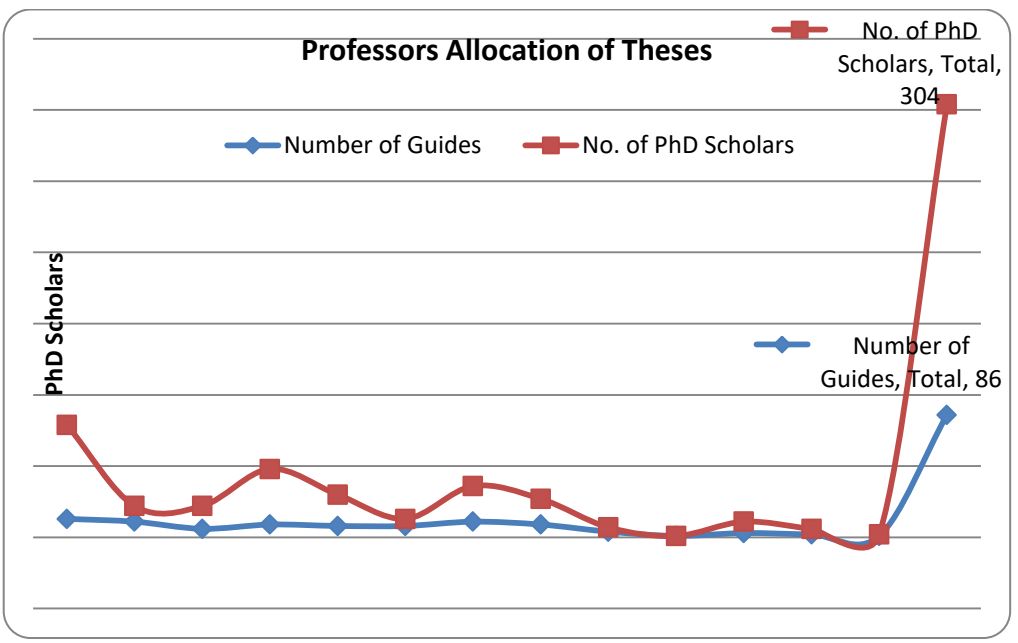
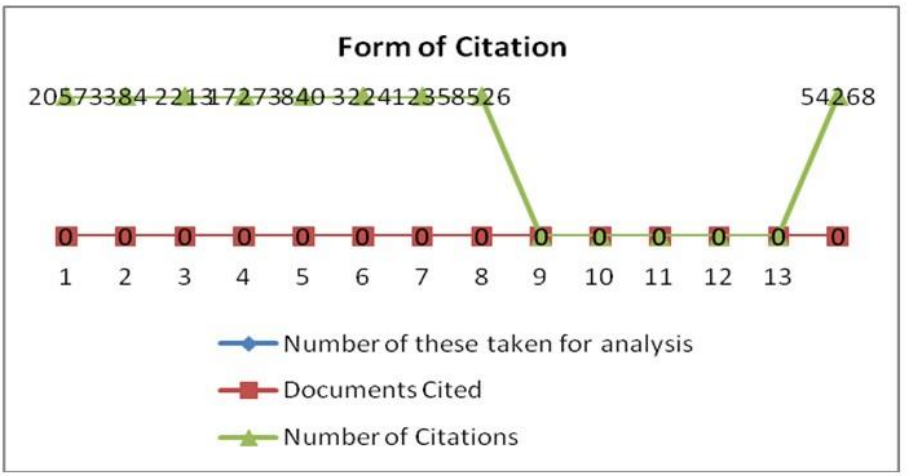


Table 5: Forms of Citation

No.	Number of these taken for analysis	Documents Cited	Number of Citations	Percentage	Cumulative Percentage
1	Agronomy **(79)**	Journals	20573	37.91	-
2	Soil Science **(22)**	Gov. Publications	384	0.71	38.62
3	Entomology **(22)**	Proceedings	2213	4.08	42.7
4	Horticulture **(48)**	Books	17273	31.83	74.53
5	Plant Pathology **(30)**	Bulletins	840	1.55	76.08
6	Crop Botany **(13)**	Theses	3224	5.94	82.02
7	Genetics & Plant Breeding **(36)**	Reports	1235	2.27	84.29
8	Agricultural Extension & Education **(27)**	Others	8526	15.71	
9	Agricultural Chemistry **(07)**				
10	Biochemistry **(01)**				
11	Biotech **(11)**				
12	Environmental Sc. **(06)**				
13	Seed Sc. Tech **(02)**				
		Total	**54268**	**100**	**100**

The university has 43 departments under six Faculties and the Agriculture Faculty has 16 departments. Out of these departments only thirteen were offered 304 PhD degrees during 1974-2014. and the researchers used 54,268 by 304 researchers.

Table 5 also shows the different forms of reading materials used by the researchers. It was found that the researchers used journals, proceeding, government publications, books, bulletins, reports and others major sources of information, and they also used different types of documents which were very few in number. Research scholars used 37.91% citations from journals, followed by 31.83% from books and the remaining sources were responsible for (30.26%) citations only.



Findings

- From Table–1 percentage of submission is very high in 2005. It increased from 2004 to 2011. There was no submission from 1975 to 1977.
- The Department of Agronomy produced the highest number of thesis (79), followed by, Horticulture (48) and Genetics and Plant Breeding (36).
- Most of the Ph.D. holders are male 277 (91.10%). Female constitute only 8.9% of the PhD holders.
- 86 Professors supervised 304 doctoral theses in Agriculture Faculty during 1974 to 2014.
- The most widely used medium of publication is articles in journals (37.9%) and text books (31.8%).
- From 1975-77 not a single thesis has been submitted and no PhD degree was

awarded from 1981 to 1988.

- Only one (01) PhD Scholar has been produced in the Department of Biochemistry at BAU.

Conclusion

The findings of the study can help the faculty members and research scholars to identify the experts in the field of Agriculture. This study also inspires the junior faculty members at BAU to pursue higher studies, especially PhD. As one of the mainstays of the economy of bangladesh, agriculture plays a vital role in the advancement of the country. Therefore, agricultural research should be accelerated in order to boost up national development. Others Faculties of the BAU should come forward and accelerate their research activities in order to develop their own field. This will help BAU play an instrumental role in the overall socio-economic development of Bangladesh.

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