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Haque, Md. Enamul

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**INFORMATION USE PATTERN OF Ph.D. RESEARCHERS OF
BANGLADESH AGRICULTURAL UNIVERSITY IN FISHERIES SCIENCE
: A CITATION STUDY**

Md. Enamul Haque

Bangladesh Agricultural University
Mymensingh, Bangladesh

Md. Milan Khan

Daffodil International University
Dhanmondi, Dhaka, Bangladesh

Abstract

The information use pattern of researchers in fisheries science was studied by analyzing 10068 citations of 44 doctoral dissertations submitted at the Faculty of Fisheries Sciences in Bangladesh Agricultural University (BAU), Mymensingh during the period 1973 to June 2012. The study reveals that researchers under the study have primarily depended on periodicals of Fisheries Sciences and its allied branches for their source of information. The more cited periodicals (Journals, Bulletin, Proceedings etc.) and non-periodicals (Books, Govt. publications, Theses etc.) were published within 50 years from some preferred countries such as Bangladesh, UK, USA, India, Netherlands, etc. The majority of citations were in English language.

Keywords : Citation analysis, Fisheries, Information use pattern.

Introduction

Citation analysis is one of the popular methods employed in recent day for the identification of core documents in various subject fields or for a particular specific community in a geographical proximity. Citation study is one of the effective and indirect methods to understand the information requirements of users. Citation method is used in the present study to understand the information needs, use pattern and use behaviour of research scholars in the field of Fisheries Science. Citations also serve other purposes like

(i) bibliography; (ii) preparing ranked list of periodicals; (iii) understanding the relative use of different types of documents; (iv) calculating the useful life of documents; (v) find out the

relatedness and dependence of subjects; (vi) calculate the citation rate of journals; (vii) find the impact factor for a concerned journal and (viii) calculate the immediacy index etc. (Hirwade, 2002)

Agriculture is the backbone of economic development of Bangladesh. The agricultural sectors in Bangladesh mainly comprise crops, forest, fisheries and livestock. Rice and fish are the main food of Bangladeshi people. The first produce of agriculture is rice and then, fisheries are the second sub-sector of agriculture in Bangladesh which bring near about 60% GDP in Bangladesh. There are six Faculties under Bangladesh Agricultural University and Faculty of Fisheries is one of them which was started in 1967.

A library is considered the nucleus for any research activity and essential ingredient for a viable research system. It provides an account of previous intellectual endeavours and functions as a breeding ground for new concepts and ideas. Library resources and facilities can be used as one of the parameters for measuring the capabilities and sophistication of research at a science and technology institutions. A good library acts as eye or pathfinder for researchers and provide them the inspiration to venture into new areas of research. On the other hand, an ineffective library may lead to low quality or duplication of research thus resulting in waste of financial, materials and human resources.

The basic purpose of acquiring, processing, maintaining and serving all kinds of reading materials is to satisfy the information requirements of users in any library or information resource centre. Systematic studies of the information gathering habits and behaviour of the user community is important for improving the communication system. Such studies were termed Statistical Bibliography (Hulme, 1922) and later Bibliometrics (Pritchard, 1969). Bibliometrics is also found quite useful for establishing and analyzing research output and academic relationships between contributors, journals and subjects and even among countries. Reference count, popularly known as the technique of citation analysis has been employed as a bibliometric technique, for ascertaining the pattern of literature use in case of large community. There are several applications of citation analysis, viz. (i) to show pattern of relationship; (ii) to show how the use of literature changes over time (iii) to serve as a guide to coverage of literature by secondary services and retrospective bibliographies (iv) to aid librarians, information scientists in the selection of representative reading materials for acquisition and (v) to aid librarians in the identification of items (especially periodicals) for withdrawals (Garfield, 1955; Chakravarthy, 1988). So, citation analysis is commonly used to determine what titles are to be purchased, to discontinue, or to weed out. The objective of this citation study is to investigate whether the Bangladesh Agricultural University library is capable of the meeting the needs and demands of the information users of the researchers in the field of Fisheries Sciences.

Scope and Purpose

Till 9th January 2012, Ph.D. degree awarded to 403 students from the six Faculties of this university. The study aimed to identify the characteristics of literature used by the researchers

in fisheries science based on the analysis of 10,068 citations, collected from the references given in 44 doctoral dissertations submitted in the Faculty of Fisheries Science in Bangladesh Agricultural University.

Objectives of the study

- (a) To find out the major form of literatures used by the researchers in Fisheries Science.
- (b) To find out the core subject of literature used and its age literature the researchers used in doing their research.
- (c) To identify the dominant countries whose literatures were of interest to researchers.
- (d) To identify the period-wise distribution of periodicals and books.

Methodology

Data about bibliographic entries listed in the dissertations were collected on study designed for this purpose. Citation analysis was done by studying the numerical distribution of citations across the bibliometric variables taken up for the study.

For analyzing the form of literature entries containing record of the citations were grouped in terms of the different forms of reading materials, e.g. journals, books, proceedings, bulletin, thesis and reports on Food and Agricultural Organizations (FAO) publications, Government publications and abstracts.

The subject-wise distribution of citations to journals was analyzed on the basis of the subject groupings of journals titles as given in the Ulrich's Periodical Directory.

The period wise distribution of citations was measured by the number of years which elapsed between the publication of the cited document and the year of publication of the source document. For this purpose, the whole time span of documents used was divided into a number of period groups each of 10 years duration.

For analyzing the country wise distribution of citations the country of publication of the periodical title were obtained from the Ulrich's Periodical Directory.

Results and Discussion

A. Forms of Ceiled Literature

In Table 1, it has been seen that the frequency distribution of different forms of literature used by researchers in fisheries science heavily depends on journal sources. Researchers used 5061 (50.27%) citations in the form of journals. Journals are, therefore, the most important sources of reporting first hand, original and latest information in the subject. The second highest source is books 2529 (25.12%) followed by proceedings and bulletin are 836 (8.30%) and

326(3.24%) respectively. Rest of the literatures are dissertation 387(3.84%), reports 512 (5.08%), FAO, government publications, abstracts etc. which are in use insignificant. Keeping in view the results, researchers found that most of the researchers (75.39%) in Fisheries Science are greatly depend on journals and books.

Table 1 : Frequency distribution of Forms of Cited Literature

| Sl. No. | Forms of literature | No. of citations | Percentage of citations (%) | Cumulative percentage (%) |
|---------|--------------------------|------------------|-----------------------------|---------------------------|
| 1. | Journals | 5061 | 50.27 | - |
| 2. | Books | 2529 | 25.12 | 75.39 |
| 3. | Proceedings | 836 | 8.30 | 83.69 |
| 4. | Bulletin | 326 | 3.24 | 86.93 |
| 5. | Dissertation | 387 | 3.84 | 90.77 |
| 6. | Reports | 512 | 5.08 | 95.85 |
| 7. | FAO publications | 189 | 1.88 | 97.73 |
| 8. | Government. Publications | 158 | 1.57 | 99.30 |
| 9. | Abstracts | 70 | 0.70 | 100 |
| | Total | 10,068 | 100 | |

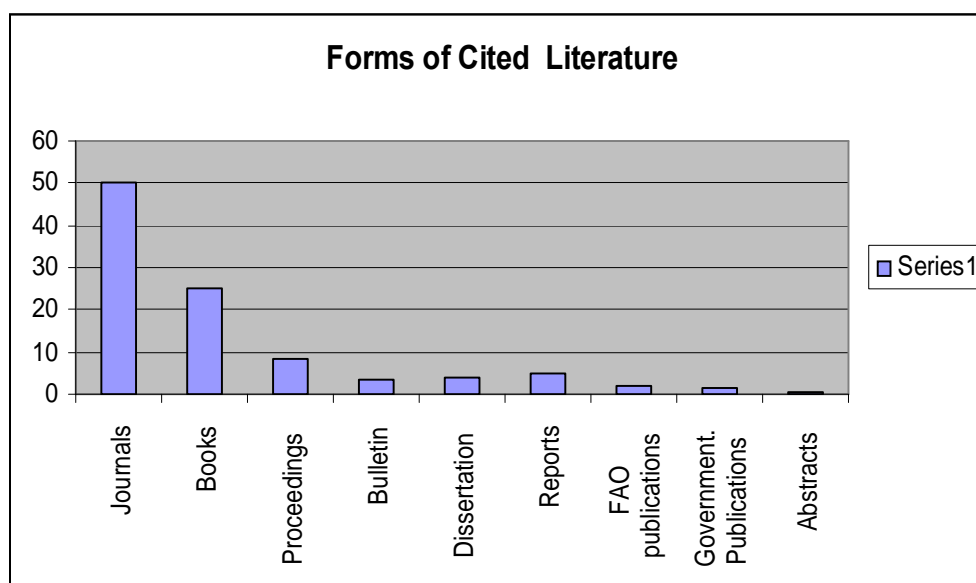


Figure 1 : Forms of cited literature

Subject Wise Distribution of Periodicals

Periodicals are the formal primary medium of communication for researchers. Table 2 provides the frequency distribution of citations of periodicals according to subject. This subject wise analysis of citations to periodicals shows that there has been considerable amount of inbreeding of literature. About 52% citations belong to the periodicals of 4th Department under the Faculty of Fisheries Science. 3700 (73.11%) out of 5061 journal citations are counted and rest 1361 (26.89%) citations are negligible because that journals are used below 5 times. 50 titles were used more than 5 times. The highest number of citations 1613 (31.87%) of the journals is depended on the department / subject of aquaculture, the second highest 543 (10.73%) is Fisheries Biology and Genetics, third 331 (6.54%) is Fisheries Management and fifth 135 (2.67%) is Fisheries Technology. But fourth 283(5.59%) is Zoology which are related to Fisheries Science. The rest of the citations are from fisheries and agriculture related journals.

The findings of the subject-wise distribution of literature and the phenomena of interdisciplinary character of literature of fisheries in the present study would be of value to librarians, documentalists and information workers in building up representative collections of reading materials, in improving the coverage of their bibliographies, documentalists and current awareness services. This list is more useful for fisheries scientists or researchers. They can choices for further literature. Periodicals are to be distributed on the basis of major / basic subjects and its allied subject also.

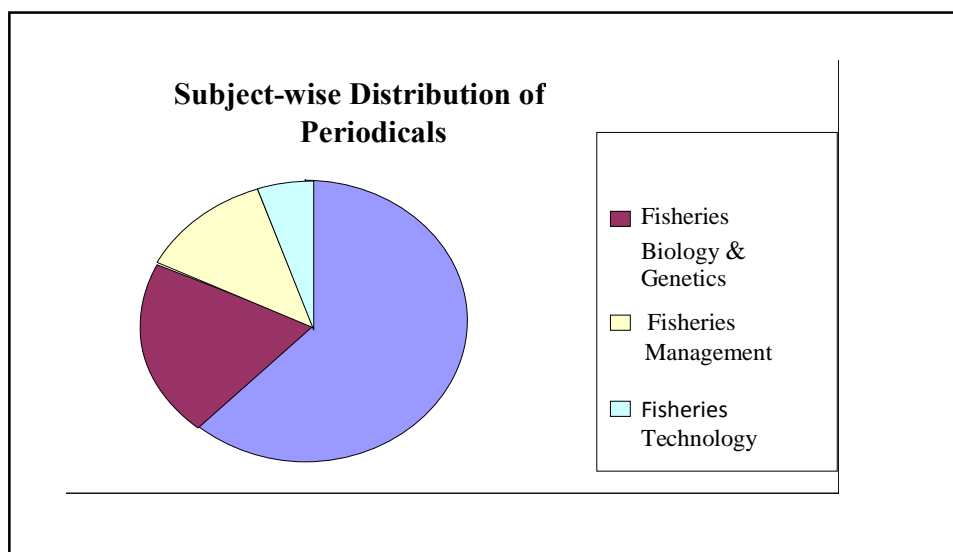


Figure 2 : Subjectwise distribution of periodicals

Table 2 : Subject-wise distribution of periodicals

| Sl. No | Subject | Rank | No. of issues used | No. of citations | Percentage (%) of citations | Cumulative percentage (%) |
|--------|---|------|--------------------|------------------|-----------------------------|---------------------------|
| 1 | Aquaculture | 1 | 183 | 375 | 7.41 | - |
| 2 | Aqua Fish Research | | 08 | 45 | 0.89 | 8.3 |
| 3 | Bangladesh J. of | | 15 | 62 | 1.23 | 9.53 |
| 4 | Aquaculture | | 120 | 260 | 5.14 | 14.67 |
| 5 | Hydrobiology | | 10 | 29 | 0.57 | 15.24 |
| 6 | ICLARM Quarterly | | 62 | 185 | 3.66 | 18.90 |
| 7 | Indian Journal of | | 39 | 150 | 2.96 | 21.86 |
| 8 | Fisheries | | 10 | 38 | 0.75 | 22.61 |
| 9 | Journal of Fish Biology | | 50 | 256 | 5.06 | 27.67 |
| 10 | Journal of Fish Pathology | | 10 | 35 | 0.69 | 28.36 |
| 11 | J. of Inland Fisheries | | 12 | 28 | 0.55 | 28.91 |
| 12 | Society of India | | 25 | 80 | 1.58 | 30.49 |
| 13 | J. of World Aquaculture Society Marine Ecology Progress Nippon Suisan Gakkaishi Progressive Fish Culture | | 24 | 70 | 1.38 | 31.87 |
| | | | | 1613 | | |
| 14 | Applied Genetics | 2 | 10 | 15 | 0.30 | 32.17 |
| 15 | Bangladesh Journal of | | 30 | 225 | 4.45 | 36.62 |
| 16 | Fisheries | | 08 | 20 | 0.40 | 37.02 |
| 17 | Coastal Self Science | | 09 | 25 | 0.49 | 37.51 |
| 18 | Environment & Ecology | | 08 | 27 | 0.53 | 38.04 |
| 19 | Indian Journal of Marine | | 09 | 24 | 0.47 | 38.51 |
| 20 | Science | | 15 | 35 | 0.69 | 39.02 |
| 21 | J. of Aquaculture in the | | 17 | 42 | 0.83 | 40.03 |
| 22 | Tropics | | 21 | 35 | 0.69 | 40.72 |
| 23 | J. of Asiatic Fisheries Society Journal of Fish Diseases Journal of Marine Biology Limnology & Oceanography | | 27 | 95 | 1.88 | 42.60 |
| | | | | 543 | | |

| | | | | | | |
|----|--|-----------|----|------------|------|-------|
| 24 | Aqua Fish Management | 3 | 12 | 42 | 0.83 | 43.43 |
| 25 | Australian J. of | | 15 | 51 | 1.01 | 44.44 |
| 26 | Freshwater Research | | 25 | 95 | 1.88 | 46.32 |
| 27 | Bangladesh J. of Fisheries | | 10 | 48 | 0.95 | 47.27 |
| 28 | Research Canadian j. of Fish & Aqua. Society Journal of Fisheries Research | | 35 | 95 | 1.88 | 49.15 |
| | | | | 331 | | |
| 29 | Journal of Fisheries | 6 | 25 | 60 | 1.19 | 50.34 |
| 30 | Technology Journal of Food Science | | 29 | 75 | 1.48 | 51.82 |
| | | | | 135 | | |
| 31 | Bangladesh Journal of | 4 | 40 | 135 | 2.67 | 54.49 |
| 32 | Zoology | | 15 | 40 | 0.79 | 55.28 |
| 33 | Canadian Journal of | | 10 | 25 | 0.49 | 55.77 |
| 34 | Zoology | | 11 | 35 | 0.69 | 56.46 |
| 35 | Journal of Zoology, London Pakistan Journal of Zoology University J. of Zoology, Rajshahi | | 15 | 48 | 0.95 | 57.41 |
| | | | | 283 | | |
| 36 | Acta Anatomy | 20 | 10 | 25 | 0.49 | 57.90 |
| 37 | American Fisheries Society | 5 | 47 | 125 | 2.47 | 60.37 |
| 38 | Bamidgeh | 19 | 35 | 125 | 2.47 | 62.84 |
| 39 | Bangladesh J. of Agricultural Science | 7 | 25 | 60 | 1.19 | 64.03 |
| 40 | Bangladesh J. of Training & Develop. | 11 | 10 | 42 | 0.83 | 64.86 |
| 41 | Dhaka University Studies | 14 | 15 | 35 | 0.69 | 65.55 |
| 42 | Japan Journal of Ichthyology | 15 | 10 | 25 | 0.49 | 66.04 |
| 43 | J. of Asiatic Society of Bangladesh | 10 | 15 | 43 | 0.85 | 66.89 |
| 44 | Journal of Biochemistry | 12 | 10 | 35 | 0.69 | 67.58 |

| | | | | | | |
|----|-----------------------------|-----------|----|-------------|------------|-------|
| 45 | Journal of Current Science | 18 | 08 | 25 | 0.49 | 68.07 |
| 46 | Journal of Ecology | 8 | 35 | 72 | 1.42 | 69.49 |
| 47 | Microbiology | 16 | 18 | 54 | 1.07 | 70.56 |
| 48 | Nature | 17 | 15 | 35 | 0.69 | 71.25 |
| 49 | Pakistan Journal of Science | 13 | 12 | 29 | 0.57 | 71.82 |
| 50 | Progressive Agriculture | 9 | 30 | 65 | 1.29 | 73.11 |
| | Total | | | 3700 | 73.11 | |
| | Others (below no. 5) | | | 1361 | 26.89 | - |
| | Grand Total | | | 5061 | 100 | |

Country-wise Distribution of Periodicals

The country-wise distribution of citations of periodicals in table 3 reveals that the researchers depend heavily 768(15.17%) on literature of periodicals which are produced in UK followed by USA, Bangladesh, Netherlands, India, Japan, Pakistan, Canada, Philippine, England, Australia and Switzerland accounting for 14.80 %, 14.33%, 10.61%, 9.60%, 4.25% , 2.75% 1.58%, 1.17%, and 0.97% respectively, of the periodicals cited. Rest of the journals 1197 (23.65%) are used below five times.

Table 3 : Country-wise distribution of Periodicals

| Sl. No. | Country | No. of used periodicals | Ranks | No. of used citations | Percentage (%) | Cumulative (%) |
|---------|---------------------|-------------------------|-------|-----------------------|----------------|----------------|
| 01. | Australia | 10 | 11 | 032 | 0.63 | - |
| 02. | Bangladesh | 195 | 3 | 725 | 14.33 | 14.96 |
| 03. | Canada | 18 | 8 | 80 | 1.58 | 16.54 |
| 04. | England | 13 | 10 | 49 | 0.97 | 17.51 |
| 05. | India | 127 | 5 | 486 | 9.60 | 27.11 |
| 06. | Japan | 60 | 6 | 215 | 4.25 | 31.36 |
| 07. | Netherlands | 155 | 4 | 537 | 10.61 | 41.97 |
| 08. | Pakistan | 23 | 7 | 139 | 2.75 | 44.72 |
| 09. | Philippine | 10 | 9 | 59 | 1.17 | 45.89 |
| 10. | Switzerland | 10 | 13 | 25 | 0.49 | 46.38 |
| 11. | UK | 321 | 1 | 768 | 15.17 | 61.55 |
| 12. | USA | 749 | 2 | 749 | 14.80 | 76.35 |
| | Total | | | 3864 | 76.35 | 100 |
| 13. | Others (Below 0.5%) | | | 1197 | 23.65 | |
| 14. | Total | | | 5061 | 100 | |

Country-wise Distribution of Books

Table 3A depicts the researchers are depended on books examined by USA (20.76%), Bangladesh (16.80%), India (14.04%), UK (11.82%), Philippine (6.17%), Japan (4.94%), Thailand (3.60%) and the rest of the countries are Belgium, England, Netherlands, Malaysia, Scotland, France, Canada and Holland are used citations less than 5% . Bangladesh, USA Journals and Books are more used in their research papers

Table 3 A : Country-wise distribution of Books

| Sl. No. | Country | No. of books | Ranks | No. of citations | Percentage (%) | Cumulative (%) |
|---------|------------------|--------------|-------|------------------|----------------|----------------|
| 01. | Bangladesh | 280 | 2 | 425 | 16.80 | - |
| 02. | Belgium | 60 | 8 | 70 | 2.77 | 19.57 |
| 03. | Canada | 16 | 14 | 25 | 0.99 | 20.56 |
| 04. | England | 50 | 9 | 58 | 2.29 | 22.85 |
| 05. | France | 22 | 12 | 29 | 1.15 | 24.00 |
| 06. | Holland | 10 | 15 | 13 | 0.51 | 24.51 |
| 07. | India | 250 | 3 | 355 | 14.04 | 38.55 |
| 08. | Japan | 85 | 6 | 125 | 4.94 | 43.49 |
| 09. | Malaysia | 25 | 11 | 40 | 1.58 | 45.07 |
| 10. | Netherlands | 35 | 10 | 49 | 1.94 | 47.01 |
| 11. | Philippine | 105 | 5 | 156 | 6.17 | 53.18 |
| 12. | Scotland | 17 | 13 | 28 | 1.11 | 54.29 |
| 13. | Thailand | 75 | 7 | 91 | 3.60 | 57.89 |
| 14. | UK | 217 | 4 | 299 | 11.82 | 69.71 |
| 15. | USA | 350 | 1 | 525 | 20.76 | 90.47 |
| | Others (Blow 2%) | - | | 241 | 9.53 | 100 |
| | Total | 1597 | | 2529 | 100 | |

Period-wise Distribution of Citations to Periodicals and Books

Table 4 depicts that 24.97% of periodicals were used within 10 years of their publication while 29.09%, 24.80% were used within 20 & 30 years old of their publication respectively. The rest of 13.30% and 07.84% were published more than 30 and 40 years old. It seems to show that most of the literature was recently published.

Again, table 4 shows that 19.10% of books were used within 10 years of their publications while 31.20% and 23.92% were used within 20 and 30 years old. Most of the cited books (75%) were published within 30 years. The rest of the cited books was published more than 30 years old. It is clear from the result large number of citations (periodicals & books) is taken from recent publications. It indicates the time with which a work gets observed in scientific communication channels. These findings may be of relevance to librarians and information scientists in framing sound acquisition policy objectively. It may also be of importance in planning and providing current and retrospective bibliographies and documentation lists.

Table 4 : Period-wise distribution of citations to periodicals and books

| Forms | 0-10 yrs. | 11-20 yrs | 21-30 yrs | 31-40 yrs | > 40 yrs |
|-------------|----------------|----------------|----------------|---------------|---------------|
| Periodicals | 1264 24.97% | 1472 29.09% | 1255 24.80% | 673 13.30% | 397 7.84% |
| Books | 483 19.10% | 789 31.20% | 605 23.92% | 339 13.40% | 313 12.38% |

Conclusions

Citation analysis is a practical tool to evaluate how a library is meeting the needs of local users. The citation analysis of the doctoral dissertations in Fisheries Science reveals that the most of the researchers depend on journals for their information use. Secondly, they used books for their information. This study also shows that considerable amount of inbreeding in the literature, as about 50% of the citations belong to the journal of Fisheries Science and its allied disciplines. It is evident from this study that the researchers largely use the literature published in journals and books during the last three decades from the time of research. This study also confirms that the researchers under the study have depended on publications only from few countries, mainly Bangladesh, UK, USA and India for original information. Results of this study will be useful to the librarians and information scientists in acquiring more useful periodicals and books as well as in circulating their contents for use by potential readers and researchers.

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