Information seeking behaviour of agricultural scientists with particular reference to their information seeking strategies

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The paper is an outcome of the research study conducted by the authors on information seeking behaviour of agricultural scientists working in the ICAR institutions of Delhi and Punjab Agricultural University, Ludhiana. Data has been collected through the structured questionnaire and analyzed with the help of latest version of MS-Excel for appropriate statistical procedures for the description (i.e., frequencies, percentage, means, and standard deviations, etc). Study discusses the findings of various strategies and procedures adopted by the agriculture scientists in meeting their information requirements. The agriculture scientists were asked to ranks the information sources in on the basis of I, II, and III in the order of priority. The survey result shows that agriculture scientists have expressed great dependence in meeting their information requirements on their institutional library/information centre. The Library/Information Centre is the most preferred source (72.05%) of the respondents for all categories of agriculture scientists. On the other hand for accessing information, agriculture scientists highly depend on the library collection, followed by the personal collection, collection of their supervisor and of their colleagues.

Introduction

Information is a critical resource in the operation and management of organizations. Timely availability of relevant information is vital for effective performance of managerial functions such as planning, organizing, leading, and controlling[1]. A well-established and well-designed information system to facilitate decision making in various agricultural development projects is critical to the success of any organization. To be successful, any project requires efficient management of human and material resources. This cannot be done unless accurate, timely, and relevant information is available to decision makers[2].

There is a universal assumption that man was born innocent or ignorant and should actively seek knowledge. Information seeking behaviour is a broad term encompassing the ways individuals articulate their information needs, seek, evaluate, select, and use information. "Information seeking is thus a natural and necessary mechanism of human existence[3]." Information seeking behaviour is the purposive seeking for information as a consequence of a need to satisfy some goal. In the course of seeking, the individual may interact with manual information systems (such as library or other information systems), or with computer-based systems (such as databases or Web)[4].

Knowledge about the information-seeking behaviour and information use of individuals is crucial for effectively meeting their information needs. The first basic user study in the broader sense was undertaken by Menzel[5] in1966 that defined information seeking behavior from three angles:

(i)   when approached from the point of view of the scientist or technologists, these are studies of scientists' communication behaviour;

(ii)   when approached from the point of view of any communication medium, they are use studies; and

(iii)   when approached from the science communication system, they are studies in the flow of information among scientists and technologists.

With regard to information seeking behavior of agricultural scientists, Subbaiah identified five levels of information needs of agricultural scientists[6]. Malhotra

has also conducted a user study on the libraries of agriculture universities namely Haryana Agricultural University (HAU), Hissar and Punjab Agricultural University (PAU), Ludhiana to determine the role of faculty in promoting library use among postgraduate students[7]. The study based on nine variables which could be used to predict whether the method of instructions used by faculty teacher is library based or otherwise found that the relationship between the adequacy of library collections and the amount of daily library use by the faculty members was satisfactory in the libraries of Haryana Agricultural University (HAU), Hissar and Punjab Agricultural University (PAU), Ludhiana. In another study conducted by Swarnalata Devi and Lahiri on 'information seeking behaviour of agricultural scientists in Manipur', it is reported that agricultural scientists approached libraries and information centres followed by department of agriculture as sources for obtaining agriculture related information for research[8]. Further the researchers found that agricultural information available in the state is not sufficient.

The present study looks at information seeking strategies of agricultural scientists in some Indian Council of Agricultural Research institutions and Punjab Agricultural University, Ludhiana.

Purpose and objectives
The main purpose/objective of the study is to explore information seeking behaviour of agricultural scientists working in the select ICAR institutions of Delhi and Punjab Agricultural University, Ludhiana. The specific objectives are:

1. To identify the different sources of information used by agricultural scientists;

2. To examine the information seeking strategies of the agricultural scientists;

3. To find the effectiveness of information resources in the field of agriculture sciences and the extent to which they meet the information requirement of agricultural scientists.

Methodology and scope
A structured questionnaire was developed for the purpose of data collection and distributed personally as well as through mail/e-mail among the agricultural scientists in the selected ICAR institutions. Seven hundred

questionnaires were distributed, out of which 375 questionnaires were received back with the response rate being 53.57%. The questionnaire covered five basic areas namely, user's characteristics such as age, sex, levels of education, field of specialization, institution affiliation and purpose of current research, strategies of seeking information, use of the libraries/information centres, and suggestions for the improvement of the existing information systems. Thus collected data have been analyzed using the latest version of MS-Excel for appropriate statistical procedures for the description (i.e., frequencies, percent, means, and standard deviations, etc). Three-point scale and five-point scale have been adopted to get the weighted values and rank order.

The study mainly consists of agricultural scientists working in the six agriculture research institutions namely, Indian Council of Agricultural Research. (ICAR), Indian Agricultural Research Institute (IARI), Indian Agricultural Statistical Research Institute (IASRI), National Bureau of Plant Genetic Resource (NBPGR), National Centre for Agricultural Policy and Research (NCAP) and Punjab Agricultural University (PAU), Ludhiana. The term 'agricultural scientists' includes the teachers as well as research scientists of various levels. These potential users of agriculture information have been categorized into four basic categories of disciplines according to the practice followed by ICAR system for categorization of agricultural scientists, i.e., Category I – Principal Scientists/Professors, Senior Scientists/Associate Professors, Scientists/Assistant Professors working in the crop improvement disciplines such as Plant Genetics and Plant Breeding, Horticulture, Floriculture, Vegetable Sciences, Seed Science and Technology and Plant Biotechnology; Category II – Principal Scientists/ Professors, Senior Scientists/Associate Professors, Scientists/Assistant Professors working in the Resource Management discipline such as agronomy, soil science, agricultural physics, microbiology, environmental sciences, agricultural engineering, and water management and technology; Category III – Principal Scientists/Professors, Senior Scientists/Associate Professors, Scientists/Assistant Professors working in the Crop Protection discipline such as plant pathology, entomology, agricultural chemicals, integrated pest management; and Category IV – Principal Scientists/ Professors, Senior Scientists/Associate Professors,

Table 1 — Use of information sources by different categories

Source of information	Category				Mean	Rank
	I	II	III	IV		
Visit library/Information centre	2.85	2.76	2.41	2.27	2.57	1
Consult review article in a periodical	2.50	2.21	2.32	2.25	2.32	2
Discussion with colleagues with in the organization	2.06	1.65	2.54	2.43	2.17	3
Consult indexing journal	2.15	2.23	1.90	2.00	2.07	4
Discussion with experts in the field	1.77	2.3	1.85	2.00	1.93	5
Consult bibliography	2.38	1.93	1.75	1.45	1.88	6
Discussion with librarian/ Reference staff of your library	2.23	2.00	1.43	1.55	1.80	7
Consult library catalogue	1.60	1.60	1.63	2.13	1.74	8
Discussion with supervisor	1.29	1.00	1.86	2.31	1.62	9
Consult indexing and abstracting journals	1.75	2.00	1.22	1.14	1.53	10
Publisher's catalogue	1.00	1.33	1.42	2.00	1.44	11
Discussion with colleagues elsewhere	1.2	1.42	1.37	1.45	1.38	12

Note: The Rank Order and Mean is calculated on 3-point scale with weight assigned as follows: I = 3, II= 2, I = 1.

Table 2 — Priority in the use of information sources

Name of sources	Priority			Total
	I	II	III	
Discussion with				
Colleagues within the organization	131 (39.48%)	128 (38.55%)	73(21.99%)	332
Colleagues elsewhere	7 (3.20%)	64 (29.22%)	148 (67.58%)	219
Librarian/reference staff of your library	64 (25.10%)	75 (29.41%)	118 (45.49%)	255
Experts in the field	82 (32.80%)	84 (25.80%)	104 (41.60%)	250
Supervisor	38 (21.97%)	57 (32.94%)	78 (45.09%)	173
Visit to library/information centre	214 (72.05%)	45 (15.15%)	38 (12.80%)	297
Consult				
Bibliography	71 (28.06%)	93 (36.78%)	89 (35.18%)	253
Library catalogues	47 (21.27%)	85 (29.41%)	109(49.32%)	221
Publisher's catalogue	23 (15.23%)	18 (11.92%)	110 (72.85%)	151
Indexing & abstracting journal	112 (42.42%)	57 (21.60%)	95 (35.98%)	264
Databases	153 (51.340%)	91 (30.54%)	54 (18.12%)	298

Note: The Rank Order and Mean is calculated on 3-point scale with weight assigned as follows: I = 3, II= 2, I = 1

Scientists/Assistant Professors working in the Basic & Applied Sciences discipline such as biochemistry, plant physiology, economics, agricultural extension, rural sociology and computer science.

Findings and discussion

Preference of source
A number of possible sources of agricultural information were identified and considered potentially relevant to agricultural scientists in meeting their information requirements. The preferences of agricultural scientists for information sources and their accessibility have been conceptualized in terms of information seeking strategies in which they first access the most preferred sources, followed by other sources if the problem remains unsolved.

It has been found that agricultural scientists have expressed great dependence in meeting their information requirements on their institutional library/information

centre. The library/information centre is the most preferred source with 72.05% of the respondents for all categories of agricultural scientists with a mean rank from 2.85 to 2.27. The review articles in periodicals were ranked first by 51.34% of the respondents and it occupies second position in the rank order. Discussion with colleagues within the organization was the third preferred source of information. Out of 332 respondents of this source 39.46% gave it first priority, whereas 38.55% and 21.89% responded for 2nd and 3rd priority respectively. The agricultural scientists of categories III and IV use this channel of information more than agricultural scientists of categories II and I.

As far as the opinion in respect of the priority in the use of indexing journals is concerned, 42.42% of the respondents gave first priority to this source. All categories of agricultural scientists use indexing journals and this source ranked fourth in order of priority. The uses of indexing journals by different categories of respondents were examined in order to find out if there is any significant difference among the various categories of agricultural scientists. It was found that agricultural scientists belonging to categories of II and I preferred the use of indexing journals than other categories of agricultural scientists. Discussions with experts in the field fall fifth i.e., 32.80% of the respondents marked first priority followed by 25.80% and 41.60% for II and III priority respectively.

The source 'consult bibliography' as a source of information falls sixth in the rank order. It is has been found that this information source was the first priority by 28.06% of the respondents followed by 36.78% and 35.18% as second and third priority respectively. The respondents of category I use this information source more than the other categories of agricultural scientists.

Librarian/Reference staff of the library as source of information indicates that only 25.10% gave first priority to this channel of information followed by 29.41% and 45.49% for second and third priority respectively. Library catalogue does not appear to be a popular source among agricultural scientists. Only 21.27% gave it first priority, 29.41% second priority and 49.32% third priority. The agricultural scientists of category IV used this source more (mean 2.13) than other categories of agricultural scientists. Supervisor as a channel of information found that 21.87% of the respondents marked first priority, followed by 32.94% and 45.09% for second and third priority respectively. As seen in Table 1 agricultural scientists in category III and IV use this source more than other categories of agricultural scientists. Further, the other sources of information such as abstracting journals, book sellers/publishers catalogue and colleagues elsewhere were found least significant. Table 2 shows the priority in the use of information sources.

Table 3 — Extend of dependence on different modes for collection of information

Sources	Extent of dependence						
	Solely	Most of time	Often	To some extent	Not at all	Weighted index	Rank
Own efforts	198	138	39	0	0	4.42	1
Computerized information search	120	80	30	55	90	3.22	2
Supervisor	98	43	59	65	110	2. 87	3
Library staff	39	41	45	85	165	2.21	4
Librarian	28	21	40	78	188	2.10	5
Colleagues	23	18	26	51	257	1.77	6
Full-time research assistant	0	11	24	56	284	1.36	7
Part-time research assistant	0	13	21	53	288	1.35	8

Note: Number of respondents is 375. * Weighted index is calculated on 5-point scale with weight assigned as follows: solely = 5, most of time = 4, often = 3, to some extent = 2, and not at all = 1

Table 4 — Extend of dependence on different sources for checking of references

Name of sources	Extent of dependence					Weighted index	Rank
	Solely	Most of the time	Often	To some extent	Not at all		
Own efforts	210	140	25	0	0	4.49	1
Checking reference sources	209	93	43	30	0	4.28	2
Consulting the library catalogue	198	96	59	22	0	4.25	3
Checking original documents	158	96	46	65	10	3.87	4
Expert in the field	39	69	78	150	39	2.78	5
Supervisor	29	58	67	176	45	2.62	6
Colleagues	41	44	39	98	153	2.25	7
Librarian	10	29	45	92	199	1.85	8
Research assistant	0	10	33	122	210	1.58	9

Note: Number of respondents is 375. * Weighted index is calculated on 5-point scale with weight assigned as follows: solely = 5, most of time = 4, often = 3, to some extent = 2, and not at all = 1

Information collection strategies

The agricultural scientists were asked to mention the different modes of collecting information. Table 3 shows their dependence on different modes for collection of information. It has been found that own efforts have received highest rank by the agricultural scientists as a mode of collecting information. The supervisor is ranked at second place. The agricultural scientists heavily rely on computerized information search facility. This indicates that agricultural scientists are more familiar and comfortable with the computerized information search facility and find it more reliable. Librarian, library staff, colleagues and full-time research assistant ranked rather low. It also indicates that the extent of dependence for collection of information is low in the case of librarian and library staff. Thus they are not actively involved in the process of information search. Part time research assistants were given the lowest priority among the agricultural scientists (i.e., 8).

Strategies in checking of references

Table 4 reveals the extent of dependence on different sources for checking of references by the agricultural scientists. It has been found that own efforts have received highest ranked for checking of references followed by checking reference sources, consulting the library catalogue, checking original documents, expert in the field, supervisor, colleagues, librarian, and research assistant as second, third, fourth, five, six, seven, and eight as a sources of checking references.

Strategies in accessing information

The dependence of the agricultural scientists on the listed sources and documents for accessing information is shown in the Table 5. The ranked order shows that agricultural scientists solely depend on the library collection, followed by the personal collection, collection of their supervisor and of colleagues in order of decreasing dependence. It is also found that library collection of own institute/university has emerged as the most important channel for accessing sources of information.

Use of information sources for specific information

For specific information, journals have been reported as a significant source with 78.4% of responses. This is followed by 13 more sources, all of which are being used by more than 50% of the respondents and rank 2-14 in the ranked orders as shown in Table 6. The least used source for obtaining specific information is dissertations/theses. The reasons for the low usage of this source can be because of non-availability, lack of direct access and lack of proper dissemination of these in the libraries of the institutions concerned.

Use of information sources for keeping up-to-date

For keeping up-to-date, Table 7 reveals that journals have been reported to be the most preferred source by the respondents (83.2%) and it occupies the first rank followed by attending lectures, conferences, seminars etc. (77.6%), books, monographs, etc. (72.8%),

Table 5 — Extent of dependence on sources for accessing information

Name of sources	Extent of dependence						
	Solely	Most of the time	Often	To some extent	Not at all	Weighted index	Rank
Library collection	145	100	90	30	10	3.90	1
Personal collection	100	130	70	55	20	3.62	2
Personal collection of colleagues	13	34	79	139	110	2.14	3
Personal collection of supervisor	10	30	75	122	138	2.07	4

Note: Number of respondents is 375. Weighted index is calculated on 5-point scale with weight assigned as follows: solely = 5, most of time = 4, often = 3, to some extent = 2, and not at all = 1

Table 6 — Use of information sources for specific information

Source of information	No. of respondents	Percentage	Rank
Journals	294	78.4	1
Conversation with colleagues and experts	279	74.4	2
Books, monograph etc.	261	69.8	3
References found while reading literature	255	68.0	4
Technical/research reports	252	67.2	5
Abstracting periodicals	249	66.4	6
Indexing periodicals	237	63.2	7
Attending lectures, conferences, seminars etc.	222	59.2	8
Yearbooks/annual reviews, advances in, etc.	210	56.0	9
Workshop, seminar and conference proceedings	204	54.4	10
Pre-prints/reprints directly from authors	201	53.6	11
Bibliographies/library catalogues	195	52.0	12
Library acquisition lists	189	50.4	13
Dissertations/theses	177	47.2	14

Note: Number of respondents is 375. Weighted index is calculated on 5-point scale with weight assigned as follows: solely = 5, most of time = 4, often = 3, to some extent = 2, and not at all = 1

Table 7 — Use of information sources for keeping up-to-date

Source of information	No. of respondents	Percentage	Rank
Journals	312	83.2	1
Attending lectures, conferences, seminars etc.	291	77.6	2
Books, monographs etc.	273	72.8	3
Yearbooks/annual reviews, advances, etc.	287	71.2	4
Abstracting periodicals	234	62.4	5
Workshop, seminar and conference proceedings	231	61.6	6
Conversation with colleagues and experts	228	60.8	7
Research reports	222	59.2	8
References found while reading literature	174	46.4	9
Indexing periodicals	171	45.6	10
Pre-Prints/reprints directly from authors	108	28.8	11
Library acquisition lists	93	24.8	12
Dissertations/theses	78	20.8	13
Bibliographies/library catalogues	75	20.0	14

Note: Number of respondents is 375. Weighted index is calculated on 5-point scale with weight assigned as follows: solely = 5, most of time = 4, often = 3, to some extent = 2, and not at all = 1

Table 8 — Use of information sources for background information

Source of information	No. of respondents	Percentage	Rank
Books/monographs	228	60.8	1
Journals	189	50.4	2
Conversation with colleagues and experts	177	47.2	3
Yearbooks/annual reviews, advances in -, etc.	174	48.4	5
Research reports/technical reports	159	42.4	5
References found while reading literature	153	40.8	6
Attending lectures, conferences, seminars, etc.	150	40.0to=	7
Abstracting periodicals	147	39.2	8
Workshop, seminar and conference proceedings	117	31.2	9
Indexing periodicals	111	29.6	10
Pre-Print/reprints directly from authors	75	20.0	11
Dissertations/theses	72	19.2	12
Bibliographies/library catalogue	68	17.6	13
Library acquisition lists	27	7.2	14

Note: Number of respondents is 375. Weighted index is calculated on 5-point scale with weight assigned as follows: solely = 5, most of time = 4, often = 3, to some extent = 2, and not at all = 1

yearbooks/annual reviews/advances in, etc. (71.2%), abstracting journals (62.4%), workshop, seminar and conference proceedings (81.8%), conversation with colleagues and experts (60.8%), research reports (59.2%), which are referred to by more than 50% of the respondents while looking for current information and ranked second to seventh position in the ranked orders.

Use of information sources for background information

For background information, Table 8 indicates that books/monographs, etc. have been identified to be the most used source by 80.8% by the respondents. Scientific journals are next in the order of rank (50.4%) followed by conversation with colleagues and experts (47.2%), yearbooks/annual reviews/advances, etc. (46.4%), technical/research reports (42.4%), references found while reading literature (40.8%). Rest of the sources (i.e., dissertations/theses, workshop, seminar and conference proceedings, library acquisition lists, pre-print/reprints directly from authors, bibliographies/library catalogue, abstracting journals) has been found less than 40% of the respondents for background information.

Conclusion

The study indicates that the agricultural scientists seek diverse information from varied sources for different purposes thus making it difficult to maintain support for the idea of a single mode of formal information channel. However, the scientific journals have been ranked first for obtaining specific information and keeping up-to-date. They have been ranked second with regard to acquiring background information. The agricultural scientists have preferences for information sources varied with characteristics of the individual agricultural scientist, nature of information needed, personal knowledge of sources and their accessibility. The most frequently used sources were those with good physical, functional, and intellectual accessibility. The users tend to use information sources which are personally known to them and also easily accessible, regardless of the quality of information. Information may be sought for a particular purpose in particular circumstances, or collected in advance because it is likely to be useful. It is of maximum use when it matches a need, which is highly specific. Thus, in view of above, it may be

concluded that the working culture of the individual needing information, the importance placed on getting it, the facilities available for seeking it, the knowledge about these facilities, the judgment of their value, the probability of getting what is wanted, are the factors that may affect information seeking behaviour.

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