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Information Seeking Strategies of Agricultural Scientists Working in the ICAR Institutions in India

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ABSTRACT

This research is a report of the findings of a study of the information seeking behaviour of agricultural scientists working in the Indian Council of Agriculture Research (ICAR) institutions of Delhi, and Punjab Agricultural University, Ludhiana. A structured questionnaire was developed to explore the information seeking behaviour of agricultural scientists. Data collected were analysed using the latest version of MS-Excel for appropriate statistical procedures for description (frequencies, per cent, means, and standard deviations), etc. The paper discusses the findings of various strategies and procedures adopted by the agricultural scientists in meeting their information requirement. The agricultural scientists were asked to rank the information sources indicating their order of priority while seeking information. They were asked to use a scale in order to their priority on the basis of I, II and III. The results show that agricultural scientists have expressed great dependence in meeting their information requirement on their institutional library/information centre. Seventy-two per cent of the respondents for all categories of agricultural scientists preferred their library/information centre as the most preferred source. For accessing information agricultural scientists highly depend on the library collection, followed by the personal collection, collection of their supervisor and of colleagues in order of decreasing priority.

Keywords: Information seeking behaviour, ICAR, agricultural scientists, Punjab agricultural university.

1. INTRODUCTION

Information is a key issue in the information age. The real challenge of this time is not producing information or storing information, but getting people to use information appropriately. Information is a critical resource in the operation and management of organisations. Timely availability of relevant information is vital for effective performance of managerial functions such as planning, organising, 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 organisation. 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 behaviour is a broad term

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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 a newspaper or a library), or with computer-based systems (such as the Web)[4].

Knowledge about the information-seeking behaviour and information use of individuals is crucial for effectively meeting their information needs. This knowledge may also lead to the discovery of novel information behaviour and user profiles that can be used to enhance existing information models or even develop new ones. Moreover, for librarians and other information professionals to be effective information providers, they require a fuller understanding of the information-seeking behaviour, needs, and uses of individuals. Wilson[5] noted that the study of information-seeking behaviour can stand on its own as an area of applied research where the motive for investing is pragmatically related to system design and development. A different motivation is involved if we wish to understand why the information seeker behaves as he does. This is an area of basic research and although the resulting knowledge may have practical applications, there is no necessity that it should. Therefore, what, when, and how information is gathered and used by agricultural scientists is of critical importance to meet their information needs[6].

2. PURPOSE AND OBJECTIVES

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

(i) To identify the purpose of seeking information, nature and types of information required by agricultural scientists

(ii) To examine the information seeking strategies of the agricultural scientists

(iii) To find the effectiveness of existing information systems and services in the field of agricultural sciences and the extent to which they meet the information requirement of agricultural scientists

(iv) To identify, the information sources and types of publications used by the agricultural scientists with particular reference to secondary and tertiary sources and

(v) To identify the problems faced by the agricultural scientists while gathering information and to provide appropriate suggestions to overcome them.

3. METHODOLOGY AND SCOPE

A structured questionnaire was developed for the purpose of data collection and distributed personally and through mail/e-mail among the agricultural scientists in selected ICAR institutions. A total of 700 questionnaires were distributed, out of which 375 questionnaires were received back (53.57 per cent). The questionnaire covered five basic areas in addition to their personal data 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 centers, and Suggestions for the improvement of the information centres/systems. The data collected were analysed using the latest version of MS-Excel for appropriate statistical procedures for description of frequencies, percentage, means, and standard deviations, etc. Three-point scale and five-point scale were developed. Likert scale, which ranged from 0 (not important) to 4 (extremely important), was used.

The population of the study mainly comprised agricultural scientists working in the six institutions of ICAR, namely, Indian Council of Agricultural Research Hqrs, Indian Agricultural Research Institute (IARI), Indian Agricultural Statistical Research Institute (IASRI), National Bureau of Plant Genetic Resource (NBPGR), National Center 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 (i.e. Principal Scientists, Senior Scientists, Scientists, Professors, Associate Professors, and Assistant Professors) taken from the various fields of agricultural sciences and their allied areas namely, Plant Genetics and Plant Breeding, Horticulture, Floriculture, Vegetable Science, Seed Science and Technology, Plant Biotechnology, Agronomy, Soil Sciences, Agricultural Physics, Microbiology, Environmental Sciences, Agricultural Engineering, Water Management and Technology, Plant Pathology, Entomology, Agricultural Chemicals, Integrated Pest Management, Biochemistry, Plant Physiology, Agricultural Economics, Agricultural Extension, Rural Sociology, and Computer Science.

4. FINDINGS AND INTERPRETATION

4.1 Preference of Source

A number of possible sources of agricultural information were identified and considered potentially relevant to help agricultural scientists in meeting their information requirements. The preferences of agricultural scientists for information sources and their accessibility have been conceptualised 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 was found from the study that agricultural scientists have expressed great dependence in meeting their information requirement on their institutional libraries/ information centre. Library/information centre is the most preferred source for 72.05 per cent of the respondents for all categories of agricultural scientists with a mean ranked from 2.85 to 2.27. The 'review articles in periodicals' were ranked first priority by 51.34 per cent of the respondents and it occupied second position in the rank order. 'Discussion with colleagues' within the organisation was the third preferred source of information. Out of 332 respondents of this source, 39.46 per cent gave it first priority whereas 38.55 per cent and 21.89 per cent responded for second and third priority, respectively.

Agricultural scientists of categories III and IV use this channel of information more than agricultural scientists of categories II and I. Verbal communication with colleagues helps in finding the solution of problems related to agricultural. So far as the opinion in respect of the priority in the use of 'indexing journals' is concerned, 42.42 per cent 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 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 more than other categories of agricultural scientists. Discussions with 'experts in the field' fall fifth; 32.80 per cent of the respondents marked it their first priority followed by 25.80 per cent and 41.60 per cent for II and III priority, respectively. The source 'consult bibliography' as a source of information falls sixth in the rank order. It is found that this information source was the first priority for 28.06 per cent of the respondents followed by 36.78 per cent and 35.18 per cent 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 per cent gave first priority to this channel of information followed by 29.41 per cent and 45.49 per cent for second and third priority, respectively. 'Library catalogue' does not appear to be a popular source. Only 21.27 per cent gave it a first priority, 29.41 per cent second priority, and 49.32 per cent 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 per cent of the respondents marked first priority, followed by 32.94 per cent and 45.09 per cent 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 found least significance. Table 2 shows the priority in the use of information sources.

4.2 Information Collection Strategies

A table of questions was asked to find out the extent of dependence of agricultural scientists on different modes of collecting of information. Table 3 shows their dependence on different modes for collection of information. The weighted index of their responses was calculated on the five-point scale. Table 3 shows that while own efforts gets the 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 computerised information search facility. This indicates that they are more familiar and comfortable with the computerised information search facility and find it more reliable. Librarian, library staff, colleagues and full-time research assistant rank rather low. This indicates that extent of dependence for collection of information is low in case of librarian and library staff. Thus, they are not actively involved in the process of information search. Part-time research assistant were given the lowest priority among the agricultural scientists and received eighth rank.

4.3 Strategies for Checking the References

Table 4 shows the extent of dependence on different sources for checking of references by the agricultural scientists on their own effort gets the first rank. Checking, original documents and reference sources were placed second and third, respectively by the agricultural scientists. The other high-ranking order was given to library catalogue, which was

Table 1. Priority in the use of information sources

Information sources	Priority (%)			
	I	II	III	Total
Discussion with				
Colleagues within the organisation	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				
Library/information centre/documentation 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 and abstracting journal	112 (42.42)	57 (21.60)	95 (35.98)	264
Databases	153 (51.340)	91 (30.54)	54 (18.12)	298

Table 2. Priority in the use of information sources by different categories

Source of Information	Category					
	I	II	III	IV	Mean	Rank Order
Visit library/information centre/documentation centre	2.85	2.76	2.41	2.27	2.57	1
Consult review article in a periodical	2.5	2.21	2.32	2.25	2.32	2
Discussion with colleagues with in the organisation	2.06	1.65	2.54	2.43	2.17	3
Consult indexing journal	2.15	2.23	1.9	2	2.07	4
Discussion with experts in the field	1.77	2.3	1.85	2	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	1.43	1.55	1.8	7
Consult library catalogue	1.6	1.6	1.63	2.13	1.74	8
Discussion with supervisor	1.29	1	1.86	2.31	1.62	9
Consult indexing and abstracting journals	1.75	2	1.22	1.14	1.53	10
Publisher's catalogue	1	1.33	1.42	2	1.44	11
Discussion with colleagues elsewhere	1.2	1.42	1.37	1.45	1.38	12

placed, fourth by the respondents. Dependence on supervisor was ranked fifth. Experts in the field and colleagues were ranked sixth and seventh, respectively by the respondents. Both the modes ranked librarian and research assistant identically, putting them in eight and ninth place, respectively. The agricultural scientists cited various reasons during the course of interview. While some of them expressed apprehensions about the authenticity and relevance of the information collected by the research assistants. However, in actual practice checking of references of reference work is hardly used by the agricultural scientists.

Table 3. Extent of dependence on different modes for collection of information

Sources	Extent of dependence						
	Solely	Most of the time	Often	To some extent	Not at all	Weighted index	Rank
Own efforts	198	138	39	0	0	4.42	1
Supervisor	98	43	69	65	110	2. 87	3
Computerized information Search	120	80	30	55	90	3.22	2
Librarian	28	21	40	78	188	2.10	5
Library staff	39	41	45	85	165	2.21	4
Colleagues	23	18	26	51	257	1.77	6
Full-time research assistants	0	13	21	53	288	1.35	8
Part-time research assistant	0	11	24	56	284	1.36	7

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

Table 4. Extent of dependence on different modes for collection of information

Sources	Extent of Dependence						
	Solely	Most of the Time	Often	To some extent	Not at all	Weighted Index	Rank
Own efforts	210	140	25	0	0	4.49	1
Checking original documents	158	96	46	65	10	3.87	4
Checking reference sources	209	93	43	30	0	4.28	2
Consulting the library catalogue	198	96	59	22	0	4.25	3
Supervisor	29	58	67	176	45	2.62	6
Expert in the field	39	69	78	150	39	2.78	5
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

follows: solely = 5, most of time = 4, often = 3, to some extent = 2, and not at all = 1.

4.4 Strategies for Accessing Information

Accessing information is a method or approach by which a document or any means of storing information may be found. This method basically depends on library collection, personal collection of the supervisor, and personal collection of the colleagues. The dependence of the agricultural scientists on the listed sources and documents for accessing information is shown in the Table 5. The ranking shows that they highly depend on the library collection, followed by the personal collection, collection of their supervisor and of colleagues in order of decreasing priority. As given in the Table 5 the library collection emerges as the most important channel for accessing sources of information. However, it needs to be pointed out that own institute/university library is the most sought source of information to the all categories of agricultural scientists. However, few of them depended on some other libraries such as IARI, NISCAIR, FRI, ICAR HQrs, Planning Commission, CSIR HQrs, and DESIDOC.

4.5 Purpose and Need of Information Sources

A scientist's need of information, whether from print or other sources, arises due to three different reasons. The first of these is the need to know what other scientists have recently done or are doing. This need to keep up-to-date with the current progress is called the current approach. The second need arises during the course of work—a need for some specific piece of information. This need, directly

Table 5. Extent of dependence on sources for accessing information

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.*

connected with the research work or problem at hand, is called everyday approach. And the third need comes less often but is equally important. This is the need to find and check, through the relevant information system on a given subject for background information when the scientists starts work on a flew investigation. This requirement can be called the exhaustive approach.

The agricultural scientists make use of a variety of information sources while seeking information for different purposes. Table 6 shows that a range of sources is used for obtaining specific information, keeping up-to-date and acquiring background information. The successive tables enumerate the sources of information in the order of importance for each purpose separately.

4.5.1 Specific Information

For specific information, journals have been reported as a significant source with 78.4 per cent of responses. This is followed by 12 more sources, all of which were used by more than 50 per cent of the respondents and rank 2-13 in the rank order (Table 7). They include conversation with colleagues and experts (74.4 per cent); books, monographs, etc. (69.6 per cent); references found while reading literature (68 per cent); technical/research reports (87.2 per cent); abstracting journals (88.4 per cent); indexing journals (83.2 per cent); attending lectures, conferences, seminars, etc. (59.2 per cent); yearbooks/ annual reviews/advances in ... etc. (56 per cent); workshop, seminar and conference proceedings (54.4 per cent); pre-prints/reprints directly from authors

Table 6. Purpose and use of information sources

Information sources	Specific information. no. of ranks responses		Keeping up-to-date no. of ranks responses		Background information no. of ranks responses	
Journals	294	1	312	1	189	2
Abstracting journals	249	6	234	5	147	8
Indexing journals	237	7	171	10	111	10
Books, monograph, etc.	281	3	273	3	228	1
Bibliographies/library catalogues	195	12	75	14	68	12
Library acquisition lists	189	13	93	12	27	14
Technical/research reports	252	5	222	8	159	5
Workshop, seminar and conference proceedings	204	10	231	6	117	9
Pre-prints/reprints directly from authors	201	11	108	11	75	11
Databases	255	4	174	9	153	6
Attending lectures, conferences, seminars etc.	222	13	291	2	150	7
Conversation with colleagues and experts	279	2	228	7	177	3
Dissertations/theses	177	14	78	13	72	12
Yearbooks/annual reviews, etc.	210	9	267	4	174	4

Table 7. Use of information sources for specific information

Information source	Number of respondents	Percentage (Out of 375)	Rank order
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	88.0	4
Technical/research reports	252	87.2	5
Abstracting journals	249	68.4	6
Indexing journals	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 a 5-point scale with weight assigned as : solely = 5, most of time = 4, often = 3, to some extent = 2, and not at all = 1.

(53.6 per cent); bibliographies/library catalogues (52 per cent); and library acquisition lists (50.4 per cent). The least-used source for obtaining specific information was dissertations/theses.

The reasons for the low usage of this source can be non-availability, lack of direct access and lack of proper dissemination of these in the libraries of the institutions concerned.

4.5.2 Keeping Up-To-Date

For keeping up-to-date, journals were reported to be the most used source by 83.2 per cent of the respondents and were ranked first (Table 8). In addition, there are seven more sources, namely, attending lectures, conferences, seminars, etc. (77.6 per cent); books, monographs, etc. (72.8 per cent); yearbooks/annual reviews/advances in, etc. (71.2

Table 8. Use of information sources for keeping up-to-date

Source of information	Number of respondents	Percentage (Out of 375)	Rank order
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 in…, etc.	287	71.2	4
Abstracting journals	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 journals	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 a 5-point scale with weight assigned as: solely = 5, most of time = 4, often = 3, to some extent = 2, and not at all = 1.

per cent); abstracting journals (62.4 per cent); workshop, seminar and conference proceedings (81.8 per cent); conversation with colleagues and experts (60.8 per cent); research reports (59.2 per cent), which are referred to by more than 50 per cent of the respondents while looking for current information and rank second to seventh in the rank order.

4.5.3 Background Information

For background information, books monographs, etc. were identified to be the most used source by 80.8 per cent respondents and were ranked first (Table 9). Scientific journals are next in the order of rank (50.4 per cent) followed by conversation with colleagues and experts (47.2 per cent); yearbooks/ annual reviews, etc. (46.4 per cent); technical/research reports (42.4 per cent); and references found while reading literature (40.8 per cent). Agricultural scientists selected sources and used them in the order consistent with stages in the innovation decision-making process. Printed material was used at the awareness or knowledge stage to review background material concerning the basics of a problem. Interpersonal contacts with colleagues were used at the analysis, hypothesis and persuasion stage in which researchers tested their results by comparing them with some standards of quality practice. Formal educational activities were used at the decision-making and confirmation stage to provide the most current information on a topic.

5. CONCLUSION

The study indicates that the agricultural scientists are much diversified in the information they seek, the sources they access and the use they make of the information. It is 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. It has been ranked, second with regard to acquiring background information. The preferences agricultural scientists have for these 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 these 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, all of these factors may affect information seeking behaviour.

Table 9. Use and purpose of information sources for background information

Source of information	Number of respondents	Percentage (Out of 375)	Rank order
Books, monographs, etc.	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	4
Research reports/technical reports	159	42.4	5
References found while reading literature	153	40.8	6
Attending lectures, conferences, seminars, etc.	150	40.0	7
Abstracting journals	147	39.2	8
Workshop, seminar and conference proceedings	117	31.2	9
Indexing journals	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 a 5-point scale with weight assigned as: solely = 5, most of time = 4, often = 3, to some extent = 2, and not at all = 1.

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