

Information Dissemination and Fostering Agricultural Research: Role of the Scientific Societies in India

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Paper Received on June 20, 2016, Accepted on September 25, 2016 and Published Online on February 14 , 2017

ABSTRACT

In India, around 70% of the population earns its livelihood from agriculture. It fulfils the basic need of human beings and animals. Agriculture is an important source of raw material for many agro-based industries in India. Quality research and development of human resources are the crucial parameters for sustainable development of agriculture across the diversified agro-ecological regions of India. Public and private research institutions have played important role in sustainable development of agriculture sector in India. The role of scientific societies is equally important and committed to accelerate the growth and development of agricultural research, education and extension in the country. The purpose of this study explores the quantitative and qualitative growth of the agricultural societies in India and their role in the agricultural research information dissemination in the country. The information about agricultural societies in India were obtained by several means such published literature & internet and analyzed. The information collection methodology used in study is Forward-Backward Information Search (FBIS). The agricultural societies have grown manifold over the past four decades in India, These societies generally share a common objective to fortify agriculture science discipline, and they achieve this objective through several activities such as publishing journals, organizing conference, seminar, meetings, recognizing achievement of scientists, etc. There are about 116 societies in agricultural sciences so far information collected for this study. This study was necessary for the practical purpose to identify the role of scientific societies are playing in agriculture development in India.

Keywords: Indian agricultural associations; Journal; NAAS; ICAR; Societies; Academies;

In India, agriculture fulfils the basic need of human being and animals. It is still source of livelihood to more than 70% population of the country (Reddy, 2015). Agriculture is also the important source of providing raw material for number of agro-based industries in India. Geographical condition of India is unique for agriculture because it provides many favourable conditions. There are plain areas, fertile soil, long growing season and wide variation in climatic conditions, etc. Apart from unique geographical conditions, India has been consistently making innovative efforts to harness the potential of science and technology for development of sustainable agriculture. To make agriculture remunerable and sustain farmer's interest, considerable research has been made during earlier decades. In India, government, non government and private sector have been continuing

playing a very important role in development of agriculture research, education and extension. The National Agricultural Research System (NARS), is one of the largest systems of its kind in the world, with more than 26,178 full-time equivalent research staff functioning in agricultural research, higher education institutions and universities. It comprises the 101 Indian Council of Agricultural Research (ICAR) institutes and 71 agricultural universities spread across the country (Nabi, 2012; ICAR, 2015).

The scientific and professional societies are also acting as a catalyst for research and development in the country. Most of the researchers and academicians working in NARS system are the members of these societies according to their disciplines and area of research. For the purpose of this study, the scientific

society particularly agricultural society is defined as a group of persons established to fortify agriculture science discipline, by promoting the related scientific, academic curricula and certification of skills (accreditation), fostering the links between the scientific and technical aspects of agriculture science, disseminating technical information through conferences and journals, and protecting the legitimate interest of the professionals vis-à-vis their clients (*Anonymous, 2011*). In several countries, scientific societies became important instruments for implementing the state's scientific policies. In India, scientific societies, except few, usually did not have their own research facilities, but they exercised considerable influence on research activities through their members involved in research and educational institutions.

Scientific societies in India considered for the study were non-governmental organizations registered voluntary with a view to establish identity of increasingly specialized groups of common interest to promote the scientific discipline. These societies are generally self-supported and performing their activities with funds raised through membership fee, subscription of publications, time to time voluntary contribution by office bearers, etc. These societies are often eligible to receive small grants from government agencies which enable them to organize minimal activities. The members of societies are mostly active/ retired employees of research institutes, university or students and their contribution in societal activities is voluntary and determined to promote professional interest and personal recognition. (*Sagar et al., 2006*)

Research publication constitutes the most important form of communications in almost all scientific research, and is one of the most significant indicators on the performance of a researcher and quality of research institution (*Kumar, 2015*). In addition, at the institutional level, the quality and quantity of a publication output help to determine its international reputation and attract the amount of funding that is based on national research performance reviews. Broadly, beside the research, the functioning of scientific societies in India is of publication of research journals, book, etc.; organization of events (conference, seminar, workshop, etc.) and motivation by recognizing the contribution of individuals and whole as institutions. The scholarly materials, journals, books, databases are being published by scientific societies also bring knowledge to scientists, professionals, students and

the public on a wide breadth of topics. Societies publish journals to provide a focused venue for the work of their members and to define their leadership and professional identity in the field (*Willinsky, 2006*). The economic benefit of scientific publishing is reaching throughout communities across the county. The most of the scientific societies are publishing the research free-of-cost or no-profit no-loss basis for the scientific and academic communities that reducing huge amount of publication.

As a part of its commitment to excellence in their respective fields, the societies are also dedicated for organizing conferences, seminars, workshop, etc. to provide the common platform to researchers, educationist, policy planner, other stakeholders for discussion, sharing of experiences, exchange of idea and enhancing knowledge. Conferences / seminars and workshops of professional societies can provide a wealth of information on a broad array of topics and professional issues. Societies are also rewarding to members and institutions for motivation by conferring prestigious awards generally open to their members.

Purpose and objectives of Study : Establishment of effective network of professional societies and their role in concerned field of agricultural research and education; fellowship and awards; conferences and seminar and publishing of journals and magazines are the indicator of growth and development of the discipline. The role being played by the Royal Society of London in Science, engineering and medicine; Zoological Society of London in animals and their habitats; Institution of Electrical Engineers (IEE) presently renamed as Institution of Engineering and Technology (IET) UK in electrical engineering and Institution of Electrical and Electronic Engineers (IEEE), USA in electrical and computer sciences, engineering disciplines are well known (*Singh et. al., 2012*). Similarly, in India, the role of the Indian Science Congress Association (ISCA) and National Academy of Agricultural Sciences (NAAS) is well known in science and agricultural sector respectively.

Through the literature review, it was found that there were few studies undertaken on this topic so far, which provided the brief overview of the agricultural societies and their role in agriculture sector of India. Therefore, realizing the need and significance of such studies for the agricultural researchers, academicians and policy planner in the country, the present study has been undertaken.

The societies considered for this study are actively involved either in publishing the journals, organizing conferences and recognising contributions of individuals, team or institutions by rewarding awards. The study carried out in keeping of following objectives in consideration:

- To document (name, URL, etc) the societies related to agricultural research and technology in India.
- To categorize the qualitative growth of research journals published by agricultural societies, whether their journals are online and assigned any impact factor or NAAS rating.
- Identify the accessibility options of the journal in different discipline published by different agricultural societies.
- To identify the societies organizing the conferences and seminars for the betterment of its members and provide fellowship/scholarship/awards in their respective fields.

METHODOLOGY

The information about 116 agricultural societies in India was obtained by several means and analyzed. The possible information pertaining to society’s activities, publication of journals, organisation of conferences or discussion meetings, conferring awards, etc., were collected from published literature and websites. Forward-Backward Information Search (FBIS) methodology was used in study for information collection. (FAU, 2015; Jessica Horst ,2016)

- *Forward information:* The information on the agricultural societies in India were collected from published literature such as directories of associations, government records (Annual Reports), websites of the societies and internet.
- *Backward information:* The output of activities performed by the societies such as publication of journals, organization of conference/ seminar, presenting awards, etc. are more prominently known to the audience as compare to about societies. Therefore, details of societies were also gathered as who is the publisher of journal and organizer of event.

Forward & Backward search approach devised for searching the society’s information is presented in fig. 1. Simple statistical tools and techniques (grouping of data for a frequency, trends analysis, percentage,

mean score, etc.) were used to analyze the data. Out of 116 societies selected for this study, the 104 societies were publishing journals under different titles. These

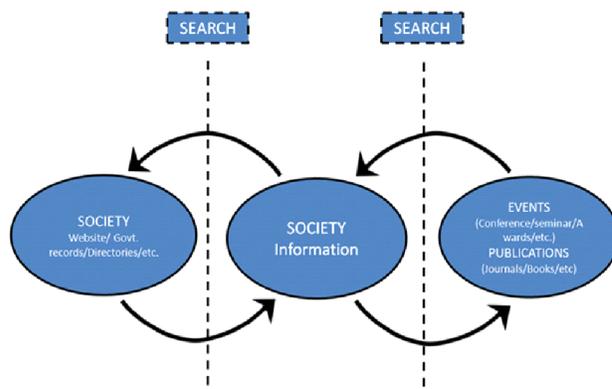


Fig.1: Forward-Backward approach for online search of societies’ information

104 journals published by the selected societies, selected for this study, were broadly categorized in following 10 categories, based on the different disciplines of research articles published in them, as presented in Table 1.

Table 1: Journals categories publishing different disciplines of research articles

Category	Area of research published
CAT1	Agriculture general
CAT2	Horticulture
CAT3	Agriculture extension, economics and statistics
CAT4	Agricultural engineering
CAT5	Plant breeding & genetics
CAT6	Plant protection
CAT7	Agronomy, physiology, soil & weed science
CAT8	Biotechnology & biochemistry
CAT9	Animal, veterinary, dairy science & fisheries
CAT10	Forestry & forage

For quality assessment, Journals were categorised based on National Academy of Agriculture Science (NAAS) rating of scientific journals in India. NAAS determine score of research journals, those journals where Thompson Reuters Impact Factor is available, and the scores are assigned as 6.00 + Impact Factor with capping on 20.00 (NAAS, 2016). Open access of journals fosters research dissemination and benefits researchers; therefore, society’s publications were also categorised on the mode of accessibility. The societies’ websites were also grouped on the basis of domain extensions.

RESULTS AND DISCUSSION

Professional and scientific societies play a

significant role and make crucial contributions by promoting excellence in their respective fields, by impacting on government, by circulating information (publishing journals, books, etc.) and by organizing events and promoting discussion of topics which effect research, extension and education in country (*European Commission, 2008*). In India, in the field of agricultural sciences, the emergence of scientific societies is relatively a recent phenomenon. Over the past decades there has been a proliferation of societies, their journals and meetings/ conferences in agricultural sciences (*Sangar et. al., 2006*).

Evolution of agricultural societies in India took place early of nineteen century. Agri-Horticultural Society of India is the oldest society of the India in the area of agriculture which was registered in 1820 (<http://www.agrihorticultureindia.com/about-the-society>).

Data of establishment of societies available (84) revealed that only nine societies registered during pre-independence (1820-1947). Fourteen societies during two decades of post-independence (1948-1968), 37 during 1969-1989 and 24 societies during 1990-2015 have been registered in different agriculture science disciplines. The evolution of agricultural societies in India is presented in fig 2.

The publishing of scholarly works can be achieved through a variety of outlets, be it the traditional book, journal, monograph or electronic form. However, the scientific journal provides one of the important and most significant avenues for the dissemination of research since long back 1665 in professional, scientific community worldwide (*Tenopir & King, 2001; Nelson Fabian, MS, 2011*). As stated in the objectives of the societies considered for the study, one of the major activities of the society is publication of journals in their respective fields. So for the information collected, 89.56 per cent societies publishing the journals covering different discipline of agriculture. The maximum journals published were of category Agriculture general (CAT1) which included most of the crop specific journals. The category wise distribution of journals published by societies is presented in fig 3.

The quality of journals was evaluated on the basis of the rating of scientific journals awarded by National Academy of Agriculture Science (NAAS). NAAS evaluates research journals related to agricultural research and issued the rating every year which is a widely recognized rating index in India (*Rajagopal et al, 2005*). In the Journals rating issued by the NAAS for 2016, all journals were rated on the scale of 1-20, while earlier rating were on 1-10 scale. Out of 104 Journals, 97 Journals included in NAAS rating issued for the year 2016 and majority of the journals (36.54%) published by the agricultural societies were in between 3-4 rating. No one journal rated in between 7-8. Very few journals (0.96%) rated more than 8 rating. The journals having NAAS rating >6 had the Thomson Reuters Impact factor and were only 5.77 per cent. The journals available only in print form are not rated more than 5 while the journal “Journal of Food Science and Technology” is online and open access rated highest rating 8.20. Therefore, there is need to improve the quality of journals and make it online to enhance NAAS rating. All the Journal were categorised in 8 NAAS rating

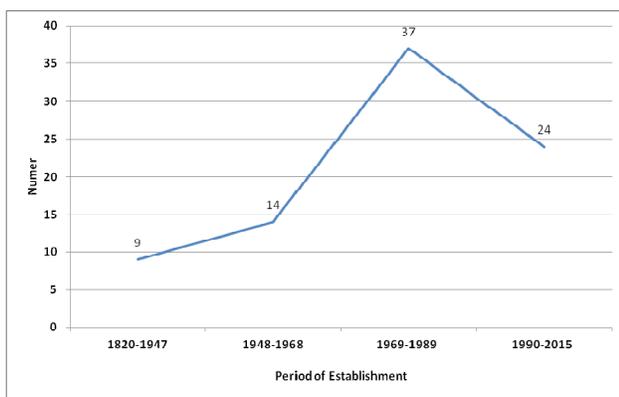


Fig.2 Evolution of societies in different periods

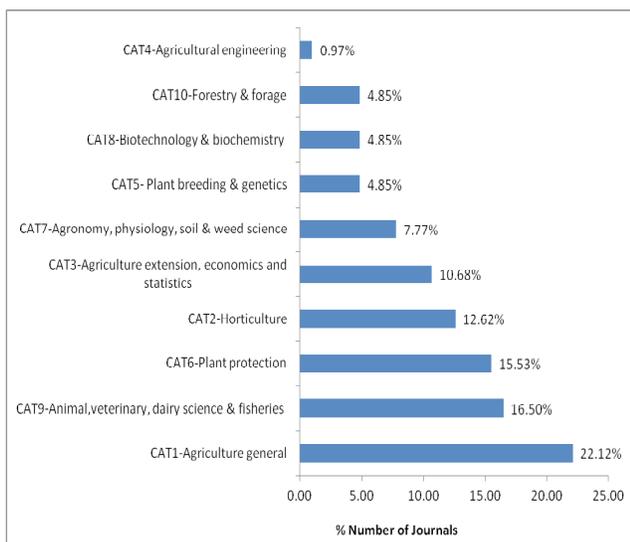


Fig. 3: Agricultural societies publishing Journals in different catagories

categories, the distribution of Journals in different group of NAAS rating except the rating category 7-8 (not rated any journal) is presented in fig 4.

Timely published or disseminated research may enhance its application and significance among the

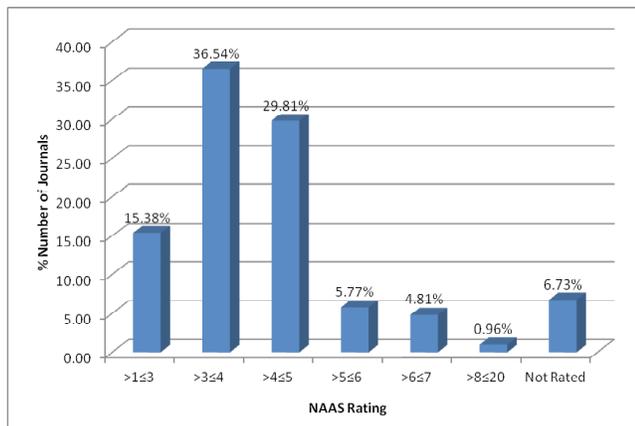


Fig.4: Distribution of Journals in different group of NAAS rating

domain. A scientific journal is a periodical publication intended to further the progress of science, usually by reporting new research. Based on the information collected, it was found that the Madras Agricultural Journal published by the Madras Agricultural Students Union was the oldest journal playing important role in publishing research, and had published its 100 volumes so far which were the maximum number among all the journals studied. However, the quality of the journal rated by the NAAS is 3.94. The maximum issue frequency of journals (58.70%) was bi-annually, and very few (1.09%) journals were monthly. For accumulating more research findings, and publishing timely, there is need that the societies have to be facilitated to increase the frequency and improve the quality of their publications. The issue wise publication information is presented in fig 5.

In developing country like India, open access benefits researchers, institutions, nations and society as a whole. For researchers, it brings increased visibility, usage and impact for their work (Victoria et al 2014). The agricultural journals published by the societies were accessible both print as well as online. Almost 98 per cent Journals were available in print form, 81.73 per cent Journals were available in both print and online access and 16.35 per cent were available only in print (Fig. 6). Among the online journals, only 41.4 per cent found open access, and rest 58.6 per cent were not open access (Fig. 7). Most of the journals available

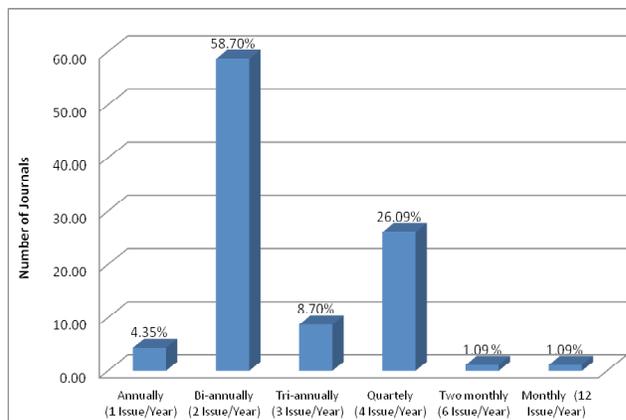


Fig.5: Frequency of Journals publication

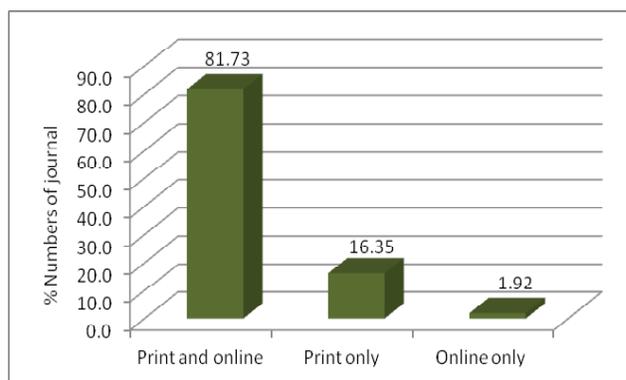


Fig.6: Formats of journals

online were accessible from the society website URL. Few had the separate URL for their journal. However, it was found that 16.35 per cent journals were still available only in print form and 58.6 per cent were not open access in this era of electronics publication. Therefore, these societies need to be facilitated and motivated for adopting the electronic and open access publication for effective and rapid dissemination of information for the readers.

Now a day the website may be used for increasing the trust of the public, building or enhancing the profile

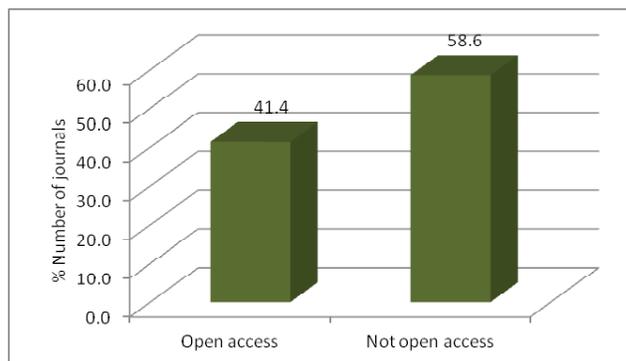


Fig.7: Journal accessibility options

and image of an institution. A website is also an important communication tool, as it provides individuals and organizations based in remote locations with a way to share and exchange information over the internet. It can represent a relatively economical and efficient solution if compared to other ways of communication. More specifically from the point of view of societies/associations it can be a publishing tool, like newspaper, a magazine (for programmes, reports and activities); it can be a marketing tool for their services and activities (journals and online databases); it can be a transactional tool (registering for membership, conferences and paying membership/subscriptions fees). In India, maximum agricultural societies were institutional societies, the societies registered by the professionals of an institutes or universities. Figure 8 shows the majority of the society (72.13%) had its own website, 7.83 per cent society's information was linked with URL of respective institute or university and for 19.83 per cent societies' website information were still not available. Result revealed that majority of the societies considered the importance of having their own website. About 28 per cent societies might not have their own website due to one or other reasons like lack of expertise, fund, resources, etc. Keeping in view of importance of website in present era of information technology, these societies should also be empowered to maintain their own website for the benefit of all concerned.

Every business or organisation needs an appropriate domain name for their website; it is the impression and image of them on the Internet. Therefore,

it is significant to select a perfect domain name and extension for an agricultural society's website. The Internet Corporation for Assigned Names and Numbers (ICANN) description of domain extensions registered for different societies' website shown in Table 2 (<https://en.wikipedia.org/wiki/INRegistry>).

The domain of agricultural societies which had its own websites selected for this study had been registered in 8 different domain extensions. As presented in table 2, the [dot]org domain extension is primarily used by non-profits groups or trade associations; therefore, the most suitable domain for societies registered in India is org[dot]in[dot] In general domain represents the identity of any organisation on World Wide Web. The maximum 30.95 per cent societies' domains were in [dot]org categories. Since most of these societies were registered as non-profits organisation and working for cause of agriculture science, therefore, the domain extension [dot]com (17.86%) second most after [dot]org and [dot]co[dot]in (7.14%) were not suitable for agricultural societies. Therefore, the societies may motivate for registering the domain of their website under org[dot]in category. The distribution of domains in different categories is presented in fig 9.

As per societies registration act, the organization of annual meeting of their members is mandatory (*Government of India, 2015*). Data revealed that more than 60 per cent societies also organizing National and International events (conferences, congresses, seminar, workshop, etc.) open for all members and non members. Societies organised these events annually, and once in

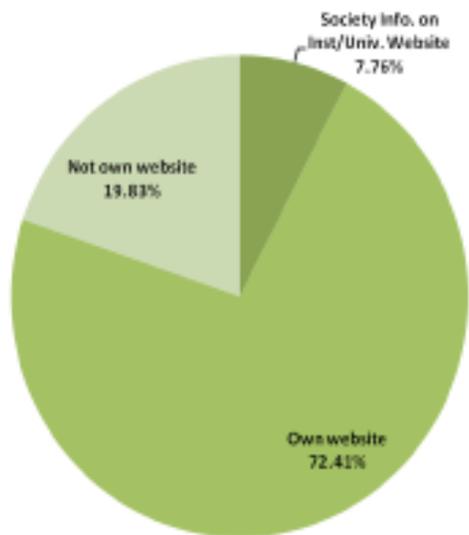


Fig.8: Online status of societies

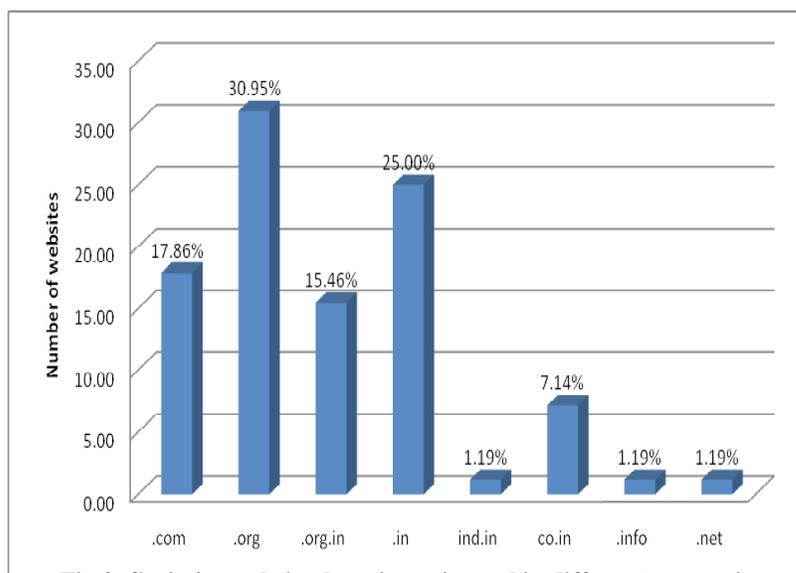


Fig.9: Societies website domain registered in different categories

two years as per their constitutions. However, the sufficient information was not available about frequency of organizing the such events. Often, societies rotate the location of such events from one city to another. It make more convenient for members to participate, depending on the proximity of the conference or seminar. Societies are well aware of the issues in their respective disciplines that are most important to their members, and they tailor programs accordingly (*Max Messmer, 2012*). Societies were organising the events such as seminars, workshops ,Conferences, etc. with the financial support of private and public organisations. In India, the events organised by the different societies or associations were also supported by government agencies like Indian Council of Agricultural Research (ICAR), National Bank for Agriculture and Rural Development (NABARD), Department of Biotechnology (DBT), University Grant Commission (UGC), Ministry of Environment Forest and Climate Change (MoEFCC), etc. These organisations provided partial financial grant on a selective basis to the registered scientific societies for holding conferences, seminars and promoting scientific excellence (*DBT; ICAR; MoEFCC; NABARD; UGC 2016*). The grantee organizations were required to submit the output of the event in the form of compendium of research papers, proceedings and recommendations of the seminar, conference, etc. to the concerned organization for implementation. The events such as seminars, workshops ,Conferences, etc. provided the common platform to researchers, educationist, students, policy planner, other stakeholders for discussion, sharing of experiences, exchange of idea and enhancing knowledge. Therefore, societies may endow with sufficient grant with proper monitoring for fruitful output of event. Data available shows that about 36 per cent societies were recognizing the contribution of researchers and academicians in their respective disciplines by conferring the awards. Out of them, some were considered very prestigious such as Fellow award of National Academy of Agriculture Science which was open for all the researchers/ academicians/professionals engaged in agriculture research and education.

CONCLUSION

The agricultural societies have grown manifold over the past four decades in India, These societies generally share a common objective to fortify agriculture science

Table2: ICANN description of domain of societies' websites

Domain	Description
[dot]com	represents the word "commercial," and is the most widely used extension for businesses
[dot]in	represent the country code of India and available to anyone; used by companies, individuals, and organizations in India
[dot]co[dot]in	is the country code for India. The .co portion of the extension indicates the domain name is for commercial purposes originally for banks, registered companies, and trademarks in India.
[dot]net	represents the word "network," and is most commonly used by Internet service providers, Web-hosting companies or other businesses that are involved in the infrastructure of the Internet.
[dot]org	represents the word "organization," and is primarily used by non-profits groups or trade associations.
[dot]org[dot]in	represents organization in India. The [dot]org portion of the extension indicates the domain name for organisation and is primarily used by non-profits groups or trade associations.
[dot]info	is for credible resource Web sites and signifies a "resource" web site.
[dot]ind[dot]in	originally for individuals, companies of India

discipline, and they achieve this objective through several activities such as publishing journals, organizing conference, seminar, meetings, recognizing achievement of scientists, etc. In India, almost 28 per cent agricultural societies still not had their own websites, 17 per cent journals were available only in print and only 35 per cent were open access. Therefore, agricultural societies need to facilitate for harnessing potential of digital technology. Since dissemination of research information is one of the prime objectives of almost all societies, the motivation of societies for open access is also needed. The quality of journals also needed to improve because NAAS rating of 87.5 per cent journals was less than six; only 5.77 per cent had the rating more than six. More than 58 per cent journals published bi-annually, for timely publication of research frequency of publications issues may also be increased. Uniform domains extension [dot]org[dot]in is most suitable for societies' website that will also give identity to agricultural societies.

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