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Agriculture Journals Covered by Directory of Open Access Journals: An Analytical Study

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ABSTRACT

With the advent of open access movement, open access journals (OAJs) being the prodigious source of academic and research information have been gaining significant magnitude. The electronic age has made it easier and more convenient than ever to break barriers to research information. The present study aims to study and analyse the status of 497 OAJs in Agriculture indexed in Directory of Open Access Journals. Specified traits such as Geographic and language wise distribution, coverage of Indexing/Abstracting databases, ranking of journals according to Impact Factor (IF), OA licensing model adopted, policy of plagiarism, visibility on social media and related issues of the OAJs in Agriculture are evaluated in the paper. Results indicated the dominance of De Gruyter Open as a publisher with highest number of OAJs, English as a content language, Indonesia with highest number of OAJs, Google scholar with highest journals indexed. The study observes the increasing migration of journals from commercial practice to OA. *Frontiers in Plant Science* found with highest Impact Factor among OAJs in Agriculture.

Keywords: Open access journals-agriculture; Agriculture; DOAJ; Open access journals-impact factor; Open access licenses; Plagiarism

1. INTRODUCTION

The open access revolution has brought about the tremendous changes in the knowledge business. Open Access Journals (OAJs) are gaining more prominence as they are being the most central platform for research information distribution. The utility of research information has reached its highest point and this is resulting in commercial publications turning into open access (OA). Open access brings more visibility, utility and can be huge source for progressing the further research in every branch of human knowledge. The digital lock which opens only to the high price subscription has been a huge obstacle for libraries with limited financial aid. The open access (OA) practice is contributing to maximise the access to scholarly information in a well orderly manner with related licenses such as creative commons. Libraries of modern age are finding ways to provide even newly published research literature through Gold Open Access and Green Open Access where authors take initiative to make their work available in a private or institutional repository[1]. The ever advancing technologies that offer electronic delivery of journals, the process of compiling, distribution and access of information are becoming increasingly less expensive[2].

2. OAJS IN AGRICULTURE

Agriculture has been an undividable part of humans' life which traces back to the early days of human civilisation. Agriculture in the modern world has gained noble worthiness as food is the foundation of life for every living being. It has been a source of national income for most of the developing economies. Agriculture plays key role in determining the economic development of a nation. Research in Agriculture has been vigorous than ever as it even deals with many non-agriculture areas such as supply of raw materials and wage goods to industries which completely depend on Agriculture. Naturally, the research information in this area is growing significantly. OAJs have been facilitating the access to scholarly and research information in Agriculture with no cost. As per the DOAJ index, there are 497 OAJs in the field of Agriculture.

3. LITERATURE REVIEW

With the enormous amount of information explosion, it has been a great challenge to balance the equilibrium in providing access to information. Journals become most important part of the knowledge of present and past as they constantly deal with research results. Access to such journals is essential to further the research and development activities. OA concept came into existence with the realisation of need to equalise the access to scientific information. Along the time, increase in OAJs became noticeable. The rapid growth in the number of OAJs is putting on challenges of quality management, evaluation, findability etc.[3]. Visibility becomes major issue in the world of research especially with OA publications. The unfortunate

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exclusion of grey literature, valuable contents in various languages, historical literature from standard abstracting and indexing databases fails the OAJs to reach wide range of users[4]. Pujar[5] opines that many scholarly journals are showing increasing acceptance of OA model ever since OAJ concept came into existence. Contribution and utility of OAJs have been enhanced due to the OA movement which created a promising environment with the participation of developing countries[6]. A study conducted across various inter disciplinary subjects such as Philosophy, Political Science, Electrical and Electronic Engineering and Mathematics confirmed OAJs can achieve better Impact Factor than that of Non-OAJs and this may be due to the universal availability[7]. The results the study was promising and encouraging for wider adoption of OA practice. The OA movement is urging the publishing industry to adopt OA licenses which in other words called copyleft licenses and adoption of one or the other creative commons model for OA content distribution has become a trend[8].

4. OBJECTIVES

The present study aims to study the status and analyse OAJs in Agriculture as listed in DOAJ. The prime objectives of the study are to measure and analyse geographic and language wise distribution and determine prolific publishers. The objectives also include ranking the OAJs as per Impact Factor (IF), finding coverage of indexing and abstracting databases where the OAJs in Agriculture are indexed, studying extent of gap in the access, OA licensing models adopted, and policies on Article Processing Charges (APC)/Article Submission Charges (ASC) and waivers. Analysis of formats and platforms adopted for content distribution, plagiarism policy and adoption of social media come at the extended part of the study.

5. METHODOLOGY

DOAJ was considered for the study as a source OAJs in Agriculture. Metadata database of the entire set of OAJs was downloaded from DOAJ website. Under the subject column of downloaded database, journals with the term "Agriculture" were harvested. In total, 497 journal were found matching the term. Information in the metadata downloaded from DOAJ served the partial information requirement. Using weblinks given in the database as well as Google search engine, each of the journals' websites was visited and scrutinised to record information on predefined criteria. Journal Citation Report (JCR) 2016 was referred for obtaining the Impact Factor of the listed journals.

Out of total 497 journal, websites of 5 journal were found being inoperable and 4 being ceased publication but providing access to archive. Omitting 9 journal, a total of 488 journal were considered for the study. Data for distinguished criteria of the study were gathered visiting the websites of journals and metadata downloaded from DOAJ.

6. LIMITATIONS

The present study is limited to the OAJs in Agriculture as listed by DOAJ. Over the period of time, Agriculture has grown to include many areas of knowledge where the applications of Agriculture can be assumed. In the study, it is observed that OAJs in Agriculture also deal with interdisciplinary subjects such as Environmental Sciences, Biology, Botany, Animal Culture, Food Science, Geography, Anthropology, Ecology, Veterinary Medicine, Fisheries, Aquaculture, Forestry and many more. Such multidisciplinary journals are also considered for the study as Agriculture is one of the subjects they deal with.

Table 1. Geographic distribution

Country	Journals	Percentage
Indonesia	84	17.21
Brazil	64	13.11
Poland	32	6.56
Iran	26	5.33
United Kingdom	25	5.12
Turkey	20	4.10
Czech Republic	14	2.87
Romania	14	2.87
Colombia	13	2.66
Egypt	12	2.46
Germany	11	2.25
United States	11	2.25
Switzerland	10	2.05
Italy	9	1.84
Serbia	9	1.84
Argentina	8	1.64
China	8	1.64
Spain	8	1.64
Bangladesh	6	1.23
Mexico	6	1.23
Iraq	5	1.02
Pakistan	5	1.02
Slovakia	5	1.02
Countries with less than 5 journals	83	17.01
Total	488	100.00

7. GEOGRAPHIC DISTRIBUTION

The study observes that out of examined 488 journals, there are 65 publisher countries among which Indonesia with 84 journal (17.21 %) has topped the list followed by Brazil with 64 (13.11 %) and Poland with 32 (6.56 %). Iran with 26 (5.33 %), UK with 25 (5.12 %) and Turkey with 20 (4.10 %) have occupied the consecutive positions. Italy, Serbia have 9 (1.84 %) journal each. whereas Argentina, China and Spain have shared the equal ranking (8; 1.64 %). 42 Countries publish less than five journal each (Table 1).Among the Developing Economies listed by United National Development Programme (UNDP), 44 country have been contributing to the global Agriculture research literature. Indonesia, Brazil, Poland being

developing countries have topped the list and it indicates the growing importance of Agriculture research in the developing countries.

8. LANGUAGE WISE DISTRIBUTION

Scientific journals have the practice of publishing articles in multiple languages in the same issue which broadens the horizon of research. The study records content of 488 OAJs in Agriculture being published in as many as 28 language. The study of language aspect was carried out through two segments such as journals with single language and journals with multiple languages (Table 2). The proportion of journals in single and multiple languages is 63.31 % and 36.68 % orderly. In the segment of journals with single language, English (238; 77.02 %) is leading. Languages such as Indonesian (10.36 %), Persian (3.88 %) and have been consecutively used the most. There are 7 language having single publication each (0.32 %).

The multiple languages division of Table 2 describes the proportion of languages in multilingual OAJs where the analysis has been carried out considering the number of occurrences of each language in the total multilingual OAJs alone. Even in this division English (38.24 %) has been at the top. followed by Spanish; Castilian (16.86 %) and Portuguese (15.20 %). It is well evident that English has been accepted as universal language for publishing OAJs in Agriculture. The previous studies on OAJs in different disciplines as well depicted the dominance of English[5,6].

Table 2. Language wise distribution of open access journals

In single language		In multiple languages	
Language	**Percentage**	**Language**	**Percentage**
English	77.02	English	38.24
Indonesian	10.36	Spanish;Castilian	16.86
Persian	3.88	Portuguese	15.20
Portuguese	1.94	Indonesian	9.74
Spanish; Castilian	1.94	Turkish	4.28
Chinese	1.29	French	2.85
Arabic	0.65	Russian	1.90
Croatian	0.65	Serbian	1.90
Bosnian	0.32	Persian	1.19
Bulgarian	0.32	German	0.95
Czech	0.32	Italian	0.95
Dutch; Flemish	0.32	Croatian	0.71
Serbian	0.32	Polish	0.71
Slovenian	0.32	Slovak	0.71
Turkish	0.32	Ukrainian	0.71
Total	100.00	Czech	0.48
		Latvian	0.48
		Romanian; Moldavian; Moldovan	0.48
		Arabic	0.24
		Brazil	0.24
		Estonian	0.24
		Hungarian	0.24
		Korean	0.24
		Slovenian	0.24
		Thai	0.24
		Total	100

9. PROLIFIC PUBLISHERS

OAJs in Agriculture are published by wide range of publishers across the globe. Among the publishers' universities, research organisations, academic institutions and regular publishers form the major part. De Gruyter Open with 32 publication (6.56 %) is leading with highest number of journals (Table 3). Czech Academy of Agricultural Sciences and Elsevier (2.25 %) have been at the consecutive position with 11 publication each followed by Biomed Central (10; 2.05 %). There are four publishers with 6 publication (1.23 %), 2 publisher with 4 journal (0.82 %) and 3 publisher with 3 journal (0.61 %) each. 281 Publisher bring out single journal each whose share is 57.58 % of total OAJs published. Commercial publishers are progressively adopting OA system to their journals.

Table 3. Prolific publishers of open access journals

Publisher	Journal	Percentage
De Gruyter Open	32	6.56
Czech Academy of Agricultural Sciences	11	2.25
Elsevier	11	2.25
BioMed Central	10	2.05
Ferdowsi University of Mashhad	8	1.64
Pusat Penelitian dan Pengembangan Perikanan	8	1.64
Bogor Agricultural University	7	1.43
Hindawi Publishing Corporation	7	1.43
Syiah Kuala University	7	1.43
MDPI AG	6	1.23
Springer	6	1.23
Universitas Gadjah Mada	6	1.23
Universitas Udayana	6	1.23
Taylor & Francis Group	5	1.02
AcademicPres	4	0.82
Wiley	4	0.82
Institut Pertanian Bogor	3	0.61
PAGEPress Publications	3	0.61
Universidad Nacional de Colombia	3	0.61
Publishers with two journals	60	12.30
Publishers with single journal	281	57.58
Total	488	100.00

10. JOURNAL RANKING

Content quality of the research journals is as important as research itself is. Quality of scientific journals is often measured in terms of Impact Factor. JCR (Journal Citation Report) has been an authenticated source for determining the IF of journals. The present study reports that as many as 87 (17.83 %) journal out of 488 journal have been included in JCR. Inclusion of OAJs in JCR is the need of the day as they get better visibility which in turn helps to improve the quality. Table 4 shows the top 25 OAJs in Agriculture according to the IF provided by JCR. *Frontiers in Plant Science* (4.298), *Rice* (3.739) and *Plant Methods* (3.510) have recorded. Authors proactively considering OAJs for publishing their work may change the scenario for OAJs to get better IF. Increasing adoption of OA policy to journals can bring more visibility which leads to increased IF. Libraries have a role to play in this task by promoting OAJs to users and contributors.

Table 4. Top 25 OAJs in agriculture according to impact factor

Journal Title	Impact Factor
Frontiers in Plant Science	4.298
Rice	3.739
Plant Methods	3.510
Genetics Selection Evolution	2.964
Aquaculture Environment Interactions	2.905
Journal of Physical Chemistry A	2.847
Veterinary Research	2.798
Plant Genome	2.736
AoB Plants	2.238
Journal of Animal Science and Biotechnology	2.052
BMC Veterinary Research	1.750
Mediterranean Marine Science	1.683
Journal of Plant Interactions	1.628
Acta Veterinaria Scandinavica	1.472
Plant Pathology Journal	1.255
Plant, Soil and Environment	1.225
Knowledge and Management of Aquatic Ecosystems	1.217
Veterinary Quarterly	1.176
Revista Brasileira De Parasitologia Veterinaria	1.139
Scientia Agricola	1.108
Revista De La Facultad De Ciencias Agrarias	1.107
Scientia Marina	1.009
International Agrophysics	0.967
Soil and Water Research	0.934
Aviation Space and Environmental Medicine	0.933

11. INDEXING AND ABSTRACTING DATABASES

Having significant visibility and effective tools for the discovery of the published work has been a great challenge in the world of research. Growing importance of indexing and abstracting tools at National and International level signifies the urge for the proper identification of work and ownership. Present study records 698 source where OAJs in Agriculture are indexed (Table 5). The sources involve diversified databases such as scientific databases, library catalogues, repositories, portals and directories. Google Scholar (52.46 %) found to be most popular among OAJs in Agriculture preceded by DOAJ which is the source database for the study. CAB Abstracts (44.88 %) and Scopus (27.46 %) have been considered by 219 and 134 journal orderly. Among the international standard databases, AGRIS, World Cat, Ebsco Information Service, Latindex, Index Coopernicus, Chemical Abstracts are found to be considerably prominent for finding research information related to Agriculture.

Table 5. Top 25 abstracting and indexing databases

Indexing/Abstracting Database	Journal	Percentage
DOAJ	488	100.00
Google Scholar	256	52.46
CAB Abstracts	219	44.88
Scopus	134	27.46
AGRIS	108	22.13
World Cat	105	21.52
EBSCO Information Services	104	21.31
Web of science	101	20.70
AGRICOLA	81	16.60
Cross Ref	80	16.39
Latindex	75	15.37
Ulrich Web	74	15.16
Chemical Abstract Service	73	14.96
Index Copernicus International	70	14.34
ProQuest	69	14.14
Science Citation Index Expanded	62	12.70
IPI Indonesia Publication Index	60	12.30
BASE, SHERPA / RoMEO	58	11.89
CNKI J, Gate	56	11.48
CiteFactor	52	10.66
JournalTOCs	49	10.04
ISJD Indonesian Scientific Journal Database	43	8.81
Scielo	42	8.61
Genamics Journal Seek, SINTA	41	8.40
EBSCO Discovery Service, Primo Central (ExLibris)	40	8.20

12. ACCESS GAP IN AGRICULTURE OAJS

While measuring the gap between the year of journals' establishment and provision of open access, it is realised that many journals give open access from the very first issue and the rate of such journals is 58.20 %. 28 (5.74 %) OAJs come under the gap between 1-5 year of access gap and 40 (8.20 %) OAJs make their content available online with a gap of 11-20 year as shown in Fig. 1. The OAJs (42; 8.61 %) fall under the category of more than 50 year is comparatively less. There are three journal whose gap of access years has crossed 100 year and this signifies the importance of research in Agriculture even a century ago. OAJs in Agriculture are demonstrating the trend of gradually making the old issues of journals available for OA and this may fill the existing gap over a period of time. In total, 328 journal (67.42 %) are still bringing out print version of the journals.

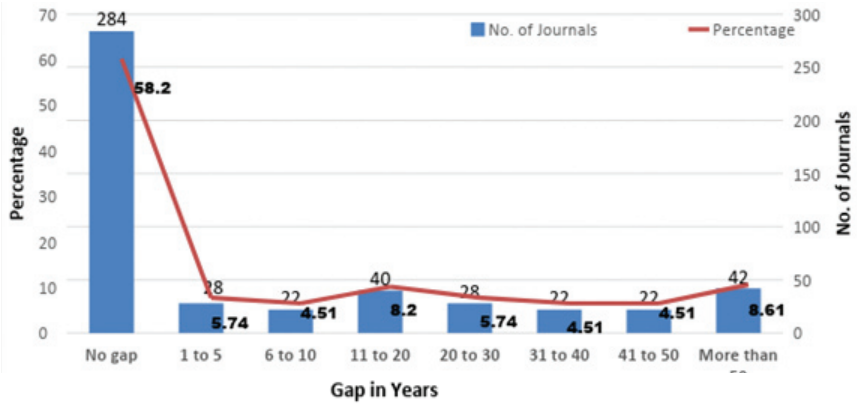

Figure 1. Access gap in OAJs in agriculture.

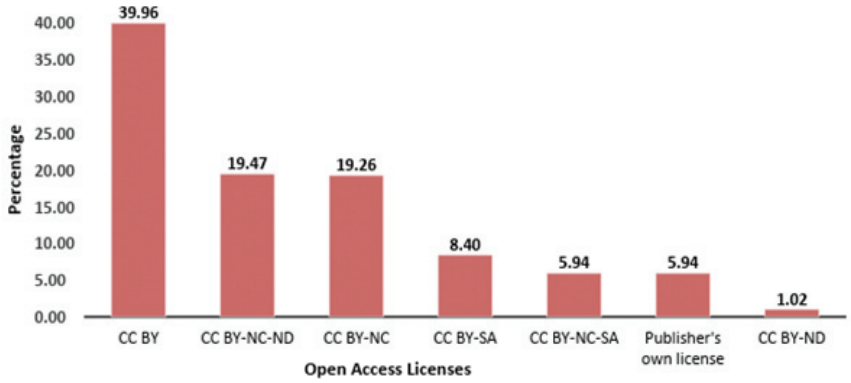

Figure 2. Open access licensing models.

13. LICENSE ADOPTED FOR OPEN ACCESS

Creative Commons licenses have been a great platform for channelising the open access content in distinguished levels according to the publishers/authors' convenience[9]. The present study finds that 195 (39.96 %) OAJs in Agriculture have adopted CC BY (Creative Common Attribution) license being the highest for the distribution of content which basically allows derivatives, commercial use, and non-share alike as shown in Fig. 2. CC BY allows users to use and modify the content with an attribution. CC BY-NC (Attribution-Non Commercial) being a non-commercial license has been adopted by (19.26 %) journals. CC BY-NC-ND (Attribution-Non-Commercial-No Derivatives) (19.47 %) which does not permit any derivatives on the source work has been adopted by almost same amount of journals.

In the OA movement, share-alike licenses such as CC BY-SA (Attribution-Share Alike) (8.40 %) and CC BY-NC-SA (Attribution-Non Commercial-Share Alike) (5.94 %) are slowly gaining popularity among research communities. Since these are viral licenses, the derived versions are unconditionally distributed under the license of the source work. The only difference is that, CC BY-NC-SA even prohibits the commercial use of the work. These licenses are being famous among the existing copyleft licenses. 5.94 % of the publishers do not rely on any existing licenses and have adopted their own license for the OA.

14. APC AND WAIVER

OA does involve some cost for the review and processing of publication. 208 (42.62 %) OAJs in Agriculture levy charges in the name of APC and 14 (2.87 %) journals charge for article submission fee. Article submission fee is usually not refunded even if the article is not accepted for the publication. 81 (38.94 %) journal out of total journals that charge APC/ ASC have provision for waiving off full or partial fee and providing discounts on the fee. Such waivers are based on specified criteria such as Low-Income/Lower-Middle Income Economies classified by World Bank and Least Developed countries listed by United Nations membership. Managements of some journals offer discounts and waivers for authors being member of certain organisations and programs such as Institutional Open Access Program (IOAP), Wiley Open Access. Apart from these conditional waivers, authors have the privilege of getting the waiver at management discretion which is heard case by case. Generally invited articles also are waived off from APC. APC can be an element that influences the author while choosing the OAJ for publishing[10].

15. FORMATS

Among the OAJs in Agriculture, PDF is the most preferred format where every journal provides its content in PDF. Formats were studied in two segments such as single and multiple. There are 325 OAJs (66.6 %) which provide contents in PDF format alone. A total of 163 journal (33.4 %) provide the contents in multiple formats. Journals with multiple formats were separated for the formats and each occurrence of type of format was taken into account. In a total 395 occurrence among the journals with multiple formats for their content provision, PDF (41.27 %) tops the list followed by HTML (35.7 %) and XML (17.72 %) as shown in Fig. 3. PDF has been most accepted for its unique qualities such as ubiquitous format, ability to work on any platform, ability to integrate non-text components, etc.

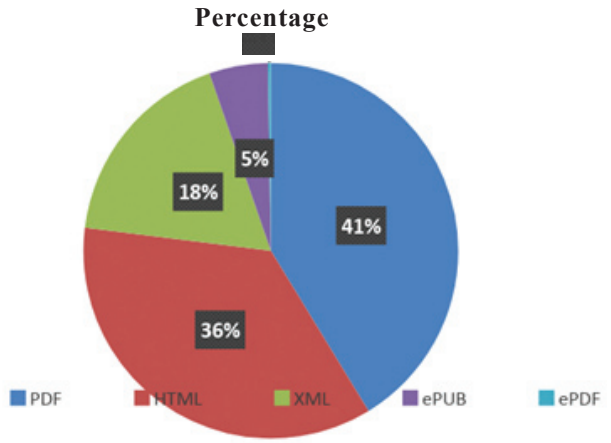

Figure 3. Journals with multiple formats for content distribution.

16. PLATFORM

Open Access Movement has eventually been thriving towards self sustainability and this is evidenced with the auxiliary applications which facilitate OA also turning into open source. An OAJ can be made available on Open Journal System (OJS)[11] which is an open source software under GNU General Public License. OJS is a product of Public Knowledge Project, a non-profit research initiative for making the results of publicly funded research projects to be openly accessible[12]. 202 (41.39 %) OAJs in Agriculture have adopted OJS as their platform for content distribution. Over the period of time, OJS is developed to include most of the aspects of journal management such as paper submission, assigning reviewer, subscription, provision of information about the journal and module for accessing articles (OJS). The rate of OAJs with their own platform (286; 58.61 %) is considerably more though use rate of OJS is higher than the previous study conducted on OAJs in Chemistry[6]. The practice of getting service from commercial providers still endures as it facilitates reduced burdens of management and timely support and enhances the ability to be modified according to the needs of publishers though considerable amount of cost is involved in it.

17. ASSOCIATION WITH SOCIAL MEDIA

OAJs require more publicity for the intended information utility and social media have been the platform for promoting OAJs. 197 (40.37 %) OAJs in Agriculture have been using various applications of social media such as Facebook, Twitter, Delicious and LinkedIn. Journals are adopting the trend of appearing in multiple social media applications for promotion and sharing of information. 88 (18.03 %) Journals use more than 4 application to increase their reachability and visibility. 140 (28.69 %) OAJs provide article alert service through either RSS (Really Simple Syndication) or emails and both. This helps for readers to keep track of new article arrival and publication of new issues. Wider visibility of OAJs has the potential to increase the adoption of OAJs.

18. PLAGIARISM POLICY

Quality of the contents of OAJs is becoming crucial in the recent times. Providing proper citations for the reference or ideas borrowed is essential as it not only makes the work more credible and authenticated, but also connects the readers who want to pursue the topic with wide range of sources. The duplication of the work, a foremost concern in the field of research is now easier to detect with the plagiarism detecting softwares in place. In the present study, 313 (64.14 %) OAJs have stated their policy about plagiarism. This gives the authors a caveat to maintain the level of plagiarism. Placing prominence on plagiarism evasion even before submitting the article signifies the importance of plagiarism policy. Plagirism detecting softwares such as Turnitin and ithenticate are popular among the OAJs in Agriculture.

19. CONCLUSIONS

The growing trend of OA to scientific journals has become almost unquestionable in the electronic age. The migration of publications from commercial to OA signifies the augmentation of sustainability of OA. The trend of bringing the back issues of journals into OA exhibits the increased positive attitude of publishers towards OA practice. Developing countries, by leading in publications, are creating promising environment for Agriculture OAJs. Charging APC/ASC is less than half of the whole journals and this gives the authors fairly enough choices to choose OAJs for their articles. The necessity of standard indexing and abstracting databases to include is better realised and this can be observed with the huge number of databases where OAJs in Agriculture are being indexed. Quality assurance has more significance in the field of research as every single research is built upon the previous research in the respective discipline. Quality enhancement can be key factor in attracting more scholars to publish their research work in OAJs. Inclusion of OAJs in JCR like databases and adherence to plagiarism policy are ineluctably essential to enhance the quality. The coexistence of quality-visibility-priority and their interrelation are obvious in OA environment. Libraries have a great deal of responsibility in OA movement by promoting, adopting and influencing OA practice among users and authors. With the predetermined standards on content quality, technology used, adoption of licensing model for content distribution, OAJs may extend their horizons to bring better OA environment.

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