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Use of E-Resources in Indian Agriculture Education System during the COVID-19 Pandemic Era

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ABSTRACT: Whole world is facing problems arose due to the COVID-19 pandemic situation. In this pandemic era agricultural activities, teaching/learning process and research activities in agriculture education system of India conducted well because of implementation of information technology (IT). Whereas, the fully adoption of such technology is not seen in case of inaccessible areas and some faculties, who not familiar with advance IT tools. Internet connectivity is the one problem faced by most of the faculty/scientist/ students of the agriculture. This paper focuses on the awareness and uses of various online e-resources by faculty members in research, teaching learning process, and its satisfaction level of information needs. This research presents the holistic picture of uses of e-resources in the Indian agriculture education in the course of current pandemic.

Keywords: Agriculture Education, COVID-19, E-Resources, Information Technology

INTRODUCTION

In last two decades information explosion and its dissemination is very fast due to rising electronic publishing technology and cloud technology. Information sources that are available in electronic format are known as e-resource (Bajpal *et al.*, 2009; Mittal and Sharma, 2014). Whole world is facing the challenges of COVID-19 pandemic since more than a year. In-spite of this pandemic era agricultural activities, teaching learning process and research activities in agriculture education system of India performed very well because of the implementation of information technology. E-resources are information products in digital format access electronically i.e. electronic journals, electronic books, E-Zine, E-Thesis and dissertation, electronic newspapers, electronic newsletters, online and offline databases in varied digital formats i.e. pdf format, WebPages, YouTube audio/video, CD-ROM databases and other computer–based electronic networks (Kenchakkanavar, 2014; Maitato, 2020). In current scenario e-resources are play vital role in information-based activities include fiscal, social, economic, scientific and technical because of its properties and nature.

Academic and scientific institutions are moving towards the e-learning based research activities therefore their library and resources centers are going to well equipped with e-resources to fulfill the desire of right information of their users. Most of the libraries and information centers of the world enriched with resources, especially cloud based e-resources/online resources in last decade because users of current generation are preferred e-resources than printed resources (Wijetunge, 2015; Kenchakkanavar, 2014; Bakkiaraj *et al.*, 2012). Online e-resources can circulated among the large number of users in very short time across the globe with social distancing therefore its alive the teaching learning process in highly infectious environment due to COVID-19. In this pandemic period most of the publishers provided free access to their valuable and fruitful contents to support online teaching learning process.

E-Resources: - Regulatory Guidelines and Policies

All the academic organizations and institutions of the country have been closed from last week of March 2020 due to the countrywide lockdown announced by the Government of India to break the chain of COVID-19. In this pandemic situation regulatory body of India *i.e.* UGC, ICAR and Ministry of Education, Government of India are issued several advisories for the use and promotion of e-resources to ensure the continuity teaching learning process (UGC, 2020). ICAR took decision that all e-resources pertaining to agricultural education developed by all the ICAR funded and supported institutions shall be made available to all the students and faculties at no cost

(Thammi-Raju, 2020). The information of e-resources and their URL are available on Education Portal of ICAR (https://education.icar.gov.in/). Likewise all State Agriculture Universities, Central Agricultural Universities and Deemed Agricultural Universities are requested to providing link of e-resources on the Portal to benefit the student fraternity for effective teaching-learning process.

In addition to the above e-resources, teachers may be encouraged to develop their own e-contents and be delivered to the students as and where required to fill all gaps. Such content may also be shared with other AUs directly through ICAR portal for mutual help to each other. ICAR has developed the Consortium for e-Resources in Agriculture (CeRA) to access the contents online by scientists, faculties, scholars, and students related agriculture sciences around the clock through IP authentication.

During this pandemic crisis, Remote Access Facility is extended to all the end users to make use of these resources from anywhere. Thus, the universities may inform all the users to access the available e-resources under CeRA. As per the guidelines of World Health Organization, regarding to the breakdown spread of COVID-19 pandemic the most of publishers across the globe provided free access of their valuable contents to learners for the continuity of research and teaching learning activities.

Characteristics of e-Resources (Velmurugan, 2013; Kavithanjali, 2019)

- **Borderless:** E-resources are not limited in any physical boundary so these can spread across the globe.
- **Availability:** These are available around the clock to the end users.
- **Multiple accesses**: E-resources are accessible from the multiple access points.
- **User friendly**: E-resources have lot of good qualities so these are very much liking by the end users.
- **Compatibility/ No storage problem**: E-resources can store in very less space in digital form or may store in cloud so no storage problem arise.

E-resources in Agriculture Sciences

CeRA

The Consortium for e-Resources in Agriculture is an e-Consortium for the libraries of agricultural and allied sciences under the ICAR for NARES Libraries. It was established in 2007 for the dissemination of information to scientists, faculties and scholars. In this consortium, more than 3000 online journals available related agricultural and allied sciences.

Krishikosh

Digital repository of accumulated knowledge in agriculture and allied sciences, Currently Krishikosh contents more than 160 thousand full text online searchable digital volumes of books, journals, reports, proceedings, reprint, research highlights, training manuals and historical records includes Doctorate theses and Post Graduated dissertations submitted by scholars in ICAR Institutes and State Agriculture Universities of India.

Sciencedirect.com

ScienceDirect is the leading e-resource for scientific, technical, and medical research. It contained articles of reputed journals, books. Approx 4500 journals and more than 35,000 book titles on ScienceDirect out of these near about 3600 publications related to Agricultural and Biological Sciences.

Directory of Open Access Journals

DOAJ provides online access, open access to high quality peer-reviewed journals. Services of DOAJ are free of cost. DOAJ covers more than eleven thousand gold open access journals in 74 languages from more than 120 countries of around 300 subject areas. The expert reviewers' team and volunteer editors to ensure quality and keep standards review all journals. DOAJ is used as a guide to quality open access journals by various institutions across the globe. Around 400 Journals and 365000 articles related to agricultural sciences. .

Shodhganga

Shodhganga provides a repository for research scholars to deposit their doctoral theses and disseminate it to entire scholarly community online. The repository has the ability to capture, index, store, and preserve Electronic Theses and Dissertations submitted by the researchers.

Directory of Open Access Books (DOAB)

The directory is open to all publishers who publish academic, peer-reviewed books in Open Access and should contain as many books as possible, if these publications are in Open Access and meet academic standards.

National Digital Library of India

Ministry of Education formally known as MHRD under its National Mission on Education through Information and Communication Technology (NMEICT) has initiated a pilot project National Digital Library of India to develop a virtual repository of learning resources to access online. NDL India manage by Indian Institute of Technology Kharagpur.

E-PG Pathshala

E-PG Pathshala is digital platform provide by ministry of education under the project NMEICT being implemented by the University Grant Commission. In this platform, high quality digital contents are available of Art, Humilities and Sciences.

E-Courses

The novel initiative of Indian Council of Agriculture Research for the e-learning purpose a platform named as e-Courses introduce for benefits of the students of agriculture and allied sciences.

agrimoon.com

Agrimoon.com is a portal of e-contents for the agriculture and allied subjects. It also provides information regarding career, exam notifications, research activities, workshop and seminar of agriculture stream.

pdfdrive.com

PDF Drive is your search engine for PDF files. Around 80 lacks eBooks are available on this platform. End

user can download these e-books free of cost during from one-week trial version.

kopykitab.com

Kopykitab.com is first private digital Library, which provides easy access to the e-resources at affordable cost to explore the education. It makes as a bridge to fill the gap between knowledge and learners.

ICAR: e-books

E-books on the different titles of the agriculture, horticulture, agroforestry, animal husbandry, fishery etc. are available on the site https://icar.org.in/e-books

JSTOR

It is a growing digital library of academic journals, books, and primary source objects. It helps students, scholars, and other individuals discover, use, and build upon a wide range of content through a powerful research and teaching platform. Subject areas include Business, Economics, History, Political Science, Language & Literature, Art & Art History, Music, Mathematics & Statistics, Education, Area Studies, Life Sciences, and Ecology & Botany.

REVIEW OF LITERATURE

Bala and Lal (2016) studied usage of electronic resources and their impact on reading culture students and faculty members of Punjab Agricultural University, Ludhiana, and reported that most of the faculty and students acknowledged that the electronic sources have improved their skills of searching and they feel more comfortable with the e-form of resources. Hendal (2020) has stated that the uses and benefits of e-resources by the faculty members of Kuwait University during COVID-19. E-resources are more beneficial for the writing research papers. Mishra, Lokanath (2020) has intended to study the perception of teachers and students on the online teaching-learning process during the COVID-19 lockdown period. While keeping the theoretical lens at the base the research provides varied perspectives on the challenges facing online teaching-learning today. Asif and Singh (2020) has described that libraries on the web have become more competent and confident in terms of resource management and overview on preventive measures and current trends in libraries to play proactive role in the present and post pandemic situation. Kalbande *et al.* (2012) reported that the CeRA is the main consortia for libraries of agriculture universities of India.

Singh (2016) reported that e resources were accepted by students and were quite extensively used, while having lack of adequate infrastructure as a major issue. Deshmukh and Poul (2017) reported that the information related to the agriculture was easily available through e-resource which is required to improve agriculture knowledge.

Thapa *et al.* (2020) reported from the study that around 52% respondents found lockdown beneficial in the sense that it helped to neutralize the gravity of viral infection and 48% of them doesn't found it beneficial as their educational schedule has been halted. The practical education of a student was disturbed due to lockdown and are utilized that period involved in online courses, trainings and webinars. McKim and Sorensen (2020) reported significant changes in the variables studied in relation to COVID-19. Gupta (2021) reported variety of reasons such as conduction of practical classes on online mode, conduction of lectures of mathematics and students research activities which create hindrance in agriculture education during pandemic COVID situation.

Sharma (2021) reported that the university and college authorities should take suggestions of the students regarding online classes during COVID period in to consideration seriously while further improving online activities in agriculture education and research. Madhurima (2021) reported that the university has to play an important role in improving education and research activities during such a pandemic situation.

Objectives of the Study

The main objectives of the study are as follows:

- To study the user awareness and use e-resources during covid-19 pandemic.
- To study the satisfaction level of users needs with the e-resources during pandemic
- To study the purpose and utilization of e-resources by faculty during covid19 pandemic.
- To study the level of satisfaction of users about availability and coverage of e-resources.
- To find out the frequency of using e-resources.
- To find out the age group preferred e-resources.
- To suggest suitable recommendations to improve facilities and services related to the use of e-resources.
- To identify the problems being faced by the users in using e-resources

MATERIALS AND METHODOLOGY

The data collected during the COVID-19 pandemic era in India from March 2020 to March 2021 through online questionnaires developed in Google form (Thapa *et al.*, 2020). This Online questionnaires were circulated among the participants of various online webinar, workshop, quiz and different online activities i.e. FDP (Faculty Development Programme), Organic farming workshop, National Workshop on bamboo: The imaging cross Bamboo etc. organized by College of Agriculture, Balaghat under Jawaharlal Nehru Agricultural University, Jabalpur (Madhya Pradesh state) in India. In these programs, responses of 250 participants of different State Agricultural Universities (SAUs) and Central Agricultural Research and Teaching Institutions covered 19 states or union territory were collected and examined for the study (Fig. 1). Standard questionnaire was prepared for the collection of an information from respondents. Questionnaire was divided into 3 segments, first segment demand the personal data of participants like name, age, designation, place etc., the second segment covers online experience of participants during lockdown and in-general, and under third segment includes opinion on online tools and awareness and utilization of e-Resources for teaching/learning process and research aspects. Such type of survey was also

conducted by Rossi *et al.* (2020) and Bidarbakhtnia *et al.* (2020) to study the impact of pandemic COVID 19 on their education. Collected data was analyzed by using MS Excel.

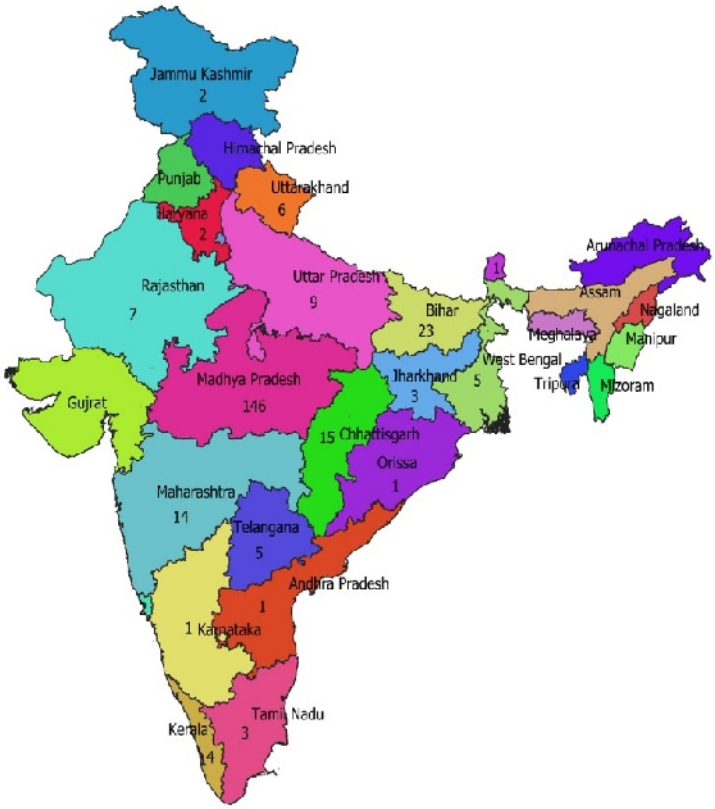

Fig. 1. PAN India Coverage of Participants.

RESULT AND DISCUSSION

Results of the responses received from the online questionnaire filled by the different stakeholder of Agricultural Educational System i.e. Research Scholars, Faculty Members, and Scientist participated in different online activities carried out by the college during such a pandemic COVID 19 were reported in table 1 to 7.

Table 1: Use of E-resources.

Use of E-resources	Participants	Percentage
No	03	1.2%
May be	10	04%
Yes	237	94.8%

Data depicted in the Table 1, state that all the participants were aware about the e-resources and 94.8 % participants were used these resources for conducting online classes and research activities at agriculture universities and research institutes. Only 1.2% participants are not using e-resources. It shows educational community move towards the e-resources during pandemic period. Most of the universities and institutions were shut down due to the pandemic COVID 19. In such situation most of the institutions started online activities through *Google Meet, Zoom, Webex, MS teams* etc. (Thapa *et al.*, 2020). Scientists/faculty access e-resources for online activities. Similar results were reported by Radwan & Radwan (2020).

Table 2: Satisfying level information needs with online e-resources during COVID 19 era.

Satisfying level	Participants	Percentage
No	02	0.8%
May be	22	8.8%
Yes	226	90.4%

Majority (≥90%) of the participants were satisfied with the e-resources (table 2). It shows that information required for educational community was meet out through the e-resources during this COVID-19 situation. Zalat *et al.* (2021) concluded from their study such as e-resources helps to develop strategic plans to combat such a pandemic situation and technology evolution for online education system. Whereas, Naik *et al.* (2021) reported 70% participants were not satisfied for online teaching, while they were aware about use of e-resources. Khan *et al.* (2020) reported positive attitude of students towards e-learning and accessing e-resources for the education during pandemic situation. Bhat (2019) reported most of the respondents using Krishi Prabha for e-thesis were satisfied for getting information regarding agriculture.

Table 3: Use of Mobile App to access e-resources.

Use of Mobile app	Participants	Percentage
No	14	10.8%
May be	27	5.6%
Yes	209	88.6%

Most of the respondents were used mobile apps for accessing e-resources (Table 3). It explains the power of the penetration of mobile apps for e-resource access during this pandemic. Grantz *et al.,* (2020) reviewed use of mobile apps for getting information related to the non-pharmaceutical and pharmaceutical interventions during COVID 19, they reported that the most of the mobile data was used to search an information through different apps installed in mobile. Sharma (2021) was also explained mobile apps as an important ICT tool for getting agriculture information during such a pandemic situation.

Table 4: E-Resource: use e-resources by different age group.

Age Group	No. of Participants		
	No	May Be	Yes
21-40	1	6	139
41-60	2	3	96
61-80	0	1	2
Total	03	10	237

Table 4 illustrates the participation of youths were significantly higher for accessing the e-resources but the middle aged respondent were not set for it. It means e-resources are popular among current generation users as compared to all age groups participants. However, some are ready to learn, most of the middle and age old participants were not familiar with new technologies which is widely used in current pandemic situation (Sintema, 2020; Murgatrotd, 2020).

Table 5: E-resources used for research purpose.

Name of E-Resource	No of Participants
CeRA	170
Sciencedirect.com	89
Sodhganga	80
SodhGangorti	21
DOAJ (Directory of Open Access Journals)	25
Krishikosh	110
Any Other	149

Table 5 shows that the CeRA and Krishikosh were mostly accessed by respondents followed by sciencedirect.com, Sodhganga for the online learning and research purpose. The response shows some particular e-recourses are also utilized for the research purpose. Use of such e-resources in agriculture education and research was explained by many researchers (Bakkiaraj *et al.,* 2012; Deshmukh and Poul, 2017; Maitato, 2020; Badhe *et al.,* 2021). Wijetunge (2015) reported that undergraduate students were depends on search engines, Wikipedia, classmates and lecturers for information. Kalbande *et al.* (2012) reported that 22.68 to 40.89 per cent respondents were used of CeRA for information related to the agriculture.

Table 6: E-resources used for teaching purpose.

Name of Resource	No of Participants
Pdfdrive.com	69
epgpathshala	47
NDLI	95
Kopykitab	22
DOAB	26
Any other	149

NDLI and Pdfdrive.com are popular e-recourses among the users for the teaching purpose (table 6). Responses showed for some specific e-recourses were also used for the teaching purpose. Mittal and Sharma (2014) reported 94.74% respondents were computer literate and about 86.84% of users was using such e-resources. Whereas, Mamo and Amidu (2016) reported unavailability of current information which creates obstacles in teaching and research activities.

Table 7: Frequency of Use the e-resources.

Frequency of Use e-resources	Participants	Percentage
Daily	86	34.4
Weekly	26	10.4
Monthly	6	2.4
Any time if needed	116	46.4
Some time	16	6.4

Data depicted in table 7 demonstrate the percentage of need based access of e-resources depends on the frequency of access. In similar study Kalbande *et al.,* (2012) reported 40.89 per cent respondents use CeRA every day, 31.96 per cent for 2-3 times in a week, 22.68 per cent weekly and 4.47 per cent once in a month, respectively. Bhat (2019) reported responses regarding once use of e-thesis from Krishi Prabha.

CONCLUSION

Online e-resources plays key role in teaching, learning and research activities during pandemic COIVD-19 situation. Most of the teaching/ learning community use e-resources effectively for the regular academic and research activities. Research scholars, faculty members and scientists move towards the e-resources to fulfill their requirement regarding information through mobile apps with high satisfaction level among all age group. Use of such resources may not lower down an importance of information print resources. Whereas, e-resources were most important for getting information related to agriculture during such a pandemic situation.

FUTURE SCOPE

- E-resources help to provide wide scale of information through different online platforms.
- Quality of information has to be maintained by the professionals involved in publishing such information on different e-platforms. This sector has wide scope in future.
- Easy and freely availability of e-resources will widens acceptance of such resources and it helps to improve teaching and research activities in agriculture sector.

- Impact of used e-resources against print resources needs to be access in future for further strengthening to the e-resources.

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