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Research4Life:
Bringing academic and professional peer-reviewed content to developing countries through public-private partnership

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Meeting: *164* — Access and innovation: delivering information to all — *Serials and Other Continuing Resources Section*

Abstract:

This year sees the tenth anniversary of the launch of the HINARI programme, originally a collaboration between the World Health Organization, a US university library and six major international medical publishers to bring vital medical knowledge to researchers and practising physicians in the world's poorest countries. In the ensuing ten years the HINARI programme has been replicated in agriculture (AGORA) and the environment (OARE), and the Research4Life partnership now covers a broader range of scientific subjects with input from three UN agencies, two US academic libraries, content from over 150 publisher partners, and technical expertise and services from companies such as Microsoft, Swets, and Ex Libris.

Keywords

Research4Life, HINARI, AGORA, OARE, research access, developing countries, scientific literature

Introduction

Research4Life (R4L) comprises three programmes operating online portals that provide low-income countries with free or low-cost access to the world's scientific literature in agriculture, health and the environment. These programmes have been developed and sustained to address the lack of access to research publications that is widespread in the world's developing countries, and that constitutes one of the key factors limiting scientific activities in those countries (Langer et al, 2004). Through these programmes, researchers in participating institutions have access to the same information as their peers in developed countries, supporting their contributions to the evolving body of global research.

In this paper we present the results of the Research4Life 2010 *User Experience Review,* including assessments of the demand for research information among developing-country researchers, of the means that they use to access that information, and of levels of use and barriers to the impact of Research4Life.

About Research4Life

Each of the three Research4Life portals enables users from subscribing institutions to search publishers' databases, view abstracts of publications, and download the complete texts of these publications.

HINARI (Programme for Access to Health Research—www.who.int/hinari) was launched in 2002 and is led by the World Health Organization in collaboration with Yale University. The HINARI online library makes available over 6,200 scientific publications from more than 70 publishers to more than 4,100 organizations, including universities, medical schools and teaching hospitals, research institutions and government offices in 107 countries.

Launched in 2003, AGORA (Access to Global Online Research in Agriculture—www.aginternetwork.org) is led by the United Nations Food and Agriculture Organization (FAO). AGORA provides researchers and others in over 2,000 subscribing institutions with access to more than 1,200 scientific journals in agriculture and related biological, environmental and social sciences. AGORA partners include the World Health Organization (WHO), major scientific publishers, Cornell University's Mann Library, the Rockefeller Foundation, the Department for International Development (DFID) of the United Kingdom, the publishing division of the Center for Agricultural and Biosciences International (CABI) and others.

Online Access to Research in the Environment (OARE—www.oaresciences.org) is led by the United Nations Environment Programme (UNEP); partners include Yale University and more than 200 leading publishers, scholarly societies and scientific associations. Approximately 1,900 institutions are registered, receiving access to more than 1,800 scientific journals.

User populations and services

R4L participation is open to a wide range of organizations and users in countries with per-capita Gross National Income (GNI) of less than US $3,500. Sixty-seven countries with per-capita GNI of less than $1,600 comprise "Band 1"; institutions in those countries receive free access. Institutions in 42 "Band 2" countries, with per-capita GNI between US $1,601 and US $4,700, pay US $1,000 per year for a subscription to one R4L programme.

Group	Per-capita GNI	Countries	Cost
Band 1	$1,600 or less	67	Free
Band 2	Between $1,601 and $4.700	42	$1,000 / yr per programme

Table 1: Band 1 and Band 2 countries, Research4Life

Subscribing organizations include universities; medical centers, hospitals and clinics; research institutes; government ministries and agencies; and non-governmental organizations, among others. Individual users include researchers, university faculty, post-graduate and undergraduate students, librarians, medical practitioners and agricultural extension educators.

Institutional subscriptions are initiated when a contact-person (e.g., a librarian, dean or researcher) requests a subscription from one of the three R4L Help Desks; the institution then receives an institutional username and password that is distributed by the institution's library to eligible users. The Help Desks also respond to queries related to log-in problems and to lack of access to specific periodicals.

The Research4Life 2010 User Experience Review

In January 2010, R4L contracted Edmond Gaible of The Natoma Group to conduct a *User Experience Review,* which was to assess key factors that affect the influence of Research4Life on developing-country participation in the activities of the global research community, with particular emphasis on the impact such participation has on social and economic development. Underlying the assessment was the perceived need to develop improved understanding about the R4L user community.

This article, presenting results of the *2010 User Experience Review*, offers an extensive picture of the people who use R4L, the activities that they conduct, and the ways in which R4L currently or potentially supports these activities. The findings presented here complement and expand the scope of recent case-study analyses of access to research in eastern and southern Africa (Harle 2010).

Prior evaluations (Scott, unpublished; Carnegie Corporation, unpublished) identified barriers posed by infrastructure (grid-based electrical power, Internet connectivity) and access (availability of computers) as the primary obstacles to effective use of R4L. These reports also point to challenges posed by the languages of publications, by username and password issues, and by restricted access to the full text of articles.

Data collection and analysis

The information presented here stems from a combination of qualitative and quantitative information collected during visits to institutions subscribed to R4L in 12 countries and through administration of two online surveys. Site visits took place in April and May 2010; online surveys were administered in June 2010.

Method	No. of respondents	Dates
Online surveys		
General survey	804	June 2010
Institutional survey	1,300	June 2010
On-site interviews		
Deans & Directors	58	April-May 2010
Library Point-of-Contact	58	April-May 2010
IT Specialists	58	April-May 2010
Active Researcher	58	April-May 2010
General Users	317	April-May 2010

Table 2: Number of surveys and interviews conducted

The site-visit process involved visits to 58 institutions in eight Band 1 and four Band 2 countries, with 571 interviews conducted overall. Site-visit countries were selected to reflect the main regions served by R4L—Africa, South Asia, Southeast Asia, the Pacific, Latin America and the Caribbean, Eastern Europe and the Middle East. Institutions were selected via quota sampling to ensure that representation of the three programmes was proportional (there are about twice as many institutions subscribed to HINARI in comparison to AGORA or OARE), that "heavy-use" and "light-use" institutions were represented, and that rural and urban institutions were represented in all countries where possible.

Interviews were conducted with (a) Deans and Directors, (b) Active Researchers, (c) Library Points-of-Contact, (d) Information Technology (IT) Specialists, and (e) General Users.

The *Institutional Survey* generated 1,303 responses from R4L contact persons, typically librarians; the *General Survey* generated 804 responses, of which approximately 240 were from people familiar with R4L. Both surveys were available in English, French and Spanish versions.

The online surveys represent an effort to collect responses from R4L users on the largest scale to date, and to a lesser extent to collect responses from researchers and others who are not users of R4L. Invitations to participate in the *Institutional Survey* were sent to 33,040 email addresses in June 2010; invitations to participate in the *General Survey* were distributed between 17 June and 21 June, 2010. The *General Survey* and the distribution of invitations were designed to collect information from R4L users and from non-users.

Design of the online surveys and the site-visit interviews meant that many questions appeared in both the surveys and the interviews. This feature enabled data from one interview or survey instrument to be cross-checked against data collected using the others. In part, cross-checking between the surveys and the interviews is valuable insofar as the survey samples are biased in favor of respondents who have reasonable Internet access.

Representation among African countries and LDCs

Of particular importance, respondents from African countries are very strongly represented in both surveys. Eight sub-Saharan African countries are among the 15 countries most represented in the *General Survey;* nine sub-Saharan African countries are among the 15 most-represented countries in the *Institutional Survey.*

In addition, survey representation among Least Developed Countries[1] (LDCs) overall is relatively high. African LDCs with high numbers of survey responses include Burkina Faso, Ethiopia, Malawi, Sudan, Tanzania and Uganda. Non-African LDCs with high participation include Bangladesh and Nepal.

Access to research information in developing countries

Access to research information is important to respondents who use R4L and among those who do not use R4L. All respondents' chief means of accessing research information is the Internet, with major barriers comprised of poor-quality Internet connectivity and their lack of ability to access the research publications that they discover via Web searches. Their primary uses of research information are to support their own clinical or field research, and to a lesser extent lab-based research, to improve the quality of services that they provide in practical areas such as patient care or training of farmers, and to support other activities such as education, advocacy and policy development.

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[1] The LDC designation is derived from three sets of indicators—per-capita GNI, the Human Assets Index and the Economic Vulnerability Index. (See http://www.un.org/esa/policy/devplan/profile/criteria.html.)

High demand for research information

Demand for research information is very high among developing-country researchers, educators and practitioners—as indicated by both online surveys and on-site interviews. Site visits and interview responses also suggest that research information is used to support a range of activities that are of benefit to subscribing institutions and to economic and social well being.

Across all data-collection methods, majorities of respondents state that research information is extremely important to them. Eighty-nine percent of *General-Survey* respondents report that access to research information is important to their work (78 percent, extremely important; 19 percent, important). Of these respondents, approximately 22.9 percent have used R4L at least once.

Interview respondents, a group almost exclusively comprised of R4L users, also cited the importance of research information to their work. Seventy-eight percent of respondents in the *Active Researcher Interviews* (n=58) and 68 percent of respondents to the *General Interviews* (n=303) report that research information is extremely important to them.

Uses of research information

Respondents to the *Institutional Survey* identify ways in which research information is used in their organizations. Current research information is used primarily to design and conduct additional research, with support for practical activities such as patient care also highly ranked.
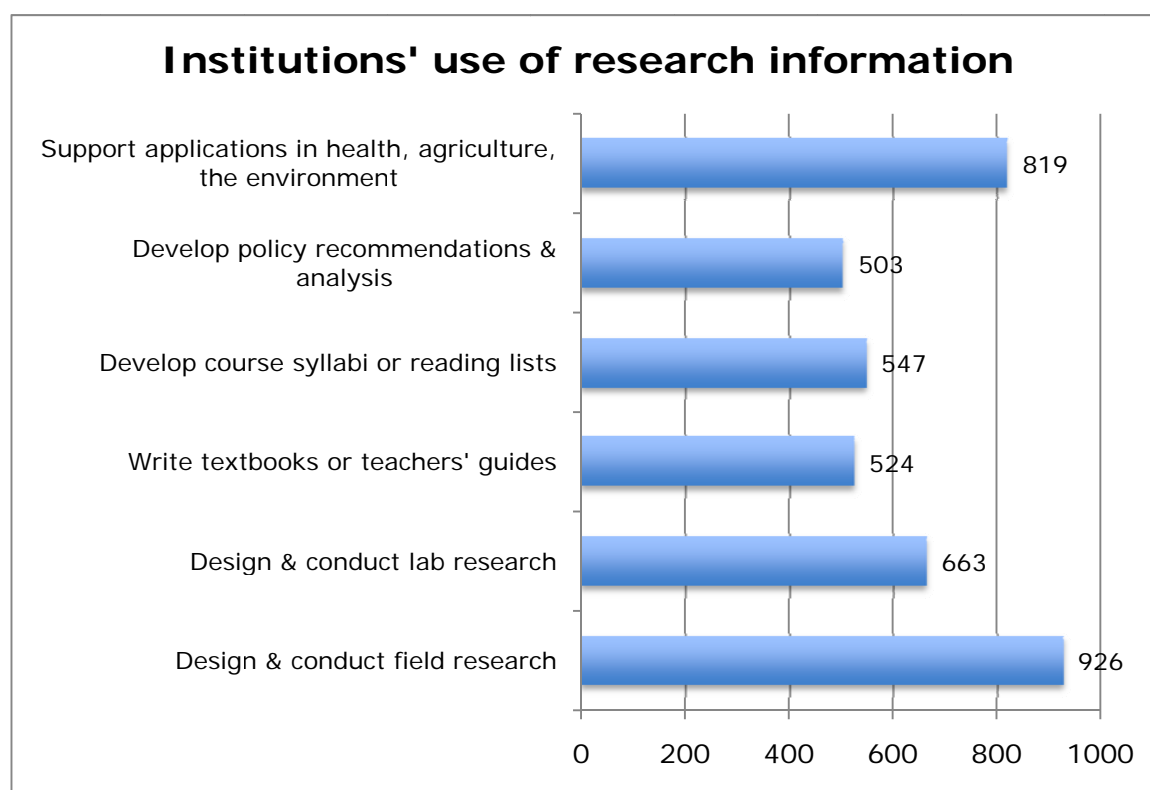

Figure 1: Uses of research information, Institutional Survey respondents, (n=1,303)

The two surveys and site-visit interviews with all five different groups suggest that research information is used most frequently in developing-country institutions to support field research, including clinical research, rather than lab-based research. Among respondents to the *General Survey*, almost all (91.6 percent) conduct field-based research, while most (72.9 percent) conduct laboratory research as well. Field and clinical research can be conducted effectively and at a

relatively high standard without prior capital investment (in labs and lab equipment), and are likely to address, and to be perceived as addressing, social needs more directly.

Other findings about the use of research information have the potential to provide guidance to the further development of R4L and similar programmes. These findings include:

- Researchers are slightly more likely to publish in national publications than in international publications; only a few (8.6 percent, n=511) do not publish.

- Although most institutions report that they are engaged in education, the use of research information directly for educational purposes is less frequently reported than are uses of research information to support research or practical activities.

- Current research information is used to support policy and advocacy activities approximately as often as educational activities.

Although the majority of R4L subscribers are educational institutions, primarily universities, teaching activities are not currently a primary channel for the use of the research information that R4L provides. Interviews suggest that educators are more likely to rely on standard texts to help undergraduates and first- and second-year graduate students gain familiarity with information essential to their fields.

For R4L and similar initiatives, then, outreach and awareness-building is likely to be effective if it is extended to potential subscribing institutions in addition to universities (e.g. government ministries, NGOs, and research institutes) that are also carrying out applied research, policy and advocacy activities. In addition, increasing access to publications focused on field- or practice-oriented sub-sectors, such as agronomy, conservation, clinical-pathological specialties, and other areas not closely tied to lab-based research, are likely to benefit users more than increased access to information supporting laboratory-based research. (In interviews, agricultural researchers in Vietnam and Peru suggested that AGORA could include more journals addressing economics and agronomy.)

Means of accessing research information

Respondents use a range of means to access research information, with the Internet cited as the most-frequently used method by a majority of respondents. Many *General Survey* respondents use several different means to access research information, as shown in the chart that follows. (The 803 respondents were asked to mark all means that they used.)
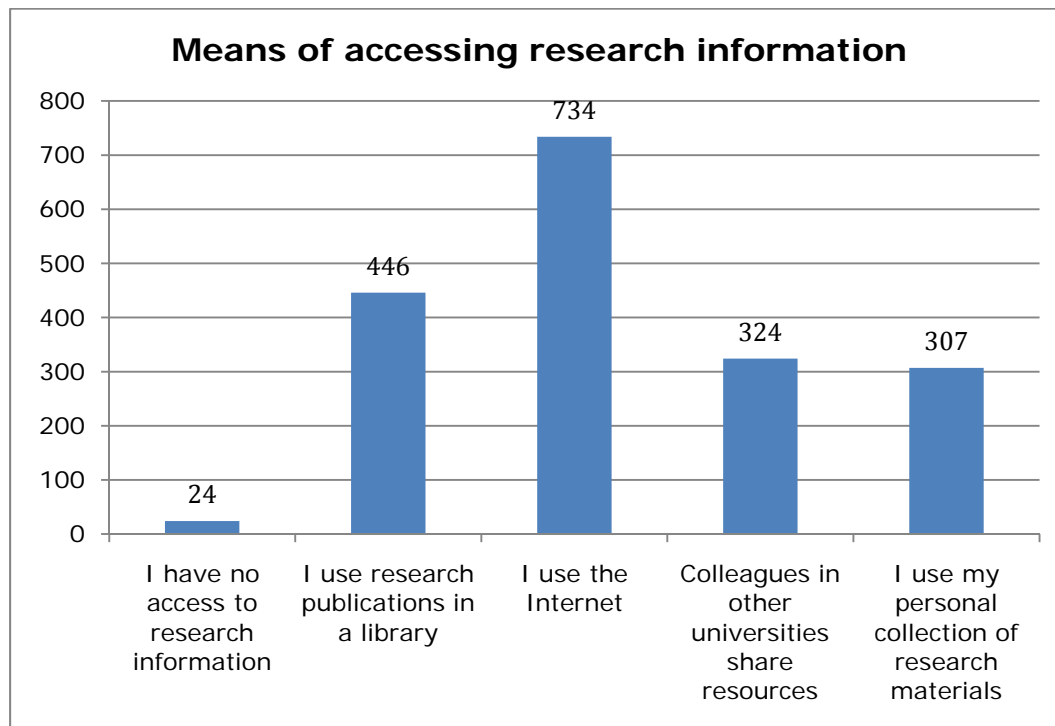

Figure 2: Means of accessing research, General Survey (n=804)

Most respondents (91.4 percent) clearly favor the Internet as a means of accessing research; use of other means appears to be relatively evenly distributed among libraries (55.5 percent), colleagues at other universities (40.3 percent) and respondents' personal collections (38.2 percent). Very few respondents (3.0 percent) report lacking all access to research information. Approximately 4.2 percent do not use the Internet. R4L users similarly report that they use the Internet most frequently, with other listed means receiving very low levels of use. Eighty-nine (89) percent of *General Interview* respondents reported that the Internet is their most-used source of research information, while 8 percent cited the library, 2 percent cited their personal collections and 1 percent cited their colleagues. It should be noted that some use of the Internet to access research literature may take place in libraries, but that distinction cannot be made from these results. Results of the *General Interviews* are supported by the *Active Researcher Interviews*, in which 88 percent of respondents (n=57) state that they use the Internet to access research information, with much less-frequent use of other means.

Challenges for libraries

Respondents to the *General Survey* suggest that while libraries are used they do not provide sufficient access to current resources: Library resources are both limited and out of date.
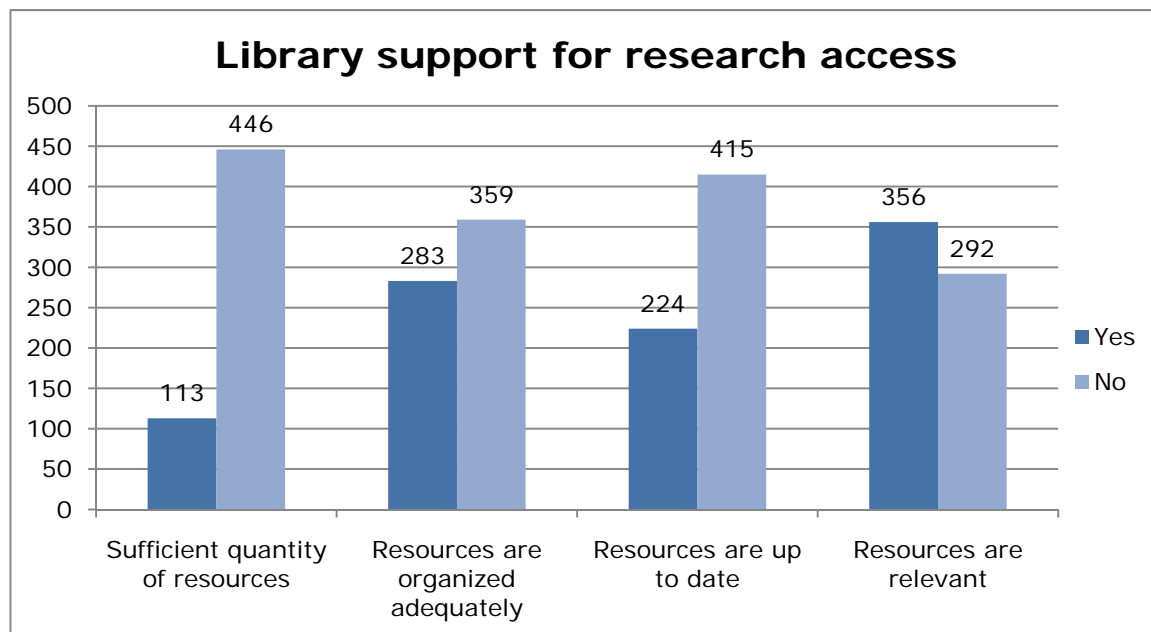

Figure 3: Challenges for libraries in relation to research access, General Survey (n=804)

These *General Survey* responses are supported by on-site interviews with active researchers, who said with regard to resources in their libraries: the quantity of resources is insufficient (84.3 percent), resources are not up to date (83.7 percent) and resources are not relevant (62.9 percent).

Nevertheless 74.4 percent of respondents report that they use their institutions' libraries. Free and low-cost online resources such as R4L offer an opportunity for libraries to rebuild their resource base in support of their institutions' research enterprise. Expanding Internet access and increasing availability of computers in libraries can provide broad-based access to research literature, particularly to students, who will benefit from materials that supplement the basic texts faculty are using in their coursework.

Challenges to accessing research

More than 50 percent of respondents to the *General Survey* rated two factors as "important" or "very important" barriers to their use of research information:

- Internet speed or bandwidth (61.7 percent)

- Gaining access to research publications that they have "discovered" via Internet search (58.5 percent)

The fact that Internet speed is the challenge *most* frequently cited as "very important" stems in part from the high level of importance of the Internet as a means of accessing research.
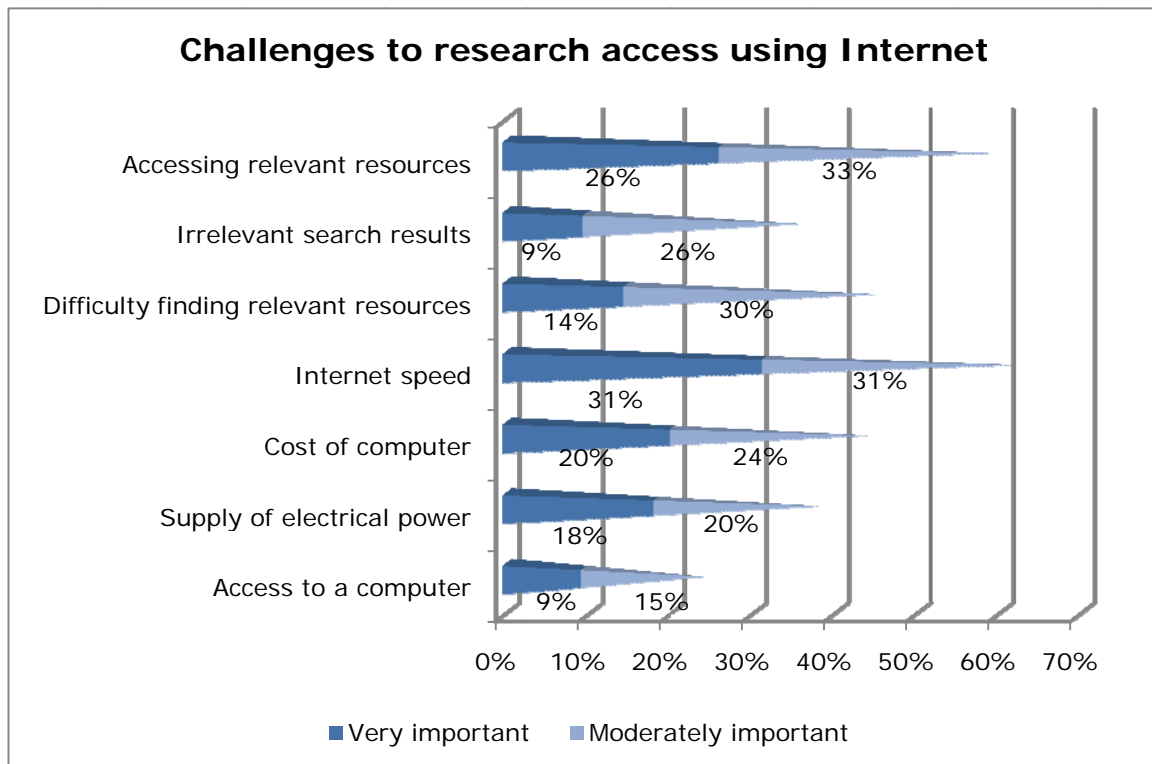

Figure 4: Challenges to accessing research via the Internet, General Survey (n=804)

As shown in *Figure 4,* other infrastructure-related conditions, such as the cost of computer or Internet access (43.9 percent[2]) and the reliability of electrical power (37.8 percent), also pose important barriers to relatively large numbers of respondents.[3]

The above-mentioned "secondary" infrastructural barriers are equaled or surpassed, however, by the difficulty that respondents report in finding relevant resources (44.7 percent). This difficulty

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[2] Each potential challenge was framed in a separate question. Sample sizes for these responses range from n=657 to n=720.

[3] While Harle (2010) finds adequate Internet connectivity at the four universities in his case-study analysis, he does find issues arising from *access* to computers and Internet connections. Differences from findings presented here might arise from differing samples—interview and survey samples underlying this article, to the extent possible, do not include first- or second-year post-graduate students or other "non-senior" personnel—and from the broader range of economic conditions in the R4L countries included in this study.

in combination with the barriers respondents report in accessing relevant resources when found can be seen as comprising a more general challenge related to "information access" rather than infrastructure.

The infrastructural and information-access barriers, taken together, suggest a "mixed" environment for programmes such as R4L: While developing-country researchers (including R4L users) rely on the Internet for access to current research information, Internet connectivity poses a challenge. Challenges cited in the *General Survey* that are not related to infrastructure—difficulty finding and accessing relevant resources—in contrast appear to be precisely the kinds of barriers that R4L is designed to address.

Use of R4L to access research

Levels of use of R4L programmes at subscribing institutions vary greatly, with a likely minimum of approximately 23 percent of eligible users having logged in to the programme at least one time during the preceding 30 days. Among active researchers, usage is typically much heavier, with nearly half of interview respondents (44 percent) reporting that they have used R4L more than 10 times in the most recent 30-day period.
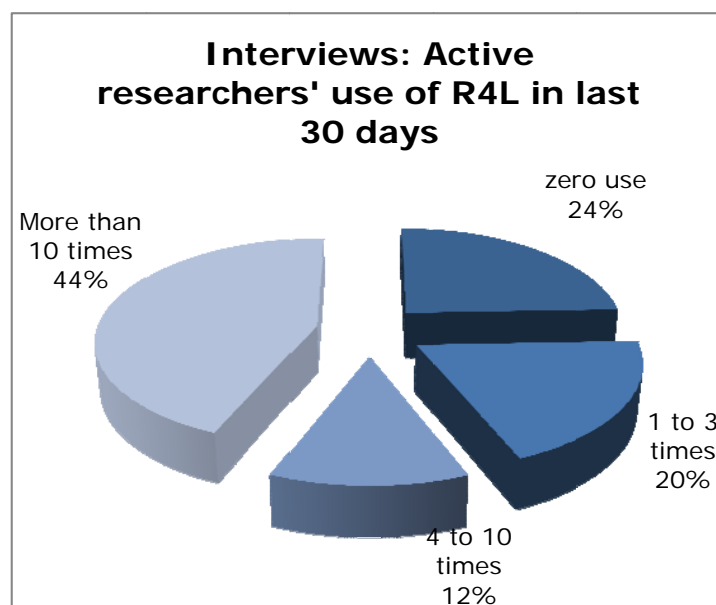

Figure 5: Use of R4L within the last 30 days, Active Researchers (n=41)

Overall, 66 percent of *Active Researcher Interview* respondents report having used R4L four or more times during the preceding 30 days.

General Survey respondents also report reasonably intensive use of R4L—especially given that the survey took place during a period (June 2010) at the end of the academic year, when most educators and students are involved in exams and other year-end activities. (Interview respondents in Peru, among other countries, suggested that while their usage estimates were accurate for the period, they were lower than was normal.)
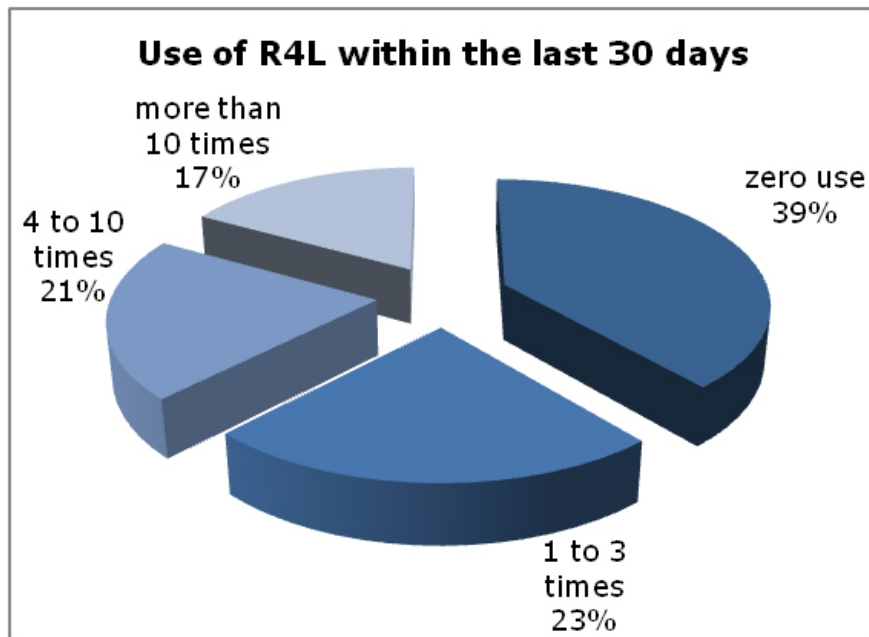
Use of R4L within the last 30 days

Figure 6: Use of R4L within the last 30 days, General Survey (n=237)

Thirty-eight (38) percent of R4L users responding to the *General Survey* report using R4L four or more times during the preceding 30 days.

Usage levels do not vary substantially among the three R4L programmes, however levels do vary greatly among institutions. Heavy-use universities establish an upper bound of more than 4,000 log-ins per month (e.g., *Universidad Peruana Cayetano* Heredia, HINARI, 2009), while at many universities—especially in LDCs—log-ins range below ten per month.[4] Some degree of variation no doubt results from differences in the quality of Internet connectivity. However the range of difference persists among institutions in the same country and even in the same city, suggesting that other factors likely influence use of R4L.

R4L value as indicated by consistent use

Potential users who use R4L once tend to become regular users. As mentioned, 66 percent of respondents to the *Active Researcher Interviews* report accessing R4L four or more times in the preceding 30 days. As interesting—but less conclusive—it appears that a very high percentage of people who use R4L once continue to use it regularly. Of all *General Survey* respondents (n=804), 22.9 percent reporting that they have used R4L at least once; a nearly equal proportion of these respondents, 21.6 percent, report that they used R4L one or more times in the preceding 30 days. The survey instrument does not collect information about how long respondents have been using R4L. However, 94.5 percent of all users report that they used the service within the

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[4] Levels of use of R4L programmes cannot be conclusively assessed for several reasons. Only the General Survey targets non-users of R4L, and the sample of respondents is uncontrolled. The Institutional Survey indicates higher levels of use than those shown by the General Survey, however in this instance respondents are asked to estimate use levels for populations of which they are not members, rather than report on their own use; the data do not capture usage rates so much as external perceptions of same. In addition, respondents to the Institutional Survey tend to cite high relative levels of R4L by educators (more than 70 percent of educators are R4L users in 42 percent of respondents' institutions), which conflicts with the results obtained from users themselves—further undermining the reliability of the Institutional Survey results in this area. Without greater control over distribution of an instrument such as the General Survey, reliably determining the proportion of users in relation to potential users is not possible.

preceding 30 days, strongly suggesting that R4L use has become a regular activity in their professional routines.

Provisional conclusions

The two surveys and the five sets of on-site interviews provide evidence of the following:

- Demand for information about current research is high among researchers and practitioners in developing-country institutions eligible for R4L subscriptions.

- Developing-country researchers and others rely heavily on the Internet as a means of searching for and accessing current research information, in part as a result of the inadequacy of their institutions' library collections.

- Poor-quality or expensive Internet connectivity poses an infrastructural challenge to research access.

- Independent of Internet connectivity, developing-country researchers report challenges finding (or "discovering") relevant research information and, once articles have been identified, gaining access to them.

- The design of R4L does address information-access problems identified by respondents, such as the difficulty in "discovering" relevant information via Web search.

- While overall levels of use of R4L are at best moderate (22.9 percent of *General Survey* respondents), researchers and others who try R4L tend to become regular users. Respondents who have been identified as researchers tend to become frequent users.

Challenges to R4L use

Somewhat surprisingly, in light of these findings, R4L users identify challenges in relation to the use of R4L that are similar to challenges identified by all *General-Survey* respondents.
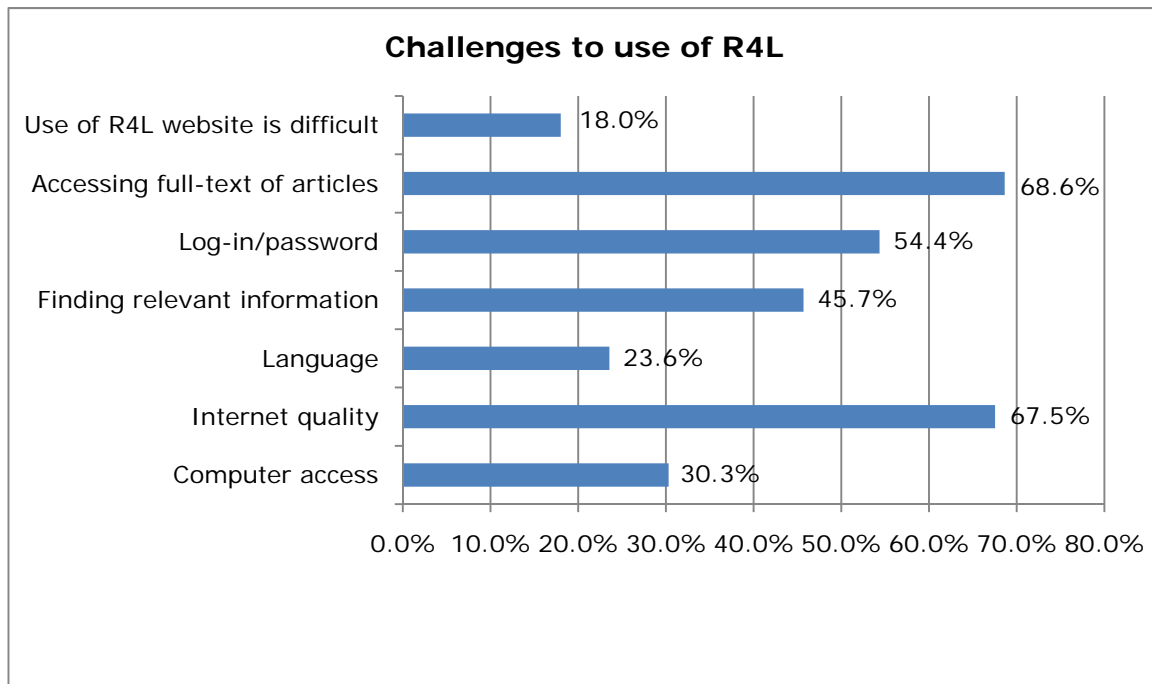
Challenges to use of R4L

Challenge	Percent
Use of R4L website is difficult	18.0%
Accessing full-text of articles	68.6%
Log-in/password	54.4%
Finding relevant information	45.7%
Language	23.6%
Internet quality	67.5%
Computer access	30.3%

Figure 7: Challenges to use of R4L, General Survey[5](n=804)

For users of R4L, the challenge posed by Internet connectivity is surpassed, although slightly, by the challenge of accessing the full text of research articles—which is one of the primary obstacles that R4L is designed to address.

Barriers to access of the full text of articles

The similarity between *General Survey* responses from R4L users and all survey respondents is evident:

- 68.6 percent of R4L users (n=204) cite access to the full text of articles as a major challenge.

- 58.5 percent of all respondents (n=652) consider accessing relevant resources an important or very important challenge.

These responses are also supported by the *Institutional Survey* and by interview participants. The *Institutional Survey* captures responses from contact persons at institutions that are subscribed to an R4L programme:

- 68.0 percent of *Institutional Survey* respondents (n=1,020) report that challenges accessing the full text of articles form a moderate or major barrier.

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[5] Sample sizes for the responses displayed in Figure 7: Challenges to use of R4L, General Survey(n=804) range from 161 to 228.

- 63.6 percent of participants in the *Dean or Director Interviews* (n=66) and 50.0 percent of participants in the *Library Point-of-contact Interviews* (n=60) cite access to the full-text of articles as a barrier to R4L use.

Difficulties in accessing the full-text of articles are experienced equally by users of all three R4L programmes. Full-text access is reported to be a challenge by essentially equal proportions of users of HINARI (70.6 percent), AGORA (66.4 percent) and OARE (63.4 percent).[6]

The inference of these results is that subscriptions to R4L do not completely solve the problems researchers or others face in terms of access to research publications. And yet, R4L users demonstrate through their frequent use of the service that the programmes have value.

There are three general causes of this anomaly:

- Problems resulting from local telecommunications infrastructure and configuration;

- Problems resulting from the R4L web architecture, and;

- Publishers' policies in relation to access from specific countries.

It is impossible, however, to accurately assess the separate impact of these three groups of factors in relation to the survey and interview responses.

Problems related to users' local infrastructures include connection "time-outs" as a result of poor-quality connectivity and large file sizes and firewall configurations at users' institutions that prevent effective downloads.

The R4L web architecture poses two related barriers: log-in and access procedures are very specific, and not entirely intuitive, leading to errors by users; these errors and other conditions do not prompt accurate or useful error messages by the system. Users who don't correctly follow steps to shift from searching for and viewing abstracts to requesting the full text of articles can encounter messages stating, in error, that payments are required for the articles they have requested.

R4L and Publishers' policies come into play in relation to the subscriptions required of institutions in Band 2 countries and in relation to "exclusions," which limit access by users in specific countries where publishers have current paying subscribers or the potential for future sales.

Institutions in Band 2 countries (with GNI greater than US $1,600) are required to pay US $1,000 per year to subscribe to any one of the R4L programmes. While the R4L Help Desks, which track these payments, support institutions via trial subscriptions, communications, and generally flexible approaches, by mid-year the subscriptions of some institutions in Band 2 countries have lapsed and access is restricted.

In addition, several major publishers elect to exclude specific journals from access via R4L to support their market-development efforts. Such exclusions occur in countries with emerging economies, such as Bangladesh and Vietnam—although Bangladesh, with per capita GNI of US $580 in 2009 (World Bank, 2009) remains well below the boundary for Band 1 (free) access.

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[6] Given the absence of sampling controls and the very small sample sizes of users of the three programmes, the degree of variation discussed here does not merit consideration as falling outside any reliable margin-of-error calculation.

Frequency of successful full-text access

R4L users among the *General Survey* respondents were asked to estimate the frequency with which they are able to download the full text of articles.
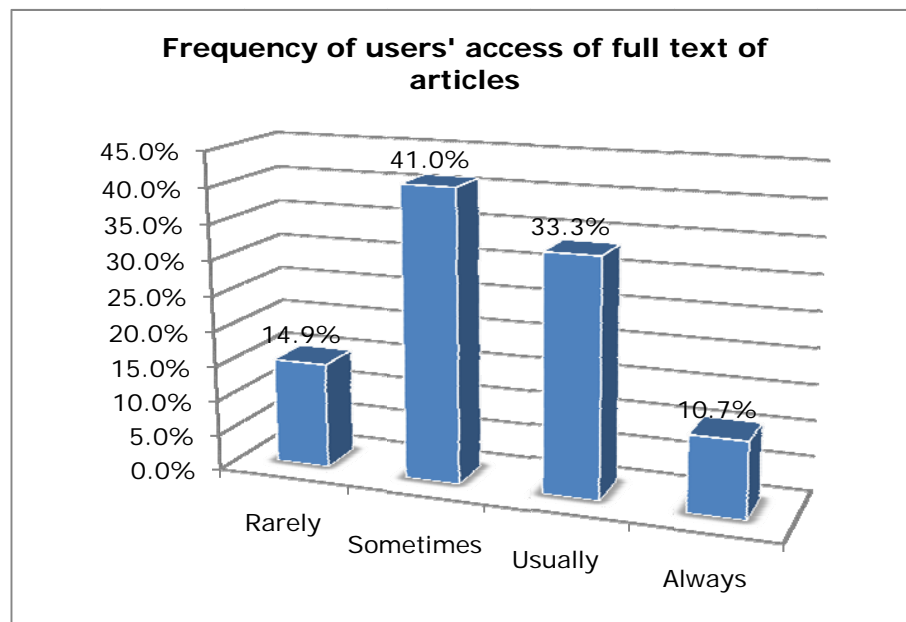
Frequency of users' access of full text of articles

Figure 8: Frequency of R4L users' access to full text of articles, General Survey (n=262)

Of note in these results is the fact that only 10.7 percent of respondents report no problem accessing the full text of articles.

Increasing access and raising expectations

A part of the problem, as shown in the on-site interviews, is that R4L users and supporting personnel—ranging from librarians to deans of schools and directors of departments—have higher expectations as a result of their R4L participation; their frustrations are also increased when those expectations are not met. In an *IT Specialist Interview,* the Information Officer at Nepal Health Research Council stated, "Sometimes full access to some of the papers is not given, it is really annoying."

For users with poor-quality Internet connectivity, each page-request requires a significant investment of their time. In many instances specific articles have been requested to enable researchers and practitioners to deliver better services to poor individuals and populations and to depleted ecosystems that are desperately in need of support, intensifying the need for access.

Given that many barriers to accessing the full text of articles lie outside the R4L system—in telecommunications infrastructure, local network configurations, publishers' decisions and other arenas—when users are denied access they don't receive accurate information about the problem nor do they receive real-time support. Inaccurate and, in some cases, accurate conjecture has arisen as users struggle to interpret search results:

- Sixty-eight (68.4) percent of *Active Researcher* interviewees (n=38) cite publishers' exclusions as the primary factor. The need for payment (13.6 percent) and Internet quality (15.8 percent) are cited much less frequently.

General Survey respondents also identify the need for payment and publishers' exclusions as the chief reasons that specific articles and publications are inaccessible.

Reason full-text is not accessible	
Log-in or password problem	17.7%
Publisher requires payment	31.3%
Internet bandwidth (connection "times out")	19.4%
Certain publishers limit access to full-text articles	31.7%
R4L website is inconsistent	0.0%
I have no problem accessing the full text of articles	7.2%

Table 3: Respondents' reasons full-text is not accessible, General Survey, (n=204)

While users' perceptions in this regard are important—and are causes for concern on the part of R4L, the accuracy of these perceptions is not testable within the scope of the 2010 *User Experience Review.* Several different factors will result in users receiving error messages stating that payment is required.

Interviewers in several countries (Fiji, Vietnam, Peru, possibly others) found that negative perceptions of publishers' exclusions are widespread. Although opinions about exclusions is not accurate in all cases, specific publishers are strongly associated with exclusions and the resulting lack of access, as demonstrated in the following interview comment:

> Just three weeks ago we had some guests from the U.S., including a doctor who works in emergency medicine. He asked us if we can get article from the *American Journal of Emergency Medicine,* we say we can't get the full text because the publisher is Elsevier, they are [active] in Vietnam so we can't get the full text of the article.
> *Programme Director, Hue University Medical School, College of Medicine and Pharmacy, Hue, Vietnam*

In addition, at least one *Institutional Survey* respondent from a Band 2 country, reported that his or her institution does not pay required fees because researchers cannot access journals from Elsevier that they would like to use. Other publishers linked to exclusions by institutional leadership, librarians and researchers include Lippincott and Springer.

As framed by the programme director in Hue, cited previously:

> The problem of course is not having adequate access to the full text of articles: Elsevier, Springer, Lippincott. Why? We can't subscribe to them. Our leaders say, Oh, HINARI, with over 6,000 journals. That's enough.

Concern about exclusions has been linked to R4L, and to all research-access programmes supported by the UN, Non-governmental organizations (NGOs) and other groups, since those programmes began (Arunachalam 2003, Kirsop B, Arunachalam S and Chan L, 2007, and Villafuerte-Gálvez J, Curioso WH and Gayoso O, 2007). However as discussed in the section that follows, these concerns notwithstanding R4L is often, for researchers who are aware of the programme, the most frequently used means of accessing research information.

Researchers' frequent use of R4L suggests that the programmes provide value, exclusions notwithstanding. Inability to access the full text of articles does, however, reduce the impact of R4L on developing-country research; that problem is compounded in the perceptions of R4L users by lack of accurate information.

R4L as a primary means of accessing research information

Across all data-collection methods, respondents cite use of one of the three R4L programmes most frequently in comparison with other sources. These findings, however, are complicated by overlap among different programmes[7] and by resulting confusion among respondents regarding programme "brands." The following summary of responses to the *General Survey* is presented, then, solely to provide additional evidence of the impact of R4L:

- More respondents (24 percent) cite HINARI as a source for life-science and medical research than cite any other source.

- More respondents (32 percent) cite HINARI as the source they use most frequently. PubMed is listed by 28 percent.

- More *General Survey* respondents (27 percent) cite AGORA as a source for agricultural and environmental information than cite any other source. OARE is cited by 14 percent of respondents.

- More respondents (54 percent) cite AGORA as the source they use most frequently. OARE is listed by 15 percent.

These results are presented to support the finding that R4L programmes deliver high value to their users regardless of the various barriers to access of the full text of research articles and other limiting factors. In light of the collaboration among different programmes and users' understandable mischaracterizations of the sources that they use, comparisons of usage rates among other programmes are not drawn.

Limited awareness as a barrier to impact

Given the overall high levels of use, it is possible that the most influential factor limiting the R4L's impact is limited awareness of the programme among potential users. This finding is supported by recent case-study research on research access in African countries (Harle 2010).

Even within subscribing institutions, awareness of R4L programmes[8] is low. Almost 62 percent of *General Survey* respondents (61.9 percent) are unaware of their institutions' R4L registrations, even though these respondents were made aware of the online survey. Many *General Survey* respondents who are *not* users of R4L—notably African respondents to the French-language Web survey—state in comments that now that the survey has made them aware of R4L they will use it.

Supporting this finding, 30.3 percent of *Dean or Director* interviewees and 43.3 percent of *Library Point-of-contact* interviewees cite limited awareness of R4L programmes as a challenge.

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[7] As an example, respondents mention both HINARI and PubMed, although PubMed can be accessed via HINARI. (Several interview respondents favor using PubMed for search then using HINARI to access articles that they have discovered.) Among overlapping programmes that result in confusion on the part of users are the International Network for the Availability of Science Publications (INASP) and Programme for the Enhancement of Research Information (PERii)—with these programmes also collaborating with EBSCO—and HINARI's relationship to Science Direct, a service of Elsevier.

[8] Interviews and surveys were designed to the extent possible to focus on assessments of awareness of separate R4L programmes, rather than the R4L initiative as a whole. Low levels of awareness described in this section and others refer to levels of awareness of the programmes themselves, not of the R4L "brand." (Note that open-ended comments to surveys all refer to specific programmes; respondents who state that their awareness was prompted by the surveys themselves in all instances refer to specific programmes by name, they do not refer to "R4L" or "Research4Life."

Findings in relation to how users initially learned about R4L suggest more effective measures that can be taken to build awareness of the programme. *General survey* respondents who are aware of R4L report learning about the programme in the following ways:

"How did you become aware of R4L?"	
I attended training	25.9%
A colleague or friend told me about it	19.8%
A librarian told me about it	10.3%
I received email notification	44.1%
My institution performed other outreach activities	8.4%
Web browsing or search	38.4%

Table 4: Means of learning about R4L, General Survey (n=263)

In these data, just over one-third of respondents report becoming aware of R4L through the efforts of librarians, either via outreach or the provision of training. A greater proportion of respondents, however, learned of the existence of R4L via their own efforts (web search), while a still greater proportion learned about R4L via email from various sources, presumably including friends and colleagues, library personnel and others. The *General Survey* responses are consistent with data derived from the *Active Researcher Interviews* and *General Interviews*.

Responses to the *Institutional Survey* suggest that the majority of librarians and their libraries have not been independently active in promoting R4L. More than one-third of respondents report that in the past 2 years their organizations have done nothing to increase awareness or use of R4L:

"In the past 2 years, has your organization conducted awareness-raising or outreach activities in relation to Research4Life?"	
No awareness-raising or outreach activities have been conducted	36.3%
Posters or signs	11.7%
Presentations, awareness-raising workshops, training	21.8%
Individual orientation sessions or individual training	22.6%
Email notification or Web-page announcements	18.4%
Not applicable	9.4%

Table 5: Outreach and awareness raising activities, Institutional Survey

Subscribing institutions appear to engage in awareness-building activities only sporadically. The fact that a higher percentage of respondents learned of R4L via their own Web searches rather than from librarians suggests that the role of library personnel in building awareness and usage levels of R4L can be enhanced.

Three factors underscore the importance of increasing awareness of R4L: the beneficial impact of access to research information in relation to improved social and economic well-being; the demand for access on the part of developing-country researchers, and the relative effectiveness of R4L in terms of meeting that demand. Promotion of R4L, then, is a responsibility that is shared among all stakeholders.

Actions to address the Review's Findings

The R4L partners have decided to take action on those areas where users reported problems or challenges in accessing and using the programmes. The first action area is to maximize users' access to the full text of research articles, and the second action area is communication with users.

In the first action area, three obstacles to consistent and reliable full-text access for some users were identified in the *User Experience Review*. The first obstacle is local telecommunications infrastructure, in which poor connectivity or bandwidth may be constraining users' ability to download full text. R4L has launched an international initiative through Microsoft's Imagine Cup competition to develop a 'download manager' application which will allow users to queue files and resume downloads when transmission breaks occur. The second obstacle is the R4L web architecture, which is currently being upgraded with a new hybrid authentication system, a new, more effective search tool that will better communicate the availability of full-text articles, and a more intuitive and efficient user interface. The third obstacle relates to publishers' policies on countries' and institutions' eligibility, exclusion, and transitions in payment status. R4L partners are working to develop a new model for eligibility based on a more sensitive categorization of countries and differentiation between types of institutions within countries, a more efficient administration of payments, and methods to ensure that users have more accurate information on exclusions.

The second action area relates to enhancing communication with R4L users. The partners are developing a central 'customer relations management' (CRM) system common to all programmes, that will enable more efficient and effective administration of users inquiries, and allow a more targeted communication with users. The CRM system will also support bulk emailings to users regarding new offers and features.

Outreach to build awareness of R4L has the potential to greatly increase the use of research publications by developing-country researchers and practitioners. Several awareness-building measures can be initiated by the R4L programme itself, drawing on what is known about how users typically find out about R4L, and by staff of registered institution. The R4L partners will support outreach at the institutional level by providing reproducible and localizable awareness-raising resources, which can be used to promote the initiative, and by "email outreach" to contact persons at subscribing institutions, sharing messages that they can forward to eligible members of their institutional communities. The partners will also develop networks amongst communities of practice, using existing regional and national platforms wherever possible.

National governments, donor agencies, and publishers all have stakes in the effective dissemination of current scientific knowledge. At present, launching and supporting a range of efforts to increase researchers' awareness of R4L is among the most effective means available to increase developing-country participation in research.

References

Arunachalam S (2003) Information for research in developing countries—Information Technology, a friend or foe? *International Information & Library Review* 35: 133-147.

Azhar G (2011) Access to information is crucial for science. *The Lancet* 377: 1404.

Carnegie Corporation (2009) Factors affecting uptake in universities in developing countries. Unpublished report. Rome: Food and Agricultural Organization.

Harle J (2010) *Growing knowledge: Access to research in east and southern African universities.* London: Association of Commonwealth Libraries. Available at:

http://www.acu.ac.uk/member_services/professional_networks/libraries_network/growing_knowledge

Kirsop B, Arunachalam S and Chan L (2007) Access to scientific knowledge for sustainable development: Options for developing countries. *Ariadne* 52.

Langer A, Diaz-Olavarrieta C, Berdichevsky K and Villar J (2004). Why is research from developing countries underrepresented in international health literature, and what can be done about it? *Bulletin of the World Health Organization* 82(10).

Pérez Koehlmoos T and Smith R (2011) Big publishers cut access to journals in poor countries. *The Lancet* 377: 273-276

Scott J (2006) *Usage Review.* Unpublished report. Rome: Food and Agriculture Organization.

Villafuerte-Gálvez J, Curioso WH and Gayoso O (2007) Biomedical journals and global poverty: Is HINARI a step backwards? PLoS Med 4(6): 220.

World Bank (2010). *Gross national income per capita 2009, Atlas method and PPP.* Available at: http://siteresources.worldbank.org/DATASTATISTICS/Resources/GNIPC.pdf