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Accessing and Disseminating Scientific Information in South Eastern Europe

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Accessing and Disseminating Scientific Information in South Eastern Europe

N°3

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This Report was written by Peter Ballantyne of the International Network for the Availability of Scientific Publications (INASP) on the basis of a series of fact-finding missions he has undertaken on behalf of the UNESCO Office in Venice in the concerned countries during the year 2005. Sara Gwynn has contributed to the organisation of the roundtable of discussions on the draft report and to the realisation of its final version.

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Foreword

In many parts of the world, keeping libraries up to date and accessing new information, particularly in the fast moving world of scientific knowledge, is a bad headache for governments and developmentalists. For some time in respect to this, UNESCO, in cooperation with partners such as TWAS, INASP and ICSU, has been seeking on an international level to provide assistance so as to tackle this problem. It is only natural therefore that the UNESCO Office in Venice – UNESCO Regional Bureau for Science and Culture in Europe (BRESCE), with the generous financial assistance from the Italian Government, should have been part of this effort, especially in those parts of Europe still trying to recover from the isolation of the Iron Curtain and the turmoil of wars and civil unrest.

This study provides some interesting recommendations that the UNESCO Office in Venice will be seeking to take forward, if continued assistance and effective partnership can be found. After all, it is more logical to keep things progressing at a consistent level – at limited costs – rather than to let them decline and then need to re-invest so much more at a later date.

Michael Millward
Director a.i.

Executive Summary

At the request of Member States from the region and according to the 'Final Communiqué' adopted by the Round Table of Ministers of Science from South Eastern Europe (Paris, October 2001), the UNESCO Office in Venice – UNESCO Regional Bureau for Science and Culture in Europe (BRESCE) has undertaken a specific project devoted to enhancing access to and delivery of scientific information in South East Europe. The International Network for the Availability of Scientific Information (INASP) was entrusted with the task of undertaking a mapping of the situation and elaborating a comprehensive report, including a series of recommendations.

As a first step, fact-finding missions were undertaken in Albania, Bosnia & Herzegovina, Croatia, FYR of Macedonia, Serbia, and Montenegro. The visits involved intensive consultations at a national level in order to assess the situation in each of the countries with regard to access to scientific information, and national capacities to produce and disseminate scientific information. They were followed up with further consultations with key stakeholders to validate the trends and conclusions identified, and to propose activities that should be undertaken at national or regional levels as a result of the findings.

The country visits revealed a very mixed situation regarding information access and dissemination. Some institutions seem to be well-endowed, whilst others have very little. Some countries have decided that connectivity is essential for academics and scientists, others leave this up to institutions and individuals.

Systematic access to international journals is not a major technical or financial problem in two of the countries; in the others this access is either very short term, limited to an institution or two, or non-existent, despite efforts in the recent past to provide and sustain this access. Many libraries seem to be struggling to adjust to the new economic and ICT environments, and to mobilize political commitment and support. Discovering the information in the libraries is not yet easy inasmuch as many have yet to make their collections available electronically and perhaps do not even hold much of the locally published science outputs.

All of the countries are struggling to document and disseminate their research outputs, especially in international journals. Local journal publishing is widespread (on paper), though it may not be top quality and it is questionable how accessible and visible these journals are locally, regionally and internationally. Experiments with open access online journal publishing are just starting in a few countries.

Personal contacts, travel, meetings, workshops, professional associations and networks are all essential forms of access and dissemination mechanisms used by individual scientists and researchers.

Many ideas and suggestions arose during the course of the fact-finding missions. The report recognises existing efforts in these areas, and identifies possible future actions to enhance:

- Accessing international journals: this requires political commitment and sustained recurring funding and might best be achieved on a regional/consortia basis.
- Accessing local/regional journals: hundreds of scientific journals are published in the countries visited but only a few are indexed internationally or available online in full text. Perhaps a regional (or linked national) service could be set up to print and index journals published in the region.
- Open access publishing: few of the journals published in the countries visited seemed to have a business model that depended on subscriptions, so publishing under open access licenses may be a promising option for many of them.
- Open access archiving: a lot of research is produced in the countries in the form of theses, reports and other monographs. It might be useful to carry out some prototype 'institutional repository' projects in different situations to explore how locally produced research outputs could be properly deposited and archived electronically in full text.
- Open access position: it may be valuable for interested countries to collaborate to develop their 'positions' on open access in publishing.
- Federated searching: an increasing number of library catalogues and indexes are made available via the Internet. Federated or cross-searching facilities would allow awareness across the holdings of different libraries.
- Policy awareness and commitment: the arguments for information and ICT investments in national educational, scientific, and developmental goals need to be made in order to motivate political and financial support for the information dimension of science (e-Science).
- Library strengthening: many libraries may need to be encouraged and supported to take on modern electronic services and roles in support of science and research.
- Regional cooperation: there is much to be gained from pooling resources and it might be beneficial to establish some type of regional forum to take activities forward.
- Thematic portals: there may be scope to revive or re-create some regional initiatives in order to ensure that science and research outputs in areas such as agriculture, Balkan history and culture, health, etc, are made visible and accessible to audiences in the region and beyond.
- Communicating science: efforts should be made to promote, popularize and communicate science to the general public and among audiences such as policy makers or school children.
- Accessing the UNESCO knowledge base in order to benefit from its communication and outreach efforts.

Of these suggested areas for action, follow-up consultations during the Roundtable organised in Maribor (see Annex IV) have identified four main priorities:

- enabling online access to national journals;
- enhancing local, regional and international cooperation and networking;
- strengthening libraries;
- improving policy awareness and commitment towards the improvement of the access to and the dissemination of scientific information the region.

Introduction

This report is the outcome of the first phase of the UNESCO – BRESCE project "Enabling access to and delivery of scientific information in South East Europe".

It is based on fact-finding missions to Albania, Bosnia & Herzegovina, Croatia, FYR of Macedonia, Serbia, and Montenegro. The missions involved intensive consultations at national level with decision-makers, university librarians and senior researchers in order to assess the situation in each of the countries with regard to the access to, and the national capacities to deliver, scientific information.

On completion of the missions, a draft report was presented to key stakeholders (via email and a roundtable meeting) in order to validate the trends and conclusions set out, and to identify and document activities that should be undertaken at national or regional level to facilitate and sustain improved access to and dissemination of scientific information in the region. All feedback was taken into consideration when creating this final report.

The first section utilises a previous UNESCO Venice Office report written by Milica Uvalic, entitled 'Science, Technology and Economic Development in South Eastern Europe'[1] which provides an overview of the scientific information 'landscape' in the South East Europe (SEE) region, including information access and management, Internet connectivity, and accessing, producing, networking and disseminating scientific information.

There are then six sections that report on the fact-finding missions. Each section provides an assessment of the national scientific context, and the situation with regards to accessing and disseminating scientific information in that country. In particular they draw conclusions regarding Internet connectivity, access to international e-resources, accessing local research, and science/journal publishing (both traditional and electronic). The table below presents a very simplified comparison of the different countries:

	Connectivity	eJournals	Libraries	ePublishing
Albania	^	^	^	^
Bosnia-Herzegovina	^	^^	^^^	^
Croatia	^^^^^	^^^^	^^^^	^^
FYR of Macedonia	^^	^	^^	^
Montenegro	^^^^	^	^^	^
Serbia	^^^^^	^^^^^	^^^^	^^^

[1] UNESCO Office in Venice, 'Science, technology and economic development in South Eastern Europe', a Report by Milica Uvalić, Science Policy Series N°1, 2005.

Finally, the report draws together the outcomes of the various missions, provides a summary of the ideas and suggestions that arose during the course of the project and reports on the recommendations identified by the key stakeholders during the concluding feedback phase of this part of the project.

Annexes to the report provide additional information on scientific and information institutions in the six countries, the stakeholders contacted during the project, the terms and conditions of the project, and the agenda and minutes of the roundtable meeting.

Setting the scene

As an introduction to the country profiles, this section maps the overall scientific information 'landscape' of the South Eastern Europe (SEE) region introducing major trends and initiatives related to science connectivity, information access, information dissemination and networking.

Science in South Eastern Europe

A recent report published by the UNESCO Office in Venice[2] gives an overview of science, technology, and research in the five countries of the so-called 'Western Balkans': Albania, Bosnia and Herzegovina, Croatia, FYR of Macedonia, Serbia, and Montenegro. Borrowing heavily from the above mentioned report, this section provides a summarized overview of the science and technology situation in the project countries.

All of the countries in the region have recently gone through exceedingly difficult political and economic situations. In general, while the transition to market economies and multiparty democracy started in 1989, these reforms were disrupted by the disintegration of Yugoslavia in mid-1991 and the military conflicts that accompanied the break-up during the first half of the 1990s in Slovenia, Croatia, and Bosnia and Herzegovina, and more recently in Serbia and Montenegro (1999) and FYR of Macedonia (2001). The economic implications of these events were particularly devastating for the four successor states of the former Yugoslavia.

Since 1989, the science, research, and education systems in the region have undergone a reform process as part of the changes required by the transition to a market economy and multiparty democracy. Though these reforms have been implemented at variable speeds, they have usually been in the shadow of other national priorities. In part, this is due to a low recognition of the role of science in the overall process of economic development, but even more to the unfavourable economic situation and extreme lack of financial resources for these purposes.

All the countries recently adopted new laws on higher education, sometimes also on science, on science and technology, or similar. A number of official documents have also been prepared and adopted by SEE Governments, such as national strategies on technological and scientific development, regulations regarding innovation centres or technology parks, and other documents that seek to promote S&T development. Higher education reforms have been in course for a number of years and all the countries have signed the Bologna Declaration[3].

[2] Idem.

[3] In May 1999, Ministers of Education from EU Member States issued a declaration on the 'European Higher Education Area', which has come to be known as the 'Bologna process'. This seeks to harmonise higher education systems among EU countries, provide greater compatibility and comparability of the national systems, and promote mobility and employability of EU citizens. In 2003,

Despite these positive developments, there have been substantial delays in implementing many of the new laws, regulations, and programmes, either because of lack of resources or because of other urgent priorities. Though the research systems have substantial potential, they are generally characterised by an unfavourable structure, weak interaction with the business sector, insufficient linkages with the national education system and research systems of other countries, also in the region. The general conclusion of experts from the concerned countries is that science, scientists, and scientific research have been marginalized. Science and technology has not been among the key priorities and clear longer-term strategies in this area are absent.

In terms of research investment, the overall R&D expenditure in all the SEE countries has declined drastically during the 1990s, leading to the shrinking of the national research systems. Generally, R&D is poorly funded, undervalued and underpaid, and the lack of finance significantly decreases the quality of research. Today, a common challenge in all the countries is to revitalise scientific infrastructure: to purchase new equipment, modernise laboratories and research facilities, promote and extend ICT systems, and update bibliographical databases and access to specialised literature. The governments have very limited financial resources for these purposes, private funding is low and is unlikely to substantially increase over the coming years, and international donors have shown limited interest to invest in modernising science and research infrastructure. In the medium term, international financial and technical assistance will remain an important source, but the necessary resources will also have to be provided increasingly from internal sources.

Information access and management

Several features of the wider research and education environment are very important influences on information access and dissemination in the region.

The first is the legacy of the former Yugoslavia where there was a lot of cooperation among information providers and managers. Among the library and publishing community especially, people regularly refer to former systems in which, for example, bibliographic systems and services were coordinated across the various republics, shared indexing tools in areas like health information were maintained, and locally produced publications were widely deposited and distributed. In recent years, although there is some informal networking and dialogue among the professionals involved, these 'regional' initiatives have weakened. The exception is perhaps in the area of library catalogues and bibliographies where the COBISS software and shared cataloguing platform maintained by the Slovenian Institute of Information Science (IZUM) is being used in Bosnia and Herzegovina, FYR of Macedonia, Serbia, and Montenegro. Excepting COBISS, the question is if and how this rich tradition of cooperation can be rebuilt.

the Conference of Ministers responsible for higher education called for efforts to secure closer links between the higher education and research systems arguing that the emerging European Higher Education Area will benefit from synergies with the European Research Area.

The second feature concerns the organisation of universities in which individual faculties have much autonomy. Each faculty, and often each department or institute within a faculty, maintains its own library, produces its own reports and journals, often maintains its own ICT infrastructure and connectivity, and manages these tasks itself (often financing much of the costs as well). The scale of potential information generation and production in the universities alone is therefore very large with at least 345 faculties and 37 university-affiliated institutions in the countries visited[4].

Where central university libraries or university computer centres exist, they have relatively weak influence over the many autonomous bodies. Levels of information awareness and investments thus differ widely according to the interests and funding available in each faculty. Visiting a faculty with very poor or very rich information infrastructure does not signify that this is the same or similar in other faculties.

Despite this, it should be said that there are many instances where faculty libraries are working together, for instance on shared library catalogues or joint subscriptions to journals and where faculties are buying into connectivity options provided by the national research and educational networks. In general, collective information initiatives are complicated because they require support and commitment at many different and largely autonomous levels.

It is likely that the reforms associated with the Bologna Process will have a strong effect on this as the process includes giving greater roles and responsibilities to central university administrations, in areas like quality control and perhaps also information access and connectivity where basic information access levels and standards could be promoted across the entire university system.

The Bologna Process has other important implications for information communities: it focuses on higher quality teaching and research and requires that universities have access to data on research outputs such as articles. In Montenegro for example, the new law on higher education (which follows the recommendations of the Bologna Declaration) stipulates that the Ministry of Science and Education should have access to evidence on all research projects, implying that systems will be needed to track scientific outputs in the form of thesis, reports, journal articles etc. The Bologna Process also promotes new approaches to teaching and learning – with more self-learning by students – in which access to the Internet and good libraries will be essential components. Finally, its emphasis on mobility will require that universities in the region will need to invest in ICT infrastructure to ensure that they can compete and attract academics and students from other countries to collaborate in doing research with them.

[4] There are at least 87 faculties plus 9 institutes in Bosnia and Herzegovina; 114 faculties and 18 institutes in Serbia and in Montenegro; 39 faculties and 10 institutes in FYR of Macedonia; 31 faculties in Albania; and 74 faculties in Croatia.

Connecting to the Internet

As part of this reforming and revitalization of science and higher education, there have been several key regional initiatives to extend and enhance Internet connectivity.

The primary and most visible action has been the South East European Research and Education Networking (SEEREN) project that interconnects and supports National Research and Education Networks (NRENs) in the region[5]. These NRENs are responsible for the national level provision of data communications networks and services to the research and education community of a country which often includes major libraries serving these communities.

The SEEREN project established connectivity to the European Internet 'backbone' through the GÉANT project[6] for NRENs in Albania, Bosnia and Herzegovina, the FYR of Macedonia, Serbia, and Montenegro. Formally inaugurated in January 2004 and led by the Greek NREN, the project provides connections at between 2 and 34 Mbps for each country. Although the SEEREN project officially ended on 1 December 2004, and contracts with the telecommunications suppliers were only funded until that date, the contracts have been taken over by GÉANT, subject to matching funds being made available from the SEEREN partners.

The participating national NRENs in SEEREN are: the Institute of Informatics and Applied Mathematics (INIMA) of the Academy of Sciences of Albania; the Academic and Research Network of Bosnia and Herzegovina (BIHARNet); the Macedonian Academic and Research Network (MARNet); and the Academic and Research Network for Serbia and Montenegro (AMREJ) coordinated through the Computing Centre of the University of Belgrade. While Croatia does not participate in the SEEREN project, its connectivity needs are provided by a similar NREN, the Croatian Academic and Research Network (CARNet).

Alongside this more infrastructure networking approach, there is a wider movement towards distributed eInfrastructure environments - which is becoming known as the 'grid' - that allows new methods of global collaborative research that area also often referred to as eScience. The South Eastern European Grid-Enabled eInfrastructure Development (SEE-GRID) project was launched in early 2004 and intends to support actions to pave the way towards the effective digital integration of SEE countries with the rest of Europe[7].

[5] See: *www.seeren.org* for more information.

[6] The GÉANT project is a collaboration between 26 National Research and Education Networks across Europe, the European Commission, and DANTE (Delivery of Advanced Network Technology to Europe - plans, builds and operates pan-European networks for research and education). The project began in November 2000 and was originally due to finish in October 2004. However, because of the project's success, and in order to permit a smooth transition to the next generation of the network (GÉANT2), the project was extended until 30 June 2005. The GÉANT project's purpose was to create a new backbone at gigabit speeds – the GÉANT network. This network became fully operational on 1 December 2001; GÉANT2 officially began in September 2004 and will run for four years. See *www.geant.net* and *www.geant2.net*.

[7] The SEE-GRID project assists the National Grid Initiatives of the South Eastern European countries to deploy a sustainable, high-performing eInfrastructure in the SEE region and thus become active members of the pan-European and Worldwide Grid efforts. See: *www.see-grid.org*.

Thus all the countries covered by the survey can be said to 'offer' fast and reliable Internet connectivity to the academic and research community. Each of the NREN organisations has been connected through GÉANT to the wider international community and is offering this access to participating institutions in their countries. However, there is much variability among the countries in terms of financing, accessibility of the connectivity, and in the connectivity actually provided at the level of the individual researcher, scientist, or indeed institution.

In Croatia, Serbia, and Montenegro, the Governments provide funds to ensure that the international access is paid for. There is also a national networking infrastructure that each institution can connect to which facilitates 'peering' among the organisations in a country and connects to the wider international infrastructure. In both countries, the people met indicated that this basic connectivity is not really a major problem; though each faculty and institute has its own approach to providing computers and connections to the network.

In FYR of Macedonia, the national networking infrastructure is not complete, though it is being extended, and many individual institutions are using alternate connectivity providers. The local network, MARnet, is experiencing difficulties to generate the Macedonian share of funds needed to pay for the international access through GÉANT.

Albania is also experiencing difficulties generating the funds required to pay for its GÉANT connection and is currently giving priority to the national networking backbone and infrastructure, especially among institutes members of the Academy of Sciences network. Academic institutions and universities seem to be following their own devices and each faculty and department has its own approach. It is particularly striking how many academics and others in Albania use free email addresses like 'Yahoo' which may indicate that much of the necessary institutional infrastructure and domain naming is not yet in place (the Academy of Sciences as the NREN seems to be the exception).

In Bosnia and Herzegovina, BIHARNet lacks stable political and financial support and has not really functioned since 2001 (from 1998 up to that point, the project was financed and managed by Slovenia), although all the infrastructure is in place. Institutions are thus using a variety of providers to get connected to the Internet.

In all three countries, the financial challenge is at two levels. First, at the national level to pay the country share of the international connection through SEEREN. Second, at the local level for the institution or faculty to pay for its connections to the local NREN or other Internet service provider.

The overall picture therefore shows much progress with infrastructure installation and network connections and excellent national access in Croatia, Serbia, and Montenegro. The other countries have much more patchy coverage: raising the funds to pay for the recurring national connection is a problem and many individual institutions try to find their own solutions with resulting technical and financial problems.

Key issues are to be able to financially sustain the connectivity that is needed and to ensure that the rollout of connectivity is equitable so that opportunities to connect are made available

to people working in all research and education institutions (including the libraries). Some governments in the region have recognised that science and teaching needs connectivity and they have made funds available for both the infrastructure and the recurring annual costs. Others need to be convinced that connectivity is as basic to the conduct of modern science and teaching as the provision of pens and paper, and indeed is essential to meet wider commitments to the Bologna Process.

Accessing scientific information

Closely associated with connectivity in the minds of the researchers and scientists is their need to gain access to the international scientific literature that is published in journals and other formats, and is indexed and made accessible through databases.

In a rather simple sense, there are two main challenges. First, to obtain access to international databases with either the indexes and/or the full text of scientific literature. The second is to describe and gain access to international information resources that are already available inside the SEE countries. Typically this involves acquiring access rights and subscriptions to international information, and building local databases and information systems to discover and manage the information resources that are held and produced inside the institution or country.

A third related challenge is to make sure that scientists can gain access to the results of research produced and published within each country.

It must be recognised that each scientist also has a personal set of tools and mechanisms that is used to gain access to information resources. These include personal contacts, professional associations and networks, and learning and travel opportunities that have been built up over the years. While these are often more effective than any formal systems, they also have weaknesses.

International subscriptions

In all of the countries, libraries have been set up to acquire and manage information resources. In some places, there are many such libraries – each university faculty usually has one and in some cases each department as well. These range from small book collections through to sophisticated information centres, to large national and university libraries with major book and journal collections. In general, each library is a depository of some kind for the publications produced by the community it serves. Each has some kind of catalogue of their collections, though many are not yet automated and rely on card or paper catalogues of some sort.

In recent years, budgets of all these libraries (and their parent institutions) have been reduced, and subscriptions to international journals have been cut and fewer books and other materials purchased. Even institutions that produce publications have seen the number of titles they can acquire by exchange dropping. There is therefore a strong interest to set up national library consortia to purchase electronic journals and databases. Generally supported

by the Soros Foundation and eIFL.net, library consortia have been set up in each country to negotiate discounted subscriptions with commercial publishers and to make this information available to academics and researchers in the country.

The Governments of Croatia and of Serbia have agreed to fund country licenses for these e-resources and thousands of journal titles are available to their research communities. In Bosnia and Herzegovina, the Sarajevo Canton Government is also supporting subscriptions for the whole Federation of Bosnia and Herzegovina.

In Albania, FYR of Macedonia, and Montenegro, after a few years with subscriptions paid for by external or government sources, local funds for subscriptions have dried up and access has largely been cut off. Exceptions are individual institutions with some funds that allow them to operate independently. Research communities in these countries thus rely on individual and institutional subscriptions or donations and there are many individual efforts relying on personal contacts and association memberships or membership in schemes such as those of the British Council whose offices provide access to some databases and resources. There are exceptions, for example in Albania where the Academy of Science Library pays to access several publishers and databases, in FYR of Macedonia where the Academy's Research Centre for Genetic Engineering and Biotechnology utilises project funds to acquire periodicals, and in both Bosnia and Herzegovina and FYR of Macedonia where medical libraries are accessing key medical journals through the Health InterNetwork Access to Research Initiative (HINARI) sponsored by the World Health Organisation[8].

With the exception perhaps of Croatia and Serbia, a major problem for the libraries is fundraising to pay for access to the journals and other materials needed by the research community.

The consortia, while operational, have not yet managed to generate the broader support that mobilises funds. One issue that could be important in Albania, Bosnia and Herzegovina, and FYR of Macedonia is that these are also countries facing connectivity challenges where it is unlikely that many researchers would actually have had the opportunity to use any of the Internet databases and subscriptions made available to them. Where there are few researchers connected, the e-resources will have less usage and less impact.

In Serbia and Croatia, the access problems don't seem to apply and the challenges are different. In Serbia for instance, academic staff complained that journals are not available when in fact the National Library subscribes to more than 11,000 titles for the country. The challenge might not be access as such but promotion and awareness so that academic staff know what is available. In Croatia, there seem to be two major competing initiatives financed by the gov-

[8] HINARI (as well as the sister AGORA initiative of the Food and Agriculture Organisation, FAO) provides free or low cost online access to more than 2000 major journals in biomedical and related social sciences. Within the SEE countries, institutions in Albania are eligible for free access to HINARI and AGORA; institutions in Bosnia and Herzegovina, FYR of Macedonia, Serbia, and Montenegro can access HINARI by paying $1,000 each per year. Data from the WHO shows that there is 1 registered institution in Bosnia and Herzegovina, 3 in FYR of Macedonia, 4 in Serbia (the National Library paid for 11 institutional licences in 2005), and 4 in Albania. See: *www.healthinternetwork.org* and *www.aginternetwork.org.*

ernment (one through the National and University Library, the other through the 'Ruđjer Bosković' Institute) to make e-journals available to academic and scientific communities, suggesting more of a management challenge.

The overall picture regarding international journal access therefore has both excellent and very poor elements. Reliable and recurring funding for the subscriptions is available on a national scale in Croatia and Serbia and to some extent in Bosnia and Herzegovina. In these cases, there is some work to be done to ensure that the resources that are accessible are actually being used. Everywhere else is dependent on what an individual institute or library or scientist or consortium can mobilise from its own contacts and resources.

Access to the local information

In terms of gaining access to information held within each country, libraries are the principal and traditional mechanism where information resources are deposited, described, indexed and accessed. Increasingly, however, electronic publishing developments, websites, tools like institutional repositories are being used to publish information in full text, and to offer search and discovery options. Much of this currently happens outside the libraries.

In general, following the wider trend towards autonomy, each library acts independently, being accountable to its parent organisation. In every case, the repository function is important and all institutions report that they 'save' a copy of all published materials, dissertations, etc, in their libraries. This is then indexed and made accessible to staff and the wider community. It is not clear how strong the motivations (or sanctions) are to enforce this and much locally produced information is not being deposited. Certainly information on locally produced but internationally published materials is frequently not captured.

Given recent financial limitations, purchasing of books and journals from abroad has fallen off and library collections are not as up to date as they were and in some cases contain much older materials. In some cases, such as Albania and Bosnia&Herzegovina, the storage of this content poses problems with inadequate buildings and a general lack of priority for libraries threatening the adequate storage of important books and reports.

In the countries of former Yugoslavia, there are many efforts by the libraries to work together to share information about their holdings and collections and to provide access by users to the library catalogues. Not all the libraries are participating – for various reasons – and there is still much work to be done to make all the holdings accessible. Still, much progress towards indexing and accessing the wider holdings of each country has been made. In some of the countries, the main vehicle for this is the COBISS[9] network that maintains and provides a system for cooperative indexing and exchange of bibliographic information among the participating libraries in

[9] The Co-operative Online Bibliographic System and Services (COBISS) was set up as a shared library cataloguing system in 1987 and connected 55 libraries from all former Yugoslav republics. Set up in 2003, COBISS.Net is the name of the network that connects the national COBISS systems. From a technical perspective, COBISS software enables users to download records from any of the COBIB shared bibliographic databases: COBISS.SI, COBISS.BH, COBISS.MK, COBISS.SR and COBISS.CG. Currently, more than 350 libraries use the software (see *www.cobiss.net*).

Bosnia and Herzegovina, FYR of Macedonia, Slovenia, Serbia, and Montenegro. Croatia is not a member of COBISS.Net but has several similar initiatives at the national level. Albania seems not yet to have reached the stage of computerized library holdings except among leading libraries such as the Academy of Sciences where such a project is in progress.

The activities of the libraries seem to suffer from a general sense that they are low priority among decision and policy makers. In many cases, they are struggling to adapt to newer demands and roles associated with the digital environment that is evolving in science and higher education.

Outside of the libraries, there is also much innovation and experimentation with tools to enhance information access and dissemination. In Croatia for example, the Ministry of Science, Education and Sports maintains the Croatian Scientific Bibliography[10] as a tool to track the activities and outputs of researchers and scientists. While this is not designed to be a 'library' of reports and documents, researchers that wish to have their work funded are required to list their outputs each year. The end result is an index to Croatian science that exists alongside the various systems of the libraries. Also in Croatia, a dataset of Croatian research outputs (articles) is maintained in the National and University Library as part of a research project to measure science outputs. In effect, it is the basis for part of a national index, but is not used as such.

The Mathematics Institute of the Serbian Academy of Sciences is working on various digital projects including the production of a full-text web archive and index to mathematics journals published in the country and region[11]. In Albania, the Academy of Sciences has its journals hosted on the Central and Eastern European Online Library[12]. The Macedonian Academy of Sciences is beginning to explore open access publishing models for local research outputs. In Bosnia and Herzegovina, the Open Book[13] project works on various book and research projects and supports the hosting of several journals and annual publications. From a sector perspective, most of the countries in the region participate in the AgroWeb Central and Eastern Europe Network that aims to collect and provide information on agricultural institutions and other important agriculture related subjects[14].

All of these initiatives focus on making information from and about local science and research accessible and visible in different ways. As yet, however, it is not possible to easily search across them – and across the library collections – to know what is produced in a institute or country or in the region or to discover what information is already available and where.

[10] See: *http://bib.irb.hr/*

[11] See: *www.sac.org.yu/komunikacija/casopisi/*; *www.mi.sanu.ac.yu/regional/ZbISajt.htm*; and *www.mi.sanu.ac.yu/regional/MathDiSajt.htm.*

[12] CEEOL is an online archive that provides access to articles, scholarly journals, electronic books and re-digitized documents pertaining to Central and Eastern European topics. It is strong on subjects like anthropology, culture, history, linguistics, literature, politics, and sociology. In March 2005, it had 5 titles from Albania; 5 from Bosnia and Herzegovina; 14 from Croatia; 3 from FYR of Macedonia; and 10 from Serbia and Montenegro. Access to the full text is restricted to subscribers (See *www.ceeol.com*).

[13] See *www.openbook.ba.*

[14] See *www.agrowebcee.net.*

Some supporting scientific information initiatives

Access to Global Online Research in Agriculture (AGORA)	www.aginternetwork.org
AgroWeb Central and Eastern Europe Network	www.agrowebcee.net
Central and Eastern European Online Library (CEEOL)	www.ceeol.com
Central European Initiative (CEI)	www.ceinet.org
Co-operative Online Bibliographic System and Services (COBISS)	www.cobiss.net
Electronic Information for Libraries (eIFL.net)	www.eifl.net
Electronic South-Eastern Europe Secretariat (ESEE Secretariat)	www.eseeinitiative.org
Health InterNetwork Access to Research Initiative (HINARI)	www.healthinternetwork.org
International Network for the Availability of Scientific Publications (I NASP)	www.inasp.info
SEEnergy	http://seenergy.masfak.ni.ac.yu
South East European Research and Education Networking (SEEREN) project	www.seeren.org
South Eastern European Grid-Enabled eInfrastructure Development (SEE-GRID) project	www.see-grid.org
UNESCO Regional Bureau for Science and Culture in Europe (BRESCE)	www.unesco.org/venice

In particular, it is very difficult to discover and obtain information on the outputs of research and science across the region. While progress is being made in each country, there is no easy way for a medical researcher in FYR of Macedonia to know of, far less to obtain, the results of research work in, e.g., Bosnia and Herzegovina or Albania. The shared regional catalogues and bibliographic databases (of COBISS for example) and other projects are moving in this direction but are only as strong as the local networks and their capacity to discover and index the local content of each institute and country.

Producing and disseminating scientific information

The previous paragraphs began to touch on the publishing of local research and scientific outputs from the perspective of information access and discovery. This reflects the increasing convergence of the 'access' (library) and 'dissemination' (publishing) strands of scholarly communication in which 'library' and 'publishing' functions are beginning to overlap in the tools and technologies being used. Here we concentrate on the situation regarding the dissemination of science and research.

As in previous discussions, there is a general sense in the countries visited that research productivity – as measured by articles in peer reviewed journals – has declined in response to the reduced funds available to science and the general stagnation of science. However, visits revealed much publishing activity across the countries. Each institution, faculty or department of a faculty is publishing reports and journals, though these are not always regarded as meeting high enough quality standards. Individual researchers and scholars are also encouraged to submit articles for publication in international journals, though many people feel that this requires a much greater priority and support, and several of the countries visited are trying to increase the visibility of their science in international indexing systems. However, data from international databases do indeed show that countries in the region account for very small proportions of the international literature. For instance, a recent report[15] shows that SEE countries each accounted for less than 0.1% of international scientific literature in 1999. Recent data[16]

show that authors from the region contributed as follows to international citation indexes in 2003: Bosnia and Herzegovina 0.01% (66 items); Croatia 0.14 % (1590 items); FYR of Macedonia 0.02% (252 items); and Serbia and Montenegro 0.03% (314 items)[17].

In terms of local publishing outlets, paper is still the dominant format for dissemination. One of the largest pools of research information is the theses and dissertations written by students in the universities. Officially, these are deposited in the faculties and universities where they may be indexed and stored. Active dissemination of the research reported in the dissertation is probably mostly done through journal articles and conference/seminar presentations.

Journals seem to be the most important formal dissemination mechanism and each country has several that aspire to international and regional status as well as numerous others providing publishing outlets for scholars in the institute or country. An important motivation to produce journals has been to exchange them for journals from foreign institutes working in the same area. The total number of journals published is hard to ascertain. In Bosnia and Herzegovina, the National and University Library estimated there are 200 titles, though not all scientific and perhaps not all active. In Croatia, a similar 200 scientific titles was mentioned of which 13 are listed and indexed in the databases of the Institute for Scientific Information (ISI). According to a recent survey by the National Library of Serbia there are some 500 journals published in the country, of which around 70 also have some kind of web presence. In FYR of Macedonia, there is reported to be 45 scientific journals of which perhaps 26 are regular and 4 have an online presence.

It is debatable how accessible these journal articles are to the national or international scientific communities. Few titles are indexed through international systems, libraries may or may not hold and index the content, and print runs are small. Moves are being made to publish some titles on the Internet but the easy discovery of these is hampered by the lack of standard indexing and metadata description tools and the scattering of titles across hard to find 'deep' web addresses (as example, the Journal of the Serbian Chemical Society is at: *www.shd.org.yu/htdocs/shd/JSCS-contents.htm*). There are some promising initiatives, however, to provide easier access to journals published in the region.

As well as journals, each country has a publishing industry that focuses on local language books and translations, especially fiction and bestsellers for the general public as well as textbooks. The actual research output in terms of books and reports is hard to assess as library deposit systems are not always followed and as institutions do not seem to have easy to access and query electronic 'repositories' listing their outputs. From the few institutions visited, it is clear that there are several very productive pockets (including especially the Academies of Science) where reports and books are regularly published.

[15]UNESCO Office in Venice, 'Scientific profile activities in CEEC: a comparative study based on scientific publication indicators and international co-publications', by Cadiou Y. and L. Esterle, 2002 (*www.obs-ost.fr/pub/unesco_012002.pdf*).

[16] Alma Swan, personal communication.

[17] The ISI data for 2004 show: Serbia and Montenegro increasing with 865 items (634 January-June 2005); Croatia increasing with 1639 items (910 January-June 2005); Bosnia and Herzegovina 73 items (63 January-June 2005); and FYR of Macedonia 247 items (122 January-June 2005) – source Alma Swan, personal communication.

Except in Albania, institutions increasingly have a website where they announce their activities and in some cases publish research outputs in full text. As was mentioned above, there are some efforts to bring together online journals on a country or regional basis, however, these are generally start-up projects that are relatively little known.

We can conclude that a lot of scientific publishing is taking place. Not all of this reaches international quality standards, which is a concern of many of the people met in the country visits. Aside from the issues of quality and scientific reward systems for publishing, dissemination of these research outputs is closely tied to issues of indexing and accessibility. Articles published internationally are frequently not actually accessible to colleagues in the same country due the high costs of access and subscription. Articles (and other publications) produced and published locally are not easy to discover unless they are properly catalogued and indexed – usually by the libraries – and if the indexes or catalogues are actually made accessible on the Internet. There is much to be done to reach this position.

In the absence of such easy access, professionals interviewed from all the countries talked of the importance of their personal networks and contacts and opportunities provided by travel to both find the information they need and to disseminate their own work. Formal channels simply struggle to provide the necessary access and discovery as well as the desired visibility.

Networking scientific information

From the beginnings of science, correspondence among scholars and face to face meetings have been primary mechanisms of staying up to date with research and sharing one's own results. The Internet seems to have expanded opportunities to meet in cyberspace and generated an explosion in the workshops, seminars, and meetings that underpin today's e-science.

Everyone encountered in the country visits emphasised that they depend very highly on their personal contacts and connections to find information. In some of the countries, this is facilitated by the relatively small size of the scientific community in which individuals tend to know who to contact in their field of interest. In many subject areas, professional associations and networks at the national and regional level support such interactions – examples being the Macedonian Society of Chemists and Technologists, the Serbian Chemical Society, the Network of Networks for Research and Cooperation in Cultural Development, the Balkan Geophysical Society, the Balkan Physical Union, the Inter-Academy Council for South-East Europe, and the Central European Initiative (CEI) Working Group on Science and Technology[18].

The Balkan diaspora working abroad as well as collaborators in other countries were identified as particularly valued sources of information and support that help scientists to better connect

[18] The network offers young scientists from CEI countries, particularly those outside the EU, the opportunity to participate in PhD courses, in training programmes and research activities in various scientific fields, developed within the network. The network has a particular focus on earth sciences, especially geology, geophysics, and geodesy. It also promotes a 'research to enterprise' project and participates in a CEI Task Force on ICT (*www.ceinet.org/main.php?pageID=65*).

with peers and state of the art ideas around the world. The so-called 'brain drain' of scientists from the region can thus sometimes have a continuing positive effect on science in their home countries.

Despite this, for various reasons, scientists and scholars in the region feel themselves to be excluded from much of this face to face debate and dialogue and everywhere there are calls for greater support to be provided to regional networking but particularly to opportunities to participate in EU supported programmes and related meetings. Lack of funds especially as well as restrictive travel regimes were singled out as particularly hampering participation in these dialogues.

Communicating science

In all the country visits, enhanced scientist-to-scientist or scholar-to-scholar information exchange and publishing was the primary focus of attention. In very few cases was any mention made of the need to communicate research and science results to the general public or the media; the need to package science in suitable forms for policy-makers was seen as important to help ensure that science is recognized as a priority of government.

Scientific Information in Albania

The scientific context

In Albania, most scientific research is carried out through the institutes and centres of the Academy of Sciences. Line ministries are also important research actors through their 26 institutes and six centres. The eight universities mainly focus on teaching but also undertake research, usually through activities and research projects realized jointly with foreign partners. National research efforts are funded from the state budget and from funds available through the Ministry of Education and Science[19].

As part of its reforms to the science and technology system, the Government has identified two major problems to be addressed. The first is to mobilize national funds to support research activities. The second is to promote collaboration with other countries and international organizations. Recently, the Ministry of Education and Science identified 6 national programmes to which funds will be directed. These are: Albanology, natural resources, ICT systems, biotechnology and biodiversity, agriculture and food, and health sciences.

Accessing scientific information

Under the SEEREN project, the Institute of Informatics and Applied Mathematics (INIMA) of the Academy of Sciences is establishing an academic and research network. So far there is no national academic 'backbone' and efforts are directed towards a wide area network for the Academy and its constituent parts. Until recently, INIMA was using a link through Greece under the SEEREN project to obtain its international connectivity. The funds that were being used for this have been re-directed to strengthen the telecommunications facilities of the Academy in order to extend connectivity to all sites.

Universities must therefore find and negotiate their own access to the Internet. In some cases, the universities fund Internet access for senior staff such as Faculty Deans. Other access often proves to be difficult as funds are not available and are at the discretion of each faculty. In the ministries, some research centres are connected as well as some senior individuals. Libraries visited suffer from the same problem and lack connectivity. The Central Scientific Library for instance had an ICT reading room, with several computers, but without any connectivity. Staff at the Faculty of Forestry at Tirana Agricultural University had set up a computer lab with connections for staff and student use, but closed it when staff could no longer afford to pay the

[19] Mucaj, A., 'Albania National Report 2004-2005', prepared for the Ministerial Conference on the Bologna Process, Bergen, 20-25 May 2005 (*www.bologna-bergen2005.no/*).

costs from their own pockets. Three of the ten research institutes in the Ministry of Agriculture and Food are unconnected to the Internet. With the exception of the Academy of Sciences, there is much to do to ensure that research, information and education institutions can afford to connect their staff to the Internet.

In terms of information access, Albanian libraries set up a consortium in late 2004 to negotiate and manage access to international journals. This followed from several years in which first eIFL.net and then the Ministry of Culture, Youth and Sports paid for subscriptions to several resources including EBSCO. At the time of the visit, no institution was willing to pay for the EBSCO access and only the Academy of Sciences library reported that it had paid for institutional licences to use Cambridge University Press, Oxford University Press, CEEOL, and BIO-ONE. The British Council in Albania provides access to some e-resources for its members and four institutions are registered to use HINARI. It was not clear why no one could pay the funds needed for the national access; perhaps the recent establishment of the library consortium is needed to create a mechanism to mobilise shared funds. Certainly, the poor connectivity would surely have made it difficult for users and librarians to use the services offered. Librarians suggested that low status and perceived lack of importance of libraries are major factors why funds were not made available for these resources (and for libraries in general). Only the Academy of Sciences library seemed to be thriving under a very supportive management.

With regard to locally produced and available information, everyone met identified discovering and obtaining information on the results of research in the country as a major challenge. For printed documents (there is still relatively little in electronic form), the main formal mechanism to archive and access documents is via the library. These are reported to exist in every research institute and faculty though their situation (except again in the Academy of Sciences) was universally judged to be poor. Budgets to purchase books and journals are minimal and donations are important sources of foreign information. While some 1500 book titles are published in the country each year (by 153 publishing houses), their distribution and availability seems to be limited. This is partly blamed on the relatively high costs of books as well as on the lack of a reading culture. Officially, five copies of all publications are deposited in the National Library. Staff in the Ministries also said that they (and the institutes they support) submit publications to the National Library (they did not expect their own libraries to maintain institutional collections). The National Library therefore has a key role in indexing national reports and publications. It was not possible to ascertain how access to this information is provided to the users; recent reports talk of a project to automate the library's catalogues. Albanian library collections tend to be closed. Access to the catalogues are vital tools to know what exists and is available to consult. As yet there does not seem to be an operational networking project to link and provide access to the various library collections.

The author's impressions on the situation with libraries coincide with a 2000 report which said that Albanian libraries face many obstacles including: "lack of a national strategy, poor political support, financial problems (lack of funds), lack of well-trained staff (it needs more qualification), building not suitable (lack of space), access to computer network etc. But the social barriers are the most important. Libraries in Albania have a poor social image [...] Albanian politicians do not know well the important role that libraries play in society. It is a sad fact that they

tend to regard libraries as costs and not as an investment."[20] Certainly the Scientific University Library in Tirana was depressing with neither connectivity nor reading rooms, and a collection of older materials rapidly disintegrating in a crumbling building.

One noteworthy initiative in agriculture is the FAO supported AgroWeb Albania web platform[21] that acts as a portal and access point to organisations and information in the sector. Comprehensive in structure, it suffers from irregular updating due to the manager having significant other duties. Of all the countries visited, however, this was the most useful and up to date of the country portals making up the regional network.

Except for the Academy of Sciences that seems to have both good connectivity and a well-functioning central library, researchers generally have poor connections to international information resources as well as difficulties to access locally produced reports and results. Researchers and scientists therefore rely heavily on personal and foreign contacts and networks to find information.

Disseminating scientific information

There does not seem to be a very dynamic and vigorous research publishing and dissemination system in Albania. Respondents indicated that seminars, meetings and workshops are the most important vehicles to share results and find out what others are doing. The exception is the Academy of Sciences which has an extensive publications programme. In 2003, its staff published 24 monographs and books; five journals containing 141 articles were also published. Other institutions and faculties also produce research results and sometimes also journals. However, it was extremely difficult to assess the scale and quality of such efforts. Several institutes, again notably the Academy of Sciences, have launched websites with varying degrees of scientific content.

With regard to online journal publishing, five periodicals published by the Academy of Sciences are listed in the Central and Eastern European Online Library (closed access)[22]. No other electronic versions of local journals could be identified.

Conclusions

In Albania, the main scientific information access and dissemination challenges can be summarised as:

1. Internet connectivity. Access to the Internet is a serious problem. The lead national agency, INIMA, is focused mainly on the Academy of Sciences network. Others find their own way.

[20] IFLA/FAIFE, 'Libraries and Intellectual Freedom: Albania', 2000 (*www.ifla.org/faife/report/albania.htm*).

[21] See *www.albania-agroweb.net*.

[22] See *www.ceeol.org*.

Policies and funding are needed to provide all researchers with affordable access. Additional funding may be needed for the national academic and research backbone.

2. International e-resources. There is a major problem accessing and paying for e-resources and other international content. The library consortium needs support, libraries need regular and reliable funding, library staff and users need training and awareness-raising. In general, additional funds for e-resources will require parallel improvements in connectivity.

3. Accessing local research. Finding information seems to be almost totally dependent on personal contacts and networks. The libraries need much support to get their collections indexed and accessible online, their staff need to be trained in modern electronic strategies and tools, and up to date content needs to be purchased (and old materials perhaps discarded). The former inter-library cooperation needs to be revived and re-directed to address some of the emerging opportunities and problems associated with the use of new ICTs in libraries. In general, the low status of libraries and absence of in-country professional training are significant limitations that need to be addressed.

4. Science publishing. It is difficult to get an overall picture of how much publishing and dissemination is going on. As is mentioned above, most of the local libraries can't provide easy (or even difficult) access to this information. The Academy is certainly a local leader. However, international journal citation indexes show very few Albanian authors publishing internationally. There is probably a local market for more locally produced research and science products perhaps written in more accessible forms as well as for peers; and researchers seems to need additional training and support to help them publish in regional and international journals.

Scientific Information in Bosnia and Herzegovina

The scientific context

The S&T general framework in Bosnia and Herzegovina is rather complicated. In the Bosnian Federation, while there is a Federal Ministry of Education and Science, the ten Cantons are actually in charge of S&T policies. In the Srpska Republic, the Ministry of Science and Technology is centralised at the level of the entire entity.

In Sarajevo, there is a long established Academy of Sciences and Arts of Bosnia and Herzegovina (ANUBiH). It is divided in six departments that may form working groups with a scope to initiate, study and evaluate various aspects of scientific and artistic activities. Four sub-units within the Academy are listed as conducting research on Balkanology, lexicography, philosophy, and medicine. The Academy publishes several periodical and other reports, though none since 2003[23].

Scientific research is concentrated in the eight universities and their 90 or so faculties and institutes: "After the war in Bosnia-Herzegovina (1992–95) during which most of the research infrastructure was destroyed (or became obsolete), scientific research activities have been significantly reduced and universities have become the main places where research is still conducted. [...] In the past one or two years, there has been a gradual revival of the economy and consequently a return of researchers from the domain of commerce and industry onto the research scene. However, their percentage share in the total activities in science in Bosnia and Herzegovina is still significantly lesser than that of the university research sector"[24].

Accessing scientific information

On the basis of a project supported by the Slovenian Government, universities met together in 1998 to establish BIHARNet as the academic and research network of Bosnia and Herzegovina. However, due to a lack of political and other types of support, stable financial resources have not been made available to the organisation and it has not really functioned since 2001, although much of the infrastructure is in place.

Thus, individual institutions and individuals tend to find and establish and pay for their own networks and Internet connections. The University of Sarajevo, for instance, has a 'University Tele-information Centre' that supports faculties and whose projects include setting up an e-Learning Support Centre.

[23] According to the Academy's web site: *www.anubih.ba/*

[24] Tanović, L., 'Bosnia and Herzegovina National Report 2004-2005', prepared for the Conference of European Ministers Responsible for Higher Education, Bergen, 20-25 May 2005 (*www.bologna-bergen2005.no/*).

The result is a very inconsistent Internet access and connectivity for the scientific community with some enjoying good access and some only very limited access or none at all.

In terms of access to international information resources, several libraries have formed the 'Electronic information consortium for Bosnia and Herzegovina libraries.' With support from the eIFL.Net foundation and coordinated by the National and University Library of Bosnia and Herzegovina (NUB), the consortium provides access to the EBCSO database and, at the time of the visit, it was also negotiating access to further resources such as the Web of Science, Science Direct, and Emerald. In 2004 and 2005, this access was financed by the Ministry of Science and Education of the Canton of Sarajevo (on behalf of the Federation of Bosnia and Herzegovina). Funding possibilities after 2005 were not yet secured. The Institute for Research and Development at the Sarajevo Clinical Centre is the only registered HINARI user in the country – it is now in its second year using the service and has had no problem so far to raise the necessary $1000 per year subscription costs. This resource is, however, only available to staff and users of the Institute library and is not directly accessible to other medical libraries and researchers. It was suggested that few libraries are subscribing to books or journals in paper format.

In terms of e-resource usage, it is not possible to see from the NUB web site how to access these materials. Nor, given the limited Internet access of students and researchers that was talked of, is it clear how much usage can be expected of such resources[25]. The NUB has included training in e-resource usage as part of its Centre for the Permanent Education of Librarians that has received support in the past by UNESCO. The Clinical Centre reports heavy usage of HINARI; they also were able to re-allocate limited journal subscription funds to pay for 33 important titles not available through HINARI.

In terms of access to the information held within the countries research libraries, each institute and faculty is thought to have a library of some sort. The consortium above reports 68 member libraries, though not all of these have fully automated and up to date catalogues of their holdings. After a gap, the Virtual Library of Bosnia and Herzegovina (ViBBiH) project based on the COBISS system[26] was reactivated in April 2005 with 12 participating libraries. The plan is to extend this so that all libraries are participating and access to the complete library holdings can be provided to users.

Disseminating scientific information

Staff at the National and University Library estimate that there are some 200 journals published in the country and perhaps 1000 new book titles each year. Of course, not all of these are regular nor scientific in focus, certainly not the books and monographs. It was suggested

[25] A positive commentary on EBSCO is however given in an article about the Human Rights Centre Library at the University of Sarajevo. According to the librarian "Our happiness was endless." See Madacki, S., 'From dusty storage to library without walls: librarian in wonderland', in Proceedings ALA Annual Conference, 2001 (*http://eprints.rclis.org/archive/00000357/01/madacki1.htm*).

[26] See: *www.cobiss.ba*.

that perhaps two local journals (one in mathematics and one in medicine) were indexed in international databases and so could be thought to meet international quality standards.

With regard to online journal publishing, six mainly cultural, literary, and historical titles are listed at three main sources: the Central and Eastern European Online Library (closed access), the 'Open Book' project that supports book and library activities in the country as well as hosting some journals in full text, and the 'Communication' NGO project currently hosted on the web site of the Serbian-American Centre[27].

Conclusions

In Bosnia and Herzegovina, the main scientific information access and dissemination challenges can be summarised as:

1. Internet connectivity. For many researchers, scientists and especially students, access to the Internet is still limited. A major bottleneck is linked with the absence of an effective NREN – BIHARNet – that can provide affordable access to the entire research community. Policy seminars were suggested as possible tools to sensitise necessary institutions and officials to the need for connectivity.

2. International e-resources. The short-term situation is positive, as national licenses for some resources have been negotiated and paid for by the Sarajevo Canton. A more sustainable model will be needed to share costs across all the benefiting institutions. It is likely that use of the e-resources is held back by lack of connectivity.

3. Journal publishing. There seems to be many journals published in the country and there are suggestions that the quality is not very high. It was suggested to review and rationalise these and give support to selected journals to improve their quality and help them get international recognition.

4. Online journal publishing. The few titles that are online are difficult to find and not all the archives are available online. Greater visibility and archiving is needed. For locally published journals that are not dependent on subscription income, moving to full-text online might be an appropriate strategy.

5. Accessing local research. It is important that the libraries work together to ensure that all locally published research is properly indexed and can be discovered through the COBISS union catalogue and bibliographic databases. This means extending the number of participating libraries and collections (which has implications for connectivity and training). Institutional repositories may offer additional opportunities to manage and access the full text of locally published research.

[27] See: *www.ceeol.org*, *www.openbook.ba*, and *www.komunikacija.org.yu*.

Scientific Information in Croatia

The scientific context

According to Polić Bobić[28], the July 2003 Act on Scientific Activity and Higher Education gives an important role to scientific research in the activities of all universities in Croatia. It is mentioned that 71% of public funds for research in Croatia are allocated to the six public universities with their 70 plus faculties. Alongside the universities, there are more than 30 independent public research institutes, many of which were once part of the university system. The Croatian Academy of Sciences and Arts promotes and organizes scientific research and publishes the results of scientific research and artistic creation. The Academy is also responsible for a number of research centres and institutes. We thus see quite a large scientific establishment with especially a large number of different locations where science is being carried out. The Ministry of Science, Education and Sports has overall public responsibility for the sector.

Accessing scientific information

Internet access for Croatian science is mainly delivered through the Croatian Academic and Research Network (CARNet). Established in 1991 and mainly funded by the Ministry of Science, Education and Sports, CARNet aims to develop and provide advanced information and communication infrastructure for the academic and research community, including fast and safe networks, and diverse contents and services. CARNet currently provides ICT infrastructure to all scientific and academic institutions (including libraries) at more than 300 locations.

Gaining reliable and fast access to the Internet does not seem to be a problem for scientists in Croatia. Indeed, CARNet is now beginning to provide various additional services such as databases and e-learning, and is experimenting with various prototype projects concerning access to content, network authentication etc.

As would be expected from such a science system, there are many information access and dissemination systems and services. Each institute and faculty – and often each department – has a library that collects and indexes documents for their constituents. These libraries are beginning to get automated and many now provide access to their library collections via the Internet[29]. Compared to the other countries in the sub-region, it is quite possible for a researcher to find what holdings his or her library has and also what other libraries have. It is

[28] Polić Bobić, M., Croatia National Report 2004-2005, prepared for the Conference of European Ministers Responsible for Higher Education, Bergen, 20-25 May 2005 (*www.bologna-bergen2005.no/*).

[29] A good start is the web page maintained by the Ruđer Bošković Institute where dozens of libraries and their online public access catalogues (OPACs) are listed. See *http://nippur.irb.hr/eng/crolibs.html*.

not yet possible to easily search across them all[30] and the content is also primarily bibliographic – it describes and locates full-text items (usually paper).

In addition to the various library catalogues and union catalogues of different library clusters, the Ministry of Science supports a series of information access systems coordinated by the Ruđer Bošković Institute. The Croatian Scientific Information Network comprises and gives access to library collections through three subsystems: humanities (*http://szi-humanistika.ffzg.hr/* with 32 participating libraries), natural sciences (*http://prirodo.irb.hr/* with 27 participating libraries), and biomedical sciences (*http://smk.mef.hr/biomed.htm* with 10 participating libraries). Each network aims to build databases in participating libraries (books, periodicals, theses etc.), build online union catalogues, and make the databases searchable through the web.

The Ruđer Bošković Institute also hosts the Croatian Scientific Bibliography (*http://bib.irb.hr/* – CROSBI) for the Ministry of Science, Education and Sports. The project started in 1997 with the main goal to collect data on scientific outputs of research projects financed by the Ministry. Today CROSBI provides a comprehensive overview of all the literature produced by Croatian scientists. Scientists themselves provide the data into the database. Furthermore, through CROSBI it is possible to build a digital archive of full-text papers (though this may not yet be widely used). As the table below shows, the project has mobilized a substantial information base on Croatian research outputs. The critical success factor seems to be that all academics and scientists are required to have a CROSBI number (and updated information on themselves) before they can submit a funding proposal or act as a peer reviewer.

A third major player in providing access to library holdings is the National and University Library which maintains a number of national databases of books, theses, journals and so on. The primary resource is the CROLIST (*http://nskcrolist.nsk.hr/*) that provides web access to the catalogues of some 43 libraries, including several universities and faculties. The library is also the base for some bibliometric research involving the compilation of full-text databases of leading Croatian journals.

These systems provide access to the holdings of many libraries serving research and science in Croatia.

What about access to international literature? Here again, Croatian scientists have a wealth of opportunities. The Centre for Online Databases at the Ruđer Bošković Institute is supported by the Ministry of Science, Education and Sports and gives access to a large range of international databases in science, technology and medicine. Also with funds from the Ministry, the National and University Library subscribes to a further set of databases and full-text resources. Between these systems, the subject coverage is very broad.

[30] The 'Ruđer Bošković' Institute has a multisearch option for some databases (See *http://preskok.irb.hr/*).

It seems that some efforts were made to set up a consortium for the libraries to collaborate in purchasing and promoting the use of these resources but that, so far, has not taken off.

Some CROSBI Statistics

YEAR	1996-1999	2000-2003	2004	>=2005	TOTAL
Books	1077	1453	417	46	2993
Book chapters	2662	4079	978	103	7822
Textbooks	535	588	155	18	1296
Scientific papers in CC journals	3927	4601	1368	360	10257
Professional and other papers in CC journals	205	240	77	22	544
Articles in a journal stated in NN 2197	3431	2567	0	0	5998
Papers in other journals	8837	10355	2724	258	22190
Conference report in CC journals	107	327	55	12	501
Papers sent to journals	0	5	586	800	1392
Invited lectures	1589	2296	734	74	4694
Conference papers with international peer-review	4874	6906	1822	116	13718
Other conference papers	2999	3330	766	117	7213
Abstracts in Book of abstracts and unpublished papers	6253	8931	2854	310	18352
Dissertations, master thesis	1974	2151	568	74	4767
Graduation thesis	3172	3839	1095	117	8223
Other papers	2728	2944	863	108	6645
Patents	117	72	35	0	226
TOTAL	**44487**	**64684**	**16097**	**2636**	**116831**

Source: http://bib.irb.hr/: Downloaded 31 May 2005

In terms of access to library holdings, this is the only country of the former Yugoslavia that is not participating in and using the COBISS system. In other countries, this has the advantage of bringing all or most of the libraries together around a single project. In Croatia, there is more diversity – which can be positive – but also more potential for uncoordinated efforts and duplicated effort.

We can conclude that Croatian scientists have 'access' to major portions of the international literature and databases and that the products of Croatian scientists held in libraries or in CROSBI are increasingly accessible online via library and bibliographic projects. There are some challenges still: there seem to be two main parallel and perhaps competing information access systems led by the National and University Library, on the one hand, and the Ruđer Bošković Institute, on the other. It is not clear how they relate to one another, nor, as CROSBI gains momentum, how they relate to its index of local research outputs. All are funded from the same source. Furthermore, one wonders how many individual academics or researchers are fully or even partially aware of all the rich and diverse developments and possibilities designed and made available to them by the various systems.

Disseminating scientific information

In terms of scientific papers, CROSBI shows that there is a substantial output. Croatia is also one of the few countries in the region to stand out in terms of the publications listed in international citation indexes with approximately 0.14% of all records in 2003[31].

Local journal publishing seems to be thriving in the country with most institutes and departments producing a journal of some type. These are very much used as a basis for exchange (to obtain foreign titles) and to provide visibility for the institution's work. The National and University Library estimates that there are some 200 scientific journals published in all subjects in Croatia. Of these, 13 are indexed in the ISI databases, indicating that they meet international quality standards regarding their contents and frequency.

With regard to online journal publishing, 14 mainly cultural, literary, and historical titles are listed at Central and Eastern European Online Library (closed access), 23 titles by the 'Communication' NGO project currently hosted on the web site of the Serbian-American Centre and nine titles are listed on the Directory of Open Access Journals[32]. Some other journals may also be published on institutional web sites in full text though it is not easy to find a list anywhere[33].

While there are no institutional repository projects yet, more and more Croatian content is being made available online – though it is often not very visible. There are several projects being developed. The University of Zagreb Computer Centre and the National and University Library are experimenting to build a digital archive of core Croatian journals in full text. The Computer Centre is also looking into an open access portal to Croatian journals and magazines. The Medical Faculty at Zagreb University is exploring use of an institutional archive to disseminate its PhD thesis. More generally, there is growing interest in open access and a proposal has been submitted to the Croatian Academy of Sciences and Arts to lead and be an exemplar in this area, with the overall goal to set up a single peer reviewed scientific information access portal for Croatia.

In terms of the popularisation of science, a recent study[34] suggests that communication between scientists and the general public is "very limited". Moreover, "the public is not sensitised to debates about science, or to intrascientific communication. The public interest in scientific discoveries is very small. People do not perceive such discoveries as having an impact on their lives. Science is generally treated as an area of narrow interest, intended for professionals."

[31] Alma Swan, personal communication.

[32] See *www.ceeol.org*, *www.komunikacija.org.yu*, *www.doaj.org.*

[33] The Electronic Journals Online Library at the Ruđer Bošković Institute lists all e-journals available to it, including some 20 or so journals published in Croatia. See *http://ejol.irb.hr/*.

[34] Švob-Đokić, N., 2002, 'Research and Development Policies in the Southeast European Countries in Transition: Republic of Croatia', Zagreb, IMO, *www.imo.hr/culture/publics/svob01/*; see pages 101-102 in particular.

Conclusions

In Croatia, the main scientific information access and dissemination challenges can be summarised as:

1. Connectivity. This does not seem to be an issue for the scientific community.

2. Access to international literature. This is good. The cooperation among the main Croatian actors needs to be improved; an inter-library platform or consortium to discuss and direct these issues at the national level might assist in this. It is not clear how aware the end-users are of the many rich possibilities available to them.

3. Library systems. There is a lot happening with not as much collaboration as might be desirable. As with the international databases, the various systems can be confusing to the end-users.

4. Scientometrics. There is considerable interest and expertise in using bibliometric methods to measure productivity and publishing patterns. This is an asset that other countries could benefit from; it would be useful to find ways to ensure that databases for research purposes can also be used, for example, as searchable full-text resources for end users.

5. Online journals. There is considerable interest in open access publishing of Croatian journals, as well as in providing an easy access to them.

6. CROSBI is an interesting science 'management' tool of the type that other countries mentioned as being of high importance to them. As institutional repositories and open access archives and journal platforms emerge to index portions of Croatian science output, the role of CROSBI and its connections with the new platforms will become critical. To avoid duplication and re-entry of information, it may be necessary to re-think CROSBI as some kind of 'meta' scientific information archive aggregating data from the other platforms.

7. Science information portal. With expanding Croatian content on the web and the many different information exchange databases and systems, a science 'start' page may be needed to guide users to all the various opportunities.

Scientific Information in FYR of Macedonia

The scientific context

According to Uzelac[35], "the governmental body in charge of research and science policy is the Ministry of Education and Science with the responsibility to organise, finance, develop and promote research, technological development, technical culture, informatics and information systems as well as international cooperation related to these issues." As elsewhere in the region, the faculties of the universities are important centres for science and research. The Macedonian Academy of Sciences and Arts is also an important player with its 5 research institutes. Within the Government, other Ministries covering different aspects of R&D are the Ministry of Agriculture, Forestry and Water Supply and the Ministries of Economy, of Health, and of Environment and Physical Planning.

National budgetary support is provided to national and international research projects, publishing, grants for postgraduate and doctoral studies in the country and abroad, R&D meetings, participation of academics in international meetings and study visits, programmes of the public research institutes, equipment, R&D literature etc. The Ministry of Education and Science is finalizing new regulations on the financing of scientific research and it is also finalizing a draft proposal for a new Law on Science and Development that will bring national legislation closer to the European regulations and lead to some reorganization of science towards more applied projects.

Accessing scientific information

All respondents indicated that researchers and academics have generally high levels of e-literacy and can generally get access to computers and other ICT facilities. Internet connectivity can sometimes be a problem however.

The national research and education network provider is MARNet. Established in 1994, it provides international and national networking services to the Macedonian academic research and educational community and support to their research and educational activities. It also promotes and disseminates the use of ICTs in the academic and research sector. Through the SEEREN project, MARNet provides fast international connections to the Internet. It is also working to improve the national academic and research 'backbone'. In early 2005, however, these plans were threatened when EU support for the international SEEREN connections ended and

[35] Uzelac, N., 'Macedonia Report 2004-2005', prepared for the Conference of European Ministries Responsible for Higher Education, Bergen, 20-25 May 2005 (*www.bologna-bergen2005.no/*).

national funds could not be mobilised to pay the costs until the start of the SEEREN2 project later in the year[36]. Mobilising national funds to pay for these international connections is therefore a major challenge for MARNet. It is not aided by the fact that many faculties and research institutions do not currently subscribe to MARNet, instead making use of other local Internet providers. In a competitive environment, MARNet needs to prove its value.

The **Central Library of the Medical Faculty of the University 'St Cyril and Methodius'** has recently begun participation in HINARI. The library has around 55,000 books, 2,800 Doctoral and Masters theses, and 65,000 volumes of periodicals. It is a depository for WHO publications. It services around 700 medical staff of the Faculty. Its catalogues are being computerized to allow staff to search the library's holdings. Most academics have access to computers and the Internet (not through MARNet). In recent years, the library purchased no books and subscribed to no journals. In 2005, it took out 22 subscriptions and subscribed to HINARI. This now provides access to most of the core medical literature needed. Weak areas in the Faculty include absence of a local area network, and absence of good indexes of medical information produced in the country and region as a whole (*www.cmb.edu.mk*).

In terms of access to scientific literature and information, the situation is similar to other countries in that each faculty and institute has its own library of books, journals, and reports. In recent years, funds for purchase have been very limited and only institutions with international projects seem to have been able to purchase some of the information they need. The libraries are just beginning to get automated so that users can know what information resources they hold. In principle, theses and other research outputs are deposited in the libraries – though they may not be properly indexed nor readily found. In 2003 and 2004, there was some support for a consortium based around the 'St. Clement of Ohrid' National and University library to collectively purchase international journals and databases. For 2005, funds for the subscriptions have not been forthcoming and the consortium needs to mobilize political and financial support. Hence, no international databases or journals packages are available to the country's researchers. Several institutions in the medical sector do, however, subscribe to the HINARI service sponsored by the WHO. This provides them with much information but is of limited use to other institutions who are not able to benefit from this access.

A national virtual library based on the COBISS system and technology is just beginning (or restarting) with some 22 participating libraries.

With information generally difficult to access through the libraries, academics and researchers count on their personal contacts and networks to find information they need.

[36] It was reported that students complained of weak connections caused by the inability of the Government to pay the necessary costs. See: *www.metamorphosis.org.mk/eng_vesti_detal.asp?id=294.*

Disseminating scientific information

As in the other countries, Macedonian researchers and academics are encouraged to publish their findings in international journals. The numbers published, however, remain small and, as is evidenced above, the journals are mostly not accessible within the country. There are pockets of productivity, such as the Research Centre for Genetic Engineering and Biotechnology of the Macedonian Academy of Sciences and Arts, where research is regularly published in international journals and indeed where an international journal is itself published. It benefits from an extensive network of international contacts and collaborators that seems to contribute to this productivity.

According to staff at the National and University Library, some 44 scientific journals that also aspire to international standards are published in the country (but only 26 on a regular basis). Members of the Medical Faculty mentioned that many people are keen to write for and to produce journals, but that the costs are often too high to sustain a regular publication schedule. With regard to online journal publishing, three mainly cultural, literary, and historical titles are listed at Central and Eastern European Online Library (closed access), one title by the 'Communication' NGO project currently hosted on the web site of the Serbian-American Centre and one title is listed on the Directory of Open Access Journals[37]. Various institutions like the Academy of Sciences are experimenting on a small scale with electronic publishing of their books and proceedings. The same institute is also keen to investigate the potential of open access publishing as a strategy for Macedonian science.

Aside from the journals, the large number of theses and dissertations generated through the universities represent a large proportion of the visible scientific outputs of Macedonian science. Their dissemination is, however, very limited and identification and access is not easy.

Conclusions

The main scientific information access and dissemination challenges can be summarised as:

1. Connectivity. It seems that the academic and research community has found ways to get itself connected, usually through independent action. However, the weak position of MARNet means that many potential in-country research collaboration synergies and benefits are not being obtained.

2. International journal access. There is currently very little access except in a few cases. Existing subscriptions cannot be paid for. An urgent case needs to be made to obtain recurring support for countrywide affordable access, and to demonstrate the value of these resources by getting them widely used and appreciated.

[37] See: *www.ceeol.org*, *www.komunikacija.org.yu*, *www.doaj.org.*

3. Library holdings. Much of the content of the libraries is just getting catalogued in an electronic format suitable for users to query. The virtual library project is a promising way to move forward and other libraries need to be encouraged and supported to join. Special attention could be given to dissertations and theses to make sure they are all indexed.

4. Journal publishing. A move to open access electronic journal publishing might be a feasible way to meet the demand by authors to publish, while also keeping the production costs low.

Scientific Information in Montenegro

The scientific context

Scientific research in Montenegro is centred in the faculties of the University of Montenegro and in several independent and government research institutes. The Ministry for Education and Science has the lead role in the Government. The Montenegrin Academy of Sciences and Arts does not itself conduct scientific research, it acts instead as a forum for science excellence, dialogue, publishing and cooperation.

While the Government of Montenegro is favourable and respectful with regard to science and research, it faces problems with its financing. In 2004, the Government financed teaching processes with 0,9 % of GDP, allocating only 0,1% of GDP to research work. Nevertheless, since 1990, the Ministry of Education and Science has supported around 500 research projects, 40% of which were in natural sciences and engineering, 45% were in biotechnology and medicine and the remaining 15% were in the social sciences and humanities. The scientific community in the country is relatively small: the Academy of Sciences and Arts has less than 40 members and the University has some 750 staff with postgraduate qualifications. It is therefore considered vital that the research community participates actively in international cooperation activities and gets involved in the creation of a knowledge-based society.

An important recent development is a new law on higher education (September 2004) that adopts the principles of the Bologna Declaration. This is expected to have positive impacts on teaching process as well as on all the other university activities. It also stipulates that the Ministry of Science and Education should have evidence of all research projects and related data, which is likely to create demands for effective information systems about, among other things, research outputs and information.

Accessing scientific information

Internet connectivity for the academic community was not a major issue raised during the visit. The University and the Academy of Sciences and Arts are both connected to the European Internet backbone through the Academic and Research Network of Yugoslavia (AMREJ) that is supported by the Montenegrin and Serbian Governments. The University also has an internal academic network available for each faculty and institute and is accessible to all University units in Montenegro.

It is important to note that Montenegro was under UN sanctions for a time and communication abroad barely existed. Today, the situation is a bit better but not good enough, since the communication of researchers with those from abroad is still based on personal level, realized

through personal contacts that also often help with procuring of international scientific books and publications.

According to the Virtual Library of the Montenegro web site[38], "Montenegrin libraries are relatively small, with inadequate technological equipment (obsolete, or even no computer and communications equipment), inadequate staff structure, and insufficient specialised knowledge etc." A symptom of these challenges perhaps is that the web site to access the virtual library seems to be frequently offline or not available.

In general, the situation regarding access to international scholarly information is very poor. It seems that some subscriptions to e-resources were paid in previous years, but that funds are now not available. The Academy of Sciences Library does report some journals received in exchange for their own products.

It is official policy that research outputs like reports and theses should be officially deposited inside institutional libraries. In reality, this is not always the case and identifying and tracking locally produced reports is a major challenge.

In terms of access to information resources held by libraries in the country, there is a project in Montenegro to create a Virtual Library using the COBISS platform. The aim of this project is to join Montenegrin libraries in a uniform information system that will enable library users to access information and documents created within the country and also in the other participating countries (Bosnia and Herzegovina, Serbia, FYR of Macedonia, Montenegro, and Slovenia). The project will bring together the National Library, academic libraries, the Montenegrin Academy of Science and Arts library, libraries of institutes and related research organisations, public libraries, school libraries, and NGO libraries.

Disseminating scientific information

The Montenegrin Academy has a publishing programme in which it produces some 18–20 new books each year and publishes 1–2 issues of various irregular journals each year. Conversations with staff from the university suggests that there is no public dissemination of university research work and publications and that the dissemination and publication of research from Montenegro are mainly based on personal contacts, since there is no official portal where research results of Montenegrin scientists could be seen. Despite the university requiring that its researchers publish their papers in internationally recognized publications to be promoted, there seems to be very little pressure or habit of publishing. In general, there are more text books than research reports published, considering the fact that many university professors write books not only for the University but also for elementary and high school.

[38] See: *http://vbcghome.cnb.cg.ac.yu/cg/vbcg_project-EN.htm.*

With regard to online journal publishing, three titles are listed by the 'Communication' NGO project currently hosted on the web site of the Serbian-American Centre[39]. Web publishing generally seems to be very limited with, for instance, the Academy website not having been updated for a long period and there being few electronic avenues to identify or obtain substantive or full-text information from or about science in the country.

It is clear, however, that the advantage of being a small scientific community is that people tend to know one another and they generally utilize their personal contacts and networks to obtain and share information.

Conclusions

In Montenegro, the main scientific information access and dissemination challenges can be summarised as:

1. Connectivity. This is not generally a major problem for scientists and researchers though access in libraries and for students needs to be expanded.

2. International e-resources. Beyond what can be obtained through personal contacts, there does not seem to be any regular access to international research findings. If academics and scientists are to overcome a perceived professional isolation, this needs to be remedied. One possibility might be to participate in the Serbian e-journal licenses scheme; people in the country expressed interest in a wider regional approach.

3. Accessing local research. The Virtual Library project has great potential to open up access to local information resources. It seems however to be moving very slowly and additional support may be needed to ensure that it meets researchers' needs to discover and exploit what they already have. While it may take a long time for the libraries to get their houses into electronic order, it can be useful to experiment with electronic forms of self-archiving and institutional repositories to ensure that the electronic full text of research outputs can be captured.

4. Disseminating local science. The new Law on Higher Education should stimulate greater attention to the quality and quantity of research outputs as well as having systems to track these. Generally, it seems that incentives to publish (and to document what is published in libraries or electronic repositories) need to be strengthened.

5. Overcoming isolation. There is a general perception that Montenegrin scientists are isolated. The small size of the local scientific community was mentioned as contributing to this, as well as the limited funds available for science. It was mentioned that they lack skills in proposal preparation needed to engage in international ventures.

[39] See: *www.komunikacija.org.yu.*

Scientific Information in Serbia

The scientific context

Compared to other countries covered by this report, Serbia, with Croatia, has many institutes where research is carried out. Scientific research is concentrated in the roughly 110 university faculties and institutes as well as in institutes affiliated to various ministries. The Serbian Academy of Arts and Science is a major player – with its own research institutes (that are frequently affiliated with university faculties).

Accessing scientific information

In recent years, Serbia was cut off from the international scientific and information communities and its institutions are now beginning to be re-connected.

In terms of Internet access, the Academic and Research Network of Yugoslavia (AMREJ) coordinates the development, operation and management of the communication and information network for education and research in Serbia and Montenegro. It is supported by the Federal Secretariat for Development and Science, the Ministry of Science, Technologies and Development and Ministry of Education and Sport of Serbia and the Ministry of Science and Education of Montenegro.

This provides good connectivity to faculties and institutes (that want it) and academic staff generally seem to face few problems getting connected to the Internet. There is considerable variability across Faculties with many (such as the Faculty of Organizational Sciences in Belgrade) having excellent facilities and others (either less rich or giving less priority to connectivity) still awaiting Internet facilities and connection to AMREJ. The Ministry of Science, Technologies and Development pays this academic connectivity centrally.

A recent development in April 2005 was the inaugural meeting of the Academic and Educational Grid Initiative of Serbia (AEGIS). This initiative aims to: coordinate efforts to further develop academic and educational high performance computing facilities (e.g. computers, storage, networks, instruments, and visualization resources), organize dissemination and training activities and help Serbian research communities to develop and deploy applications that can use AEGIS infrastructure; coordinate fund raising efforts to improve AEGIS infrastructure and human resources; facilitate wider participation of AEGIS members in Framework 6 and other international Grid projects; and create a national GRID development policy, and lobby for its position within an overall research agenda.

University of Belgrade Faculty of Organizational Sciences. The Faculty is probably not typical as it generates much of its own income (around 60% of its total budget) from what it calls 'management' services (business solutions and consulting, advice) plus the execution of applied science projects from the Ministry of Science, Technologies and Development. From its own income, the Faculty publishes 3 journals in paper and open access online formats (to exchange and for visibility). The Faculty has its own library (considered the 'weakest' part of the Faculty) and very good connectivity through the academic network. It is experimenting with distance learning and it has developed an e-commerce curriculum that it hopes to deliver with other partners. Unofficial ways to find information were rated as very important, with the diaspora, inter-institutional collaboration, travel and personal contacts highly rated. A major challenge identified was to find information that is published in a decentralised way (*www.fon.bg.ac.yu*).

In terms of access to international literature, the Serbian system is also developing fast. The National Library acts as the hub for a 150 member library consortium that currently provides access to some 13,000 international journal titles and training for students and the research community. It is interesting to note that the National Library has also agreed to purchase 11 HINARI access licenses for the country's medical research centres and libraries. All these licenses are also financed centrally by the Ministry of Science, Technologies and Development through a contract with the National Library. It is possible to access the content of these titles through a sophisticated web interface developed by the National Library.

Strictly speaking, the national 'access' dimension of these international journals can therefore be said to be addressed, the challenge is to ensure that researchers and other users are aware of their existence and are actually using the resources on offer. One respondent at the National Library suggest that their "main problem is how to 'find' all our users and introduce our service to them." Informal discussions suggested that some users were not at all aware of what they could access and thus they often still identify journal access as a continuing problem (which it is if they are not fully aware of what is already in place).

In terms of accessing locally held information, the libraries of faculties and institutes are supposed to act as repositories for documents and theses published by their parent organisations and they are encouraged to participate in the library consortium and in the Virtual Library of Serbia project. This uses the COBISS system and aims to set up an online union catalogue and a library network joining all the libraries in Serbia. In the first phase, an online union catalogue with over 1.3 million bibliographic records was created based on local catalogues of the National Library of Serbia, the 'Matica Srpska' Library, the University Library 'Svetozar Marković' and the Yugoslav Bibliographic-Information Institute. According to recent information, 39 libraries are currently working on the shared cataloguing system[40].

[40] See: *http://vbshome.nbs.bg.ac.yu/SR/vbs_project-EN.htm.*

The **Mathematical Institute of the Academy of Sciences and Arts** acts as a sort of professional network for mathematics in the country. It has about 30 full-time and more than 200 part-time collaborators employed at over 30 different institutions, mostly Faculties of the Universities in Belgrade, Novi Sad, Niš and Kragujevac that are involved in 14 fundamental research and technological development projects funded by the Serbian Ministry of Science and Environmental Protection. It runs a library, organises meetings and seminars etc., hosts research projects, and publishes its own journal (available online in full text). It also contributes to various regional and international projects designed to make mathematics information more accessible. It participates in an international project called Multimedia Technology for Mathematics and Computer Science Education in which its task is to develop a regional mathematical information centre that mirrors sites of the European Mathematical Information Service, the Zentralblatt MATH and MATHDI databases, hosts a database and presentation of Serbian mathematical journals, and gives access to electronic catalogue of the Institute library (*www.mi.sanu.ac.yu*).

This looks to be an excellent strategy and much progress has been made. However, it is not clear to what extent the many research libraries are all able to participate and what the status is of their collections and catalogues (the Faculties of Philology and Philosophy in Belgrade for instance have 15 and 14 departmental libraries respectively). There also seem to be issues around software with some libraries using different packages that might not be compatible with the COBISS system.

Alongside the libraries with their still mainly full-text paper collections and bibliographic indexes, there are several exciting projects in Serbia that aim to index full-text documents and publications.

The most advanced seem to be associated with the Mathematical Institute of the Academy of Sciences where a group of researchers is working to index mathematics journals published in Serbia and the region generally. This work is done in association with 'Zentralblatt MATH' – the world's major abstracting and reviewing service in pure and applied mathematics. Beyond indexing locally published journals, the team are now also moving towards full-text publishing (see below).

Disseminating scientific information

Serbia is the only country visited where there is already a lot of progress and action regarding the online publishing of journals and other documents.

With regard to online journal publishing, 11 mainly cultural, literary, and historical titles are listed at Central and Eastern European Online Library (closed access), 90 titles by the 'Communication' NGO project currently hosted on the web site of the Serbian-American Centre and three titles are listed on the Directory of Open Access Journals[41].

[41] See: *www.ceeol.org*, *www.komunikacija.org.yu*, *www.doaj.org.*

The Mathematical Institute hosts a National Centre for Digitization that promotes and facilitates the digitization of cultural and scientific heritage in Serbia. One of its main activities has been focused on digitising scientific journals and building a collection of links to full-text journals (especially, but not limited to, mathematics). So far, relying on voluntary efforts, they have uploaded the full text of six local journals (115 volumes). Together with the 'Communication' NGO, they have also developed a prototype multilingual search interface to the database as well as links to other full-text journals published in the region.

The National Library recently launched a similar project in cooperation with the Ministry of Science, Technologies and Development. At *www.doiserbia.nbs.bg.ac.yu*, the National Library has begun to allocate DOI numbers to scientific articles of several Serbian journals[42]. These DOI numbers help to improve the visibility of locally published content in international databases. However, a well as providing the unique reference numbers for the five local scientific journals, the web site also offers an index and the full text for recent issues of these journals.

With these projects, Serbia is moving towards an improved indexing of its online journal outputs. There is some way to go however: the National Library estimates that some 500 scientific journals are published in Serbia, of which around 70 are available in full-text online. Moreover, the various online publishers and journals have so far not followed any standards with regard to metadata or formatting which, despite the very commendable efforts, means that it is difficult to easily find, query and harvest the content of the various journals.

Conclusions

In Serbia, the main scientific information access and dissemination challenges can be summarised as:

1. Connectivity. This is not generally a major problem for scientists and researchers in Serbia. Those whose institutions give less priority to access and connectivity may face limitations in terms of access to computers, etc.

2. Access to international journals. Nationally, access to these journals is not a major issue, though many academics and researchers are not aware of what resources are available. It is a major challenge to promote and market these tools.

3. Local publishing. There are many local journals and much local publishing. These ought to be accessible through the many libraries and ultimately through the Virtual Library. Much still needs to be done to get all research libraries up to a level of active participation in collective cataloguing and indexing efforts and making their holdings available online. It was not clear how complete faculty or department libraries are with regard to local research outputs.

[42] A digital object identifier (DOI) is an identifier string (combination of numbers and letters) that can be assigned to an item and provides a unique identifier for that item. The aim of the DOI system is to provide a common format for cross-linking of electronic content from different publishers. In Serbia, see *www.doiserbia.nbs.bg.ac.yu*.

4. Online journals. The various open access electronic journal publishing activities need to be better guided and coordinated nationally, especially regarding the use of standards to ease retrieval and maintain high quality. The National Library's efforts in this direction seem to be a good way to add value to the individual efforts of the many journals by harnessing current thinking and tools regarding online indexing. The different actors and projects need to come together to agree a course of action that makes online publishing easier (technically) and the results more accessible and visible.

5. Promising models and applications. There is much scope to support pilot or experimental projects, especially regarding journal publishing and institutional archives/repositories – to try and capture more locally produced full-text materials alongside the current library focus on bibliographic metadata and indexing. Given the high quality of research in the country, something like the journals project could usefully be developed for theses and dissertations to ensure that they become more visible and accessible.

Conclusions from the Country Visits

The country visits revealed a very mixed situation regarding information access and dissemination. Some institutions seem to be well-endowed, others have very little. Some countries have decided that connectivity is essential for academics and scientists, others leave this up to institutions and individuals.

Systematic access to international journals is not a major technical or financial problem in two of the countries; in the others this access is either very short term, limited to an institution or two, or non-existent – despite efforts in the recent past to provide and sustain this access. Many libraries seem to be struggling to adjust to the new economic and ICT environments and to mobilize political commitment and support. Discovering the information in the libraries is not yet easy – in as much as many have yet to make their collections available electronically and perhaps they do not even hold much of the locally published science outputs.

All of the countries are struggling to document and disseminate their research outputs, especially in international journals. Local journal publishing is widespread (on paper) though it may not be top quality and it is questionable how accessible and visible these journals are locally, regionally and internationally. Experiments with open access online journal publishing are just starting in a few places.

Personal contacts, travel, meetings, workshops, professional associations and networks are all vital access and dissemination mechanisms used by individual scientists and researchers.

The table below present a very simplified comparison of the different countries:

	Connectivity	eJournals	Libraries	ePublishing
Albania	^	^	^	^
Bosnia-Herzegovina	^	^^	^^^	^
Croatia	^^^^^	^^^^	^^^^	^^
FYR of Macedonia	^^	^	^^	^
Montenegro	^^^^	^	^^	^
Serbia	^^^^^	^^^^^	^^^^	^^^

It shows that Albania has the weakest overall scientific information access and dissemination situation (though its Academy of Sciences is well advanced in some areas – connectivity, library, ePublishing). Particularly worrying is the state of the libraries whose resources and collections and staff need to be updated and upgraded. Connectivity in the universities is also a major question mark.

At the other end of the scale, researchers in Croatia and Serbia enjoy good connectivity and wide access to international journals and databases. In both countries also, the various libraries are moving forward to make their collections accessible over the Internet. Here, the major challenges are more associated with capturing and publishing the outputs of national science in full-text format. Montenegro shares the good connectivity of Serbia but does not benefit from access to international journals.

In between are Bosnia and Herzegovina and FYR of Macedonia where there are pockets of access and connectivity but still encounter problems to mobilize funds and commitment for these purposes.

Recommendations

Many ideas and suggestions arose during the course of the mission. These were brought together to help focus discussions in the follow up 'roundtable' discussions in Slovenia. The intention is that several pilot or prototype projects or initiatives could be elaborated and supported in each area.

Accessing International Journals. In several countries, this is a major problem requiring political commitment and sustained recurring funding. Most of the country consortia are struggling and this might be something to investigate on a regional basis, though there is no obvious institutional platform to do this. Once access is gained, the task of marketing services, informing and training users, and demonstrating value (and retaining political support) should not be underestimated.

Online Journals Service. Hundreds of scientific journals are published in the countries visited. Only a few are indexed internationally. Only a few are available online in full text. In Serbia, there is already a project to collect and publish online journals and to link to others. Some titles are available via CEEOL. Perhaps a regional (or linked national) service could be set up to publish and index journals published in the region. Certainly it would be good to stimulate and extend the current activities and to encourage use of international standards that make access easier and increase the visibility of local science outputs from the region.

Open Access Publishing. Some of the journals published in the countries visited seemed to have a business model that depended on subscriptions. Most indeed struggle to publish on time in paper format. Publishing in full text under open access licenses therefore seems to be a promising option for all but a small number of journals that are already commercially published. Such a strategy needs to ensure that journals published in the region are visible and properly indexed and that the content can easily be accessed within the region.

Open Access Archiving. Undoubtedly a lot of research is produced in the countries in the form of theses, reports and other monographs. Each country and institute has regulations to ensure that copies of all such reports are deposited in institutional and national libraries. It is questionable how comprehensive these are in reality. It might be useful to carry out some prototype 'institutional repository' projects in different situations to explore how locally produced research outputs could be properly deposited and archived electronically in full text. Such an approach would match with the increasing desire of Science Ministries to be able to track research outputs in a systematic way. It would thus be useful to explore how CROSBI-like systems could also act as science information repositories. Different approaches to building the same result (institutional repository, researcher 'bibliography', virtual library, online thesis archives) could be explored to ensure that an open access full-text archive of research outputs is built up in each country.

Open Access Position. More generally, it would be valuable for representatives from interested countries to collaborate to discuss and perhaps develop their 'positions' on open access in publishing. With relatively few authors contributing to international journals, most of the countries would benefit more from an open access regime (so called 'author pays') than from the current costly subscription model.

Federated Searching. As the various libraries get organised, we are going to see an increasing number of library catalogues and indexes made available on the Internet. For the end user, it will be necessary that some kind of 'federated' or cross-searching facilities are made available to allow him or her to search across the holdings of different libraries. There are different architectures and tools for this (from Google, to COBISS, to others) that would build on existing cooperative ventures by the libraries. These can be envisioned at country, disciplinary or even regional levels where it is important to build data connections across different types of systems. The prototype regional SEE Science Portal, for example, could benefit from a 'harvesting' approach that brings together content from the dozens of systems that already exist in the region.

Policy Awareness and Commitment. In most of the countries, there is an urgent need to sensitize public sector science policy makers and managers on the issues and opportunities in this area. There is also much experience on this that could be shared across countries in the region. Croatia and Serbia and Montenegro each finance national networks to provide academic connectivity; the other countries do not. Croatia, Serbia and the Sarajevo Canton each pay for national licenses to access international ejournals; the others do not. The arguments for information and ICT investments in relation to national educational, scientific, and developmental goals need to be made much more strongly to motivate greater and recurring political and financial support for the information dimension of science (e-Science). These arguments will benefit from 'evidence-based' approaches that illustrate and demonstrate the benefits that current or past investments have created.

Library Strengthening. Each country has some kind of consortium or association that, among other things, seeks to manage access to e-resources, provides training, and develops cooperative projects like union catalogues of holdings. Though very new, these offer interesting possibilities to collectively make local information accessible and sustain international database access. They need additional support and resources to reach their potentials. More generally, many libraries need to be encouraged and supported to take on modern electronic services and roles in support of science and research – working with full text as well as bibliographic information and making their holdings easily available and accessible to their users. A major part of this is to show that libraries are relevant and useful and to re-tool the libraries and the librarians to meet emerging demands.

Regional Cooperation. After a turbulent recent history, there is much mutual suspicion in the region. This would seem to call for a series of country based initiatives. However, there is also much to be gained from pooling resources and capacities in some of these areas – avoiding also reinventing wheels and processes. Some promising steps have been taken but have so far struggled to make an impact. These need to be examined and re-vitalized where necessary. For

some of the activities mentioned here, there may need to be some kind of regional forum to take them forward – such as for example the existing inter-academy collaboration.

Thematic Portals. All the countries have research in health/medicine and to a lesser extent in agriculture. There is also a major interest in Balkan history and culture. There may be scope to revive or re-create some regional initiatives to ensure that these science and research outputs are made visible and accessible to audiences in the region and beyond. The agricultural community has a regional system that needs reinforcing. The medical information community no longer works together on its joint 'index medicus'. Some of these regional exchanges could be given special attention within any follow up on open access archiving or publishing.

Communicating Science. Hardly no one mentioned any efforts being made to promote or popularize or communicate science in the wider population or among audiences such as policy makers or school children. This looks like a missed opportunity in terms of broadening the support base for science and attracting people to be scientists. Without such understanding and awareness, science and research may be considered as an 'ivory tower' and irrelevant, especially when the results and outputs are difficult to locate and rather invisible outside their small communities. No concrete suggestions were made during the visits.

Accessing the UNESCO knowledge base. Several people mentioned that they wished to receive more information from UNESCO and to benefit from its communication and outreach efforts.

ANNEXES

ANNEX I

Scientific and Information Institutions in SEE Countries

Albania

Academy of Sciences of Albania	Academy
Centre for Geographical Studies	Academy Research Institute
Centre for Hydraulic Research	Academy Research Institute
Centre of Albanian Encyciopedia	Academy Research Institute
Centre of Art Studies	Academy Research Institute
Institute of Archaeology	Academy Research Institute
Institute of Biological Research	Academy Research Institute
Institute of Economy	Academy Research Institute
Institute of History	Academy Research Institute
Institute of Hydrometeorology	Academy Research Institute
Institute of Informatica and Applied Mathematics	Academy Research Institute
Institute of Linguistics and Literature	Academy Research Institute
Institute of National Culture	Academy Research Institute
Institute of Nuclear Physics	Academy Research Institute
Institute of Seismology	Academy Research Institute
Agricuiture Research Institute	Government Research Institute
Fisheries Research Institute	Government Research Institute
Food Research Institute	Government Research Institute
Forage Research Institute	Government Research Institute
Forest and Pasture Research Institute	Government Research Institute
Fruit Trees Research Institute	Government Research Institute
Maize and Rice Research Institute	Government Research Institute
Plant Protection Institute	Government Research Institute
Soil Research Institute	Government Research Institute
Tobacco Institute	Government Research Institute
Vegetable and Potato Research Institute	Government Research Institute
Veterinary Research Institute	Government Research Institute
Zootechnical Research Institute	Government Research Institute
AgroWeb Albania	Information Provider
British Council Albania	Information Provider
National Library	Information Provider
Academy of Arts	University
Academy of Sports and Physical Training	University
Agricultural University of Tirana (3 faculties)	University
Polytechnic University of Tirana (4 faculties)	University
University of Elbasan (5 faculties)	University
University of Gjirokastra	University
University of Korça (3 faculties)	University
University of Shkodra (5 faculties)	University
University of Tirana (7 faculties)	University
University of Vlore (4 faculties)	University

Bosnia and Herzegovina

Academy of Sciences and Arts of Bosnia and Herzegovina	Academy
Agricultural Institute, Banjaluka	Government Research Institute
Balkanology Research Center	Academy Research Institute
Centre for Medical Research	Academy Research Institute
Lexicographic Department	Academy Research Institute
Philosophical Research Center	Academy Research Institute
Center for Advancement of Agriculture, Sokolac	Government Research Institute
British Council Bosnia and Herzegovina	Information Provider
National and University Library of Bosnia and Herzegovina	Information Provider
National and University Library of the Republic of Srpska	Information Provider
Open Book Project	Information Provider
Public and University Library, Tuzla	Information Provider
Virtual Library of BiH	Information Provider
Bosnia and Herzegovina Academic and Research Network (BIHARNET)	Internet Provider
'Dzemal Bijedic' University of Mostar (7 faculties)	University
University of Banja Luka (13 faculties; 5 institutes)	University
University of Bihac (5 faculties)	University
University of East Sarajevo (16 faculties)	University
University of Mostar (7 faculties)	University
University of Sarajevo (23 faculties; 4 institutes)	University
University of Tuzla (13 faculties)	University
University of Zenica (3 faculties)	University

Croatia

Croatian Academy of Arts and Sciences (9 departments)	Academy
Institute of Historical and Social Sciences	Academy Research Institute
Institute for the History and Philosophy of Science	Academy Research Institute
Linguistic Research Institute	Academy Research Institute
Adriatic Institute	Academy Research Institute
Institute for the Paleontology and Geology of the Quarternary Period	Academy Research Institute
Institute of Ornithology	Academy Research Institute
Institute for the History of Croatian Literature, Theater and Music	Academy Research Institute
Institute for Scientific Work in Varaždin	Academy Research Institute
Institute for Corrosion Research and Desalinization in Dubrovnik	Academy Research Institute
Institute for Historical and Social Sciences in Rijeka	Academy Research Institute
Institute for Historical Sciences in Zadar	Academy Research Institute
Institute of Historical Sciences in Dubrovnik	Academy Research Institute
Institute for Scientific and Artistic Work in Split	Academy Research Institute
Institute of Historical and Social Sciences, Zagreb	Academy Research Institute
Institute for Scientific Work in Osijek	Academy Research Institute
Civil Engineering Institute	Independent Research Institute
Croatian Entomological Society, Zagreb	Independent Research Institute
Croatian Institute for History, Zagreb	Independent Research Institute
Croatian Philological Institute, Zagreb	Independent Research Institute
Economics Institute of Zagreb	Independent Research Institute
Forest Research Institute, Jaska	Independent Research Institute

Hydrographic Institute, Split	Independent Research Institute
Institute for Adriatic Crops and Karst Reclamation, Split	Independent Research Institute
Institute for Agriculture and Tourism, Poreč	Independent Research Institute
Institute for Anthropological Research, Zagreb	Independent Research Institute
Institute for Applied Social Research, Zagreb	Independent Research Institute
Institute for Archaeology, Zagreb	Independent Research Institute
Institute for Diabetes 'Vuk Vrhovec', Zagreb	Independent Research Institute
Institute for International Relations	Independent Research Institute
Institute for Medical Research and Occupational Health, Zagreb	Independent Research Institute
Institute for Oceanographic and Fishery Studies	Independent Research Institute
Institute for Tourism, Zagreb	Independent Research Institute
Institute of Art History, Zagreb	Independent Research Institute
Institute of Economics, Zagreb	Independent Research Institute
Institute of Geology, Zagreb	Independent Research Institute
Institute of Immunology, Zagreb	Independent Research Institute
Institute of Medical Research and Occupational Health, Zagreb	Independent Research Institute
Institute of Oceanography and Fisheries, Split	Independent Research Institute
Institute of Physics, Zagreb	Independent Research Institute
Institute of Public Finance, Zagreb	Independent Research Institute
Agricultural Institute, Osijek	Independent Research Institute
'Ruđer Boskoviać' Institute, Zagreb	Independent Research Institute
Zagreb Institute for Social Research	Independent Research Institute
British Council Library	Information Provider
Center for Online Databases	Information Provider
Croatian Information Documentation Referral Agency (HIDRA)	Information Provider
Croatian Scientific Bibliography (CROSBI)	Information Provider
Croatian Scientific Information Network (CSIN)	Information Provider
National and University Library	Information Provider
Public and University Library, Osijek	Information Provider
University of Rijeka Library	Information Provider
University of Rijeka Library, Pula	Information Provider
University of Split Library	Information Provider
University of Zadar Library	Information Provider
Croatian Academic and Research Network (CARNET)	Internet Provider
Brodarski Institut	Private Research Institute
American College of Management and Technology	Private University
University 'J.J. Strossmayera', Osijek (9 faculties)	University
University of Dubrovnik (1 faculty)	University
University of Rijeka (10 faculties)	University
University of Split (9 faculties)	University
University of Zadar (1 6 departments)	University
University of Zagreb (29 faculties)	University

FYR of Macedonia

Macedonian Academy of Sciences and Arts	Academy
Areal Linguistics Research Centre	Academy Research Institute
Centre for Strategic Research	Academy Research Institute

Lexicographical Centre	Academy Research Institute
Research Center for Genetic Engineering and Biotechnology	Academy Research Institute
Research Centre for Energy, Informatics and Materials	Academy Research Institute
Veterinary Institute, Skopje	Government Research Institute
British Council Library	Information Provider
'St. Kliment Ohridski' National and University Library	Information Provider
Virtual Library of Macedonia	Information Provider
Macedonian Academic and Research Network (MARNet)	Internet Provider
South-East European University (5 faculties)	Private University
Tetovo University (4 faculties)	University
University 'St. Cyril and Methodius' (24 faculties; 7 institutes)	University
University 'St. Kliment Ohridski' (6 faculties; 3 institutes)	University
French Cultural Centre Library	Information Provider
New York College	Private University
Association of Technical Culture of Macedonia	NGO

Montenegro

Montenegrin Academy of Sciences and Arts	Academy
Centre of Field Crops, Vegetables and Forage Crops	Government Research Institute
Centre of Forestry	Government Research Institute
Centre of Plant Protection	Government Research Institute
Centre of Viticulture, Viniculture and Fruit Culture	Government Research Institute
Hydrometeorological Institute	Government Research Institute
Institute of Biotechnology, Podgorica	Government Research Institute
Seismological Observatory of Montenegro	Government Research Institute
Centre for Meteorology and Seismology	Independent Research Institute
Institute for Eco-toxicological Investigations	Independent Research Institute
Institute for Geology	Independent Research Institute
Institute for Healthcare	Independent Research Institute
Institute for Strategic Studies and Prognoses	Independent Research Institute
British Council Library	Information Provider
National Library	Information Provider
Institute for Aluminium	Private Sector Research Institute
Institute for Steel Production	Private Sector Research Institute
University of Montenegro (15 faculties; 4 institutes)	University

Serbia

Serbian Academy of Sciences and Arts	Academy
Archeological Institute	Academy Research Institute
Ethnographical Institute	Academy Research Institute
Geographical Institute 'Jovan Cvijiae'	Academy Research Institute
Historical Institute	Academy Research Institute
Institute for Balkan Studies	Academy Research Institute
Institute for Byzantine Studies	Academy Research Institute
Institute for the Serbian Language	Academy Research Institute
Institute of Musicology	Academy Research Institute

Institute of Technical Sciences	Academy Research Institute
Mathematical Institute	Academy Research Institute
Agricultural and Technological Research Centre, Zajecar	Government Research Institute
Agricultural Research Institute 'Serbia'	Government Research Institute
Centre for Temperate Fruit Crops and Medicinal, Aromatic and Wild Plants	Government Research Institute
Centre of Subtropical Crops, Bar	Government Research Institute
Clinical Centre of Serbia	Government Research Institute
Fruit and Grape Research Centre, Cacak	Government Research Institute
Grape and Wine Centre, Nis	Government Research Institute
Hydrometeorological Service of Serbia	Government Research Institute
Institute for Medical Research	Government Research Institute
Institute for the Protection of Cultural Monuments of Serbia	Government Research Institute
Institute of Fruit and Vine Growing	Government Research Institute
Institute of Plant Protection and Environment, Belgrade	Government Research Institute
Potato Research Centre, Guca	Government Research Institute
Seismological Institute of Serbia	Government Research Institute
Vegetable Crops Centre, Smederevska Palanka	Government Research Institute
Institute for Biological Research 'Sinisa Stankovic'	Independent Research Institute
Institute For Technology of Nuclear and Other Raw Materials	Independent Research Institute
Institute of Oncology and Radiology of Serbia	Independent Research Institute
Institute of Soil Science	Independent Research Institute
Research Institute for Reproduction, Artificial Insemination and Embryo Transfer	Independent Research Institute
Serbian Chemical Society	Independent Research Institute
British Council Serbia and Montenegro	Information Provider
'Communication' NGO	Information Provider
Konzorcijum biblioteka Srbije za objedinjenu nabavku (KOBSON)	Information Provider
National and University Library of Kosova	Information Provider
National Library of Serbia	Information Provider
University of Belgrade Library	Information Provider
University of Kragujevac Library	Information Provider
University of Nis Library	Information Provider
University of Novi Sad Library	Information Provider
Virtual Library of Serbia	Information Provider
Academic and Educational Grid Initiative of Serbia	Internet Provider
Yugoslav Academic and Research Network	Internet Provider
Chemical Power Sources Institute	Private Research Institute
Electro technical Institute 'Nicola Tesla'	Private Research Institute
'Mihajlo Pupin' Institute	Private Research Institute
European University, Belgrade (2 faculties)	Private University
Megatrend University of Applied Sciences, Belgrade (3 faculties; 1 institute)	Private University
Singidunum University (5 faculties)	Private University
University Braca Karic (5 faculties)	Private University
University in Novi Pazar (4 faculties)	Private University
University of Arts (4 faculties)	University
University of Belgrade (30 faculties)	University
University of Kragujevac (8 faculties; 2 institutes)	University
University of Nis (13 faculties; 2 institutes)	University
University of Novi Sad (12 faculties, 10 institutes)	University
University of Pristina (12 faculties)	University

ANNEX II

Terms of Reference of the Report

In close cooperation with UNESCO-BRESCE, implement the first phase of the project 'Enabling access to, and delivery of, scientific information in South Eastern Europe'. To this end, undertake the following activities:

1. Undertake a fact-finding mission to each of the countries concerned by the project, i.e. Albania, Bosnia & Herzegovina, Croatia, FYR of Macedonia, Serbia, and Montenegro, with the aim of assessing the situation with regard to the access to, and the national capacities to deliver, scientific information. To this end, contact and hold intensive consultations at national level with decision-makers, university librarians and senior researchers.

2. On the basis of the findings of the mission, elaborate and submit to UNESCO-BRESCE a report containing detailed information on the following items:

   - assessment of the national situation and a comparative regional view concerning access to electronic publications;
   - the need for training in scientific writing and the dissemination of national research;
   - the need for electronic networking of researchers;
   - the existing national/regional portals of information;
   - clear recommendation concerning activities to be undertaken by UNESCO in each of the countries, as well as at regional level, with regard to improving (if needed) access to, and the delivery of, scientific information.
   - any other relevant information.

3. On the basis of the findings of the mission and the contacts made on the occasion, organize and hold, in close cooperation with UNESCO-BRESCE, a meeting for the dissemination of results of the mission among national decision-makers and concerned national and regional institutions. Propose a draft programme and a provisional list of participants for the organization of the meeting for the dissemination of results of the Mission. The meeting could be organized either in Venice or in one of the concerned countries.

ANNEX III

Itinerary of the Country Visits and Persons Contacted

17 January 2005: Tirana, Albania

- Prof. Zenun Mulaj, Faculty of Natural Sciences, University of Tirana;
- Prof. Tatjana Mulaj, Department of Physics, Polytechnic University of Tirana;
- Mr. Tonin Shtjefni, Director, Scientific University Library, Tirana;
- Mr. Ilir Tartari, Responsible for Periodicals and Electronic Information, Scientific University Library, Tirana;
- Ms. Athina Basha, Director, Public Library of Fier;
- Ms. Shehri Dhurata, Department of Literature, University of Tirana;
- Ms. Linda Mineku, Department of Linguistics, University of Tirana;
- Mr. Agron Hetoja, National Project Manager, Agriculture Production Support in Albania, FAO, Tirana.

18 January 2005: Tirana, Albania

- Scientific University Library, Tirana;
- Ms. Alma Kopliku, Specialist, Scientific Research Directorate, Ministry of Education and Science, Tirana;
- Mr. Altin Vangelli, IT Specialist, Directorate General of Forests and Pastures, Tirana;
- Mr. Taulant Hoxha, Administrator, MEDIALB.com, Tirana;
- Ms. Tefta Buzo, President, Albania Library Association;
- Ms. Tatjana Dishnica, Director, Department of Science and Extension Service, Ministry of Agriculture and Food, Tirana;
- Mr. Irfan Morelli, Head of Extension Sector, Department of Science and Extension Service, Ministry of Agriculture and Food, Tirana;
- Mr. Ermir Nika, Publishing and Books Specialist, Ministry of Culture, Youth and Sports, Tirana;
- Mr. Kiytim Dashi, Library Specialist, Ministry of Culture, Youth and Sports, Tirana;
- Prof. Leonidha Peri, Chair of Forest Utilization and Forest Economics, Faculty of Forestry Sciences, Agricultural University of Tirana.

19 January 2005: Tirana, Albania

- British Council Office in Tirana (by phone);
- Prof. Gudar Beqiraj, Director, Institute of Informatics and Applied Mathematics (INIMA), Tirana;
- Prof. Neki Frasheri, Vice-Director, Institute of Informatics and Applied Mathematics (INIMA), Tirana;
- Prof. Salvator Bushardi, Scientific Secretary, Section of Natural and Technical Sciences, Academy of Sciences of Albania, Tirana;
- Dr. Mariana Ymeri, Director, Scientific Library, Academy of Sciences of Albania, Tirana.

20 January 2005: Belgrade, Serbia

- Prof. Srbijanka Turajlić, UNESCO Chair for University Management, Department of Electrical Engineering, University of Belgrade;
- Prof. Zoran Petrović, Director, Institute of Physics, Department of Experimental Physics, University of Belgrade;
- Prof. Miljenko Perić, Department of Physical Chemistry, University of Belgrade;
- Prof. Vesna Fila, Deputy Minister, Serbian Ministry of Education and Sports, Belgrade;
- Prof. Ranko Milić, Secretary-General, Serbian and Montenegrin National Commission for UNESCO, Federal Ministry of Foreign Affairs, Belgrade;
- Prof. Zoran Marjanović, Vice Dean for Science and Research, Faculty of Organizational Sciences, University of Belgrade;
- Prof. Bozidar Radenković, Faculty of Organizational Sciences, University of Belgrade;
- Dr. Zoran Marković, Director, Mathematical Institute, Serbian Academy of Sciences and Arts, Belgrade;
- Dr. Zoran Ognjanović, Research Associate Professor, Mathematical Institute, Serbian Academy of Sciences and Arts, Belgrade;
- Prof. Neda Bokan, Dean, Faculty of Mathematics, University of Belgrade;
- Dr. Miodrag Mihaljević, Mathematical Institute, Serbian Academy of Sciences and Arts, Belgrade;
- Ms. Vesna Injać, Deputy Director, National Library of Serbia, Belgrade;
- Ms. Biljana Kosanović, Head, Department of Scientific Information, National Library of Serbia, Belgrade.

21 January 2005: Podgorica, Montenegro

- Prof. Momir Djurović, President, Montenegrin Academy of Sciences and Arts, Podgorica;
- Prof. Zarko Mirković, Vice Rector for international cooperation, University of Montenegro, Podgorica;
- Ms. Slobodanka Koprivica, Deputy Minister, Montenegrin Ministry of Education and Science, Podgorica;
- Prof. Sreten Skuletić, Faculty of Electrical Engineering, University of Montenegro, Podgorica;
- Ms. Bosiljka Cicmil, Director, Central Library, University of Montenegro, Podgorica.

22 January 2005: Belgrade, Serbia

- Dr. Gordana Stokić, Department of Library and Information Science, Faculty of Philology, University of Belgrade, Belgrade;
- Prof. Aleksandra Vranes, Department of Library and Information Science, Faculty of Philology, University of Belgrade, Belgrade.

24 January 2005: Skopje, FYR of Macedonia

- Ms. Lenka Danevska, Head, Central Medical Library, Faculty of Medicine, 'St Cyril and Methodius' University, Skopje;
- Prof. Katica Zafirovska, Department of Nephrology, Faculty of Medicine, 'St Cyril and Methodius' University, Skopje;
- Prof. Georgi Zografski, Institute of Radiotherapy and Oncology, Faculty of Medicine, 'St Cyril and Methodius' University, Skopje;

- Professor Georgi Efremov, Director, Research Centre for Genetic Engineering and Biotechnology, Macedonian Academy of Sciences and Arts, Skopje;
- Dr. Dijana Plaseska-Karanfilska, Research Centre for Genetic Engineering and Biotechnology, Macedonian Academy of Sciences and Arts, Skopje;
- Prof. Bojan Sopratrajanov, Academician, Macedonian Academy of Sciences and Arts, Skopje;
- Ms. Nada Georgieva, Head of the Library, Macedonian Academy of Sciences and Arts, Skopje;
- Mr. Andrija Volkanovski, Systems Engineer, Macedonian Academy of Sciences and Arts, Skopje;
- Prof. Zoran Popovski, State Secretary, Ministry of Education and Science, Skopje;
- Prof. Margita Kon-Popovska, Faculty of Natural Sciences and Mathematics, Institute of Informatics, 'St Cyril and Methodius' University, Skopje;
- Prof. Aneta Buckovska, Vice-Dean for Research and International Collaboration, Faculty of Electrical Engineering, 'St Cyril and Methodius' University, Skopje.

25 January 2005: Skopje, FYR of Macedonia

- Mr. Borko Zafirovski, Director, National and University Library, Skopje;
- Ms. Viktorija Kostoska, International Relations Coordinator, National and University Library;
- Ms. Elena Nikodinovska, National and University Library, Skopje;
- Mr. Miodraig Dadasović, National and University Library, Skopje.

26 January 2005: Zagreb, Croatia

- Ms. Jaka Primorać, Research Fellow, Institute for International Relations, Zagreb;
- Ms Snjezana Ivanović, Head, Information and Documentation Service, Institute for International Relations, Zagreb;
- Dr. Radovan Vrana, Department of Information Sciences, Faculty of Philosophy, Zagreb;
- Dr. Maja Jokić, National and University Library, Zagreb;
- Dragan Schwartz, Assistant Minister (Department for Information Society), Ministry of Science, Education and Sports, Zagreb;
- Prof. Vlatko Silobrèiã, Member, Croatian Academy of Arts and Sciences, Zagreb.
- Dr. Jelka Petrak, Head, Central Medical Library, Zagreb;
- Ms. Vesna Vrga, CARNet, Zagreb;
- Mr. Miroslav Milinović, Assistant Director, University Computing Centre, University of Zagreb.

27 January 2005: Sarajevo, Bosnia and Herzegovina

- Library, Institute for Research and Development, Clinical Centre, Ministry of Health, Sarajevo;
- Prof. Nenad Tanović, Faculty of Natural Sciences and Mathematics, University of Sarajevo, Sarajevo.

28 January 2005: Sarajevo, Bosnia and Herzegovina

- Dr. Enes Kujundzić, Director, National and University Library, Sarajevo;
- Ms. Azemina Njuhović, Ministry of Education and Science, Canton of Sarajevo, Sarajevo.

Others

- Ms. Rima Kupryte, Director, eIFL.net Foundation, Rome;
- Mr. Cosmin Salasan, AgroWeb SEE Manager, Banat University of Agricultural Sciences, Timisoara, Romania;
- Ms. Azemina Vuković, Head of the Office for the Monitoring and Implementation of Bosnia and Herzegovina Medium Term Development Strategy, Sarajevo;
- Mr. Tomaz Seljak, Director, Institute of Information Science Maribor, Slovenia;
- Ms. Jadranka Stojanovski, Library Director, 'Ruđjer Bosković' Institute, Zagreb, Croatia;
- Ms. Jelena Durović, Director, Central National Library of Montenegro, Cetinje, Montenegro.

ANNEX IV

Minutes of Roundtable

for discussions of the Draft Report

Organised by: UNESCO Office in Venice (I. Nechifor), with INASP (S. Gwynn) and COBISS (Franci Pivec)
Time: The roundtable began at 08:30, 11 November 2005
Place: Diplomat Room, Mezzanine Floor, Hotel Habakuk, Maribor, Slovenia

Objectives:
The roundtable had two major objectives:
- to validate the trends and conclusions set out in the report;
- to identify and document activities that should be taken at the national or regional level to facilitate and sustain improved access to and dissemination of scientific information in the region.

The roundtable was one part of a process of validation and identification of appropriate activities that to be included within the final report.

Participants:
The following persons participated in the discussions at the Roundtable:
- Ms Myrvet Bramati, Polytechnic University Scientific Library, Tirana, Albania;
- Mr Petro Luarasi, University of Tirana, Faculty of Natural Science, Albania;
- Mr Sefik Rizvanović, Ministry of Civil Affairs of Bosnia and Herzegovina, Bosnia and Herzegovina;
- Ms Azemina Njuhović, Ministry of Education and Science, Canton of Sarajevo, Bosnia and Herzegovina;
- Mr Ranko Risojević, National & University Library of the Republic of Srpska, Banja Luka, Bosnia and Herzegovina;
- Mr Viktor Stevof, Ministry of Education and Science, Skopje, FYR of Macedonia;
- Mrs Pavlina Mitrevska-Gjurovska, National and University Library 'Sv Kliment Ohridski' Skopje, FYR of Macedonia;
- Mr Sreten Ugričić, National Library of Serbia, Belgrade, Serbia and Montenegro;
- Ms Aleksandra Popović, University Library 'Svetozar Markoviš', Belgrade, Serbia and Montenegro;
- Ms Bosiljka Cicmil – Vuković, Central Library, University of Montenegro, Podgorica, Serbia and Montenegro;
- Ms Vesna Vucković, Central National Library of the Republic of Montenegro, Serbia and Montenegro;
- Dr Jozsef Gyorkos, IZUM, Slovenia;
- Dr Marta Seljak, IZUM, Slovenia;
- Mag Franci Pivec, IZUM, Slovenia;
- Mr Howard Moore, UNESCO-BRESCE;
- Ms Sara Gwynn, INASP, UK.

Roundtable Outcomes:

1. Validation of the draft report

Overall, participants stated they were happy with the report and proposed the following specific suggestions:

- need to consider the usage of resources;
- need to include discussion on archiving issues;
- in the section covering 'Bosnia and Herzegovina', only include sentence stating 'situation is rather complicated' if the argument has been made to back this statement up.

2. List of areas for action

With reference to the suggestions in the draft report, participants agreed the following list of areas in which action was needed in order to strengthen access to and dissemination of scientific information in SE Europe:

- Accessing international journals;
- Online journals services;
- Open access publishing;
- Open access archiving;
- Open access position statement;
- Federated searching;
- Raising awareness and commitment at policy level;
- Strengthening libraries;
- Regional cooperation;
- Thematic portals;
- Communicating/promoting science;
- Accessing UNESCO knowledge base;
- Comparative information about legislation and models for science and research ;
- Education, promotion and marketing to improve usage of resources;
- Archiving of licensed resources, solutions, collaboration;
- Infrastructure: services, buildings, IT connectivity and hard/software.

It was felt that availability of appropriate infrastructure was a key requirement, with needs specific to each country.

3. Priority area for action

Participants felt that the key action area was to strengthen libraries. They felt libraries should be supported to become central to the lives of their users, the country and the region.

They identified the following outcomes for actions aimed at strengthening libraries:

- Libraries have the necessary infrastructure for accessing and disseminating scientific information (including buildings, ICT hardware and software, connectivity) ;
- Libraries were centrally included in regional, national and institutional policy and legislation;
- Library staff had the skills necessary to operate in the digital environment;
- Libraries were represented and involved in local, regional and global cooperation ;
- Libraries had effective access to resources from both international and national sources in either print or digital format;
- Libraries acted as repositories for collections of unique local and regional materials.

Participants felt that UNESCO's reputation and neutral position would enable the organisation to play a role in enhancing access to and dissemination of scientific knowledge in South East Europe by:

1. Improving policy awareness and commitment. This priority was raised in all sources of feedback and UNESCO was identified as being in a position to play a role in helping to persuade and inform policy makers;
2. Enabling online access to national journals: another priority identified during this process has been for national, or regional, service that enabled locally published academic journals to have an online presence. Such a service could:
   - improve the national, regional and international visibility of nationally published journals;
   - support nationally published journals to become self-sustaining;
   - provide researchers with improved routes to have their work published,
   - provide researchers in the region, and internationally, with 'one stop' access to high-quality, relevant, locally specific information;
3. Motivating and stimulating local, regional and global cooperation (e.g. supporting meetings at existing fora such as IFLA);
4. Providing a 'trademark' to raise visibility and relevance of cooperation efforts;
5. Enabling regional knowledge and 'know how' sharing;
6. Enabling online access to national journals.

ANNEX V

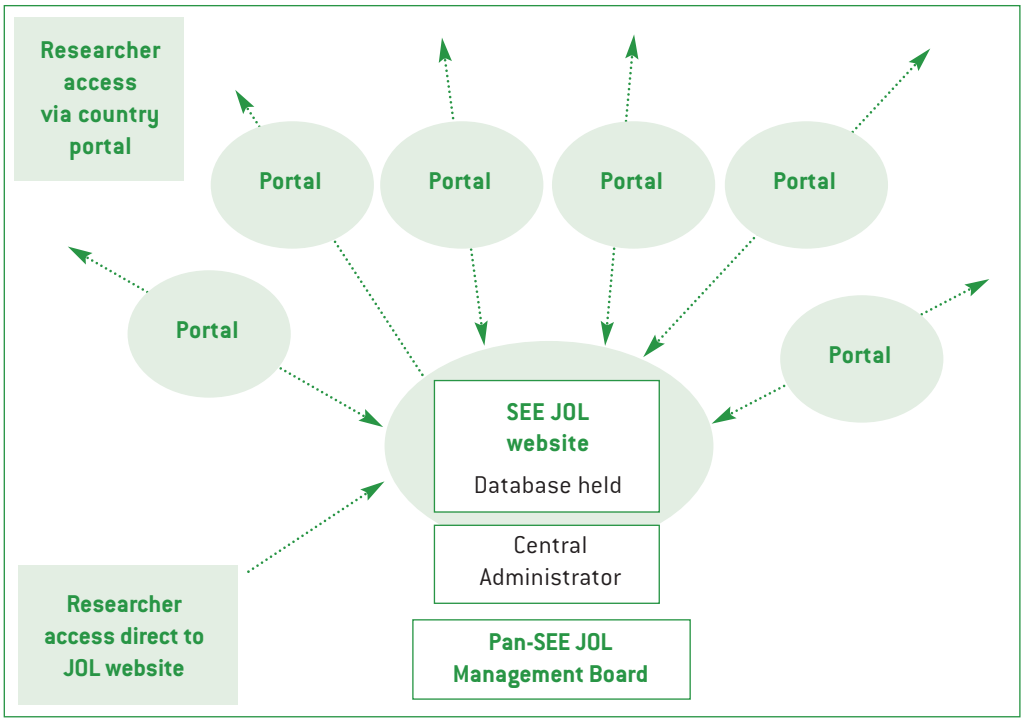
Project Proposal
SEE Journals Online Concept Paper

1. Concept summary

Aim

To establish a journals online (JOL) service onto which journals published within the South East Europe region can publish their research journals online either as:

- tables of contents and abstracts only, or
- as full text in either an Open Access model, or
- with access controls.



Key

1. SEE JOL website, a central website to host all database content. Managed either within, or outside, region.
2. Database held on central server to hold all content, managed either within, or outside, region
3. Central Administrator responsible for maintenance and development of website/database and also for promotion of the JOL, for reporting on the service, and for management of central finances.

4. Management Board (MB) consisting of representative from each participating country, responsible for planning/agreeing JOL strategy and development and involving journals from their own countries.
5. Portal: represent country portals, hosted on Management Board Organisations' (MBO) websites, providing a window to their own country journals via access into the central database.

Proposal

1. To establish one website to present the region's journals to the global research community.
2. To hold all content within one database.
   a. To encourage the establishment of country portals to the JOL to give recognition to the contribution of each country, and build ownership of their contribution to the JOL.
3. To host abstracts of all articles, plus full text as required (either Open Access or behind access controls) to ensure sufficient flexibility for the journals in order that they can continue to manage their own publishing strategy.
4. To centrally manage the JOL within one institution or organisation with an international remit to avoid possible perception of single-country-ownership.
5. To work through country partners instead of directly approaching journals.
   a. To create a Management Board comprised of representatives from each participating country to ensure ownership by participating countries, and to build sustainability within each country.
6. To delegate the responsibility of loading content to the members of the Management Board.
7. To provide document delivery through the Management Board members.
8. To work with the participating journals to build editing and publishing skills to improve the quality of publications and ensure greater sustainability within the region.
9. To initially work with identified countries, but could offer the opportunity of participation to other countries in the region subject to available resources (financial and human).
10. To create and continue support to the network of stakeholders (MBOs, journals, etc.) to ensure flow of information and strengthening of abilities to dissemination national research findings.

It is suggested that an initial fund is required to launch the service, but once the service has been launched all subsequent funding is country-based, and each country pays an agreed annual amount to the Central Administrator.

It should be noted that the cost of including additional countries will not increase the total project cost proportionately - i.e. it is relatively cheaper for each country that joins the project.

The annual budget is estimated to be as follows:

Year 1	USD 100,000
Year 2	USD 85,000
Year 3	USD 85,000

(These exclude some local costs incurred by participating countries, for example the cost of providing document delivery.)

2. Implementation proposal and budget details

Initiation

1. Agree initial funding.
2. Establish an initial Management Board (MB) and undertake a sensitisation meeting of the MB to agree parameters and methodology.
3. Agree the terms and arrangements with the Central Administrator and the Member Board Organisations (MBOs).
4. Agree the document delivery methodology to be used within each MBO.

Launch and Year 1

5. Database and website development.
6. Portal websites/web-pages development.
7. Journal publishing workshops to introduce JOL to participating journals and encourage publishing skills.
8. "Content loading" and "Managing JOL" training.
9. Loading of initial content.
10. Launch of JOL.
11. Launch of national portals.
12. Initial promotional activities.

Ongoing activities Year 1 and 2

13. Annual meeting of MBO.
14. Follow-up workshops as required.
15. Ongoing support and promotion from the Central Administrator.
17. Monitoring and evaluation of the project.

Budget[43] details

Item	Year 1	Year 2	Year 3
Initiation and launch			
Sensitisation workshop for Management Board	30,000		
Central Administrator	30,000		
Database and website setup	25,000		
Publicity	5,000		
Content loading and JOL management workshop	20,000		
Journal publishing workshops	20,000		
Ongoing support activities			
Database and website maintenance		5,000	5,000
Central Administrator		25,000	25,000
Publicity		5,000	5,000
Annual meeting of Management Board		15,000	15,000
National follow-on content loading workshops		30,000	30,000
Journal publishing workshops		20,000	20,000
Monitoring and evaluation	10,000	5,000	10,000
Annual total	**130,000**	**105,000**	**110,000**
National costs [44]			
Setup and maintenance of national portal	?	?	?
Local costs of Management Board	3,000	3,000	3,000

Activities details

Sensitisation workshop for Management Board

Duration 3 days

Delegates 2 people from each country, including the member of the Management Board, and a person who will be more involved with the operation of the JOL within their own country (e.g. loading content, managing document delivery, etc.)

Facilitators INASP

Location To be chosen on cost/facilities

[43] For the purposes of this budget, only one in-country journal publishing workshop has been planned for each year of the 3-year plan. However, with adequate resources (financial and human) it is possible to run these in a single year, or to add additional workshops, should new countries join this initiative.

[44] Within National costs, an allowance for the costs of providing document delivery and internet connectivity has been made, but these figures exclude staff time (to load content, manage document delivery, and for the Management Board member to attend meetings, etc.) Also the cost of setting up and maintaining a local portal are approximate, as these may be very low if the MBO place their portal within their existing websites.

Objectives

- To provide a forum for agreeing the terms and conditions of the JOL operation
- To raise awareness of what participation involves
- To gain understanding of publishing environment in each country
- To obtain list of journals to be included in service at time of launch
- To communicate the needs of the service (file formats etc.)
- To ensure that the database/website will be developed around the needs/desires of the Management Board
- To ensure that the Management Board understand the requirements for their organisation (e.g. the portal development, etc.)
- To agree plans for implementation (in-country and by Central Administrator)
- To establish a network of Management Board Organisations who can build on knowledge and discussions for the future

Database / website development

This has been estimated from costs provided by PKP (the developers behind the software. The estimate includes time for INASP staff to oversee and manage this development.

Local portals

Depending on the agreement at the MB meeting, it is assumed that each MBO will host a portal within their own website. This will list the journals from their country with hot-links to the central database. It may also provide a filtered search mechanism (i.e. only searching within the national journals, and not the entire database).

Pre-loading of content

Depending on agreement by MBOs, this assumes that each MBO will provide the Central Administrator with text and electronic copies of all issues/journals that it wishes to be included on the service at launch, and the CA will undertake to set up each journal on the database/website so that at launch there is content for users to see.

Promotion

It is assumed that in addition to producing and sending print and online alerts, flyers, and other promotional materials, the Central Administrator will attend one or two relevant meetings during the year to promote the service, and will ensure that it is as widely known as possible.

Journal publishing workshops

- To support the participating journals as much as possible, it is proposed to target these journals for journal publishing training based in-country, following the INASP model. This training will be customised to the need of each country, and will include modules on topics such as:
- Rights and licensing
- Online publishing - strategy, planning and implementation
- Production and design
- Marketing, promotion and publicity
- Editorial issues, authors, reviewers and editorial standards
- Sales and subscription management

As these workshops are not providing training in methodology, but providing updates on current publishing practices in addition to training in current practice and publishing decision-making, they are not suitable for the cascading methodology used elsewhere by INASP. However materials will be produced to enable cascading of skills to other people within the same community, and encouragement of further meetings and training events (non-INASP-facilitated) will be encouraged.

Duration 3 days
Delegates Approximately 20 journal editors/publishers from one country
Location To be chosen in-country
Objectives
- To enable the journals to build more sustainable models for their publications
- To provide awareness of the electronic publishing environment
- To improve the quality of publication
- To provide the participants with an awareness of how to use their participation in the JOL to promote their publications
- To provide a toolkit for the journals to assist with developing their publications into the future
- To provide a forum for discussion and networking to resolve local problems with publications

Content loading and managing a JOL training workshop

It is proposed that the first workshop is facilitated by INASP as the Central Administrator, but can subsequently be changed to local facilitation following the INASP cascading methodology

Duration 4 days
Delegates Approximately 10 journal editors/publishers from one country, plus 2 representatives from each of the other participating countries (6)
Facilitators INASP
Location To be chosen on cost/facilities
Objectives
- To develop skills in loading content onto the JOL database/website
- To provide awareness of how to make best use of the JOL to promote the national journals, and local research
- To provide an awareness of quality issues pertinent to this service
- To build skills in using the service, and liaising with participating journals and publishers/editors
- To establish a network of content-loaders within the region

Follow-on content loading workshops

Following the cascading workshop methodology of INASP, these workshops will use the same methodology. The skills and knowledge of how to load content onto the JOL need not be transferred through a formal, 3-day workshop, but could be done informally, over a few hours, a day, or several days. It is therefore proposed that the workshops are left as flexible as possible, but that encouragement is given to assist local training to increase the pool of trained people able to use the system. For budgeting purposes it is assumed that there will be formal workshops, one in each country annually (i.e. 4 workshops p.a. over the region).

Duration	1-3 days as felt appropriate by facilitator
Delegates	As felt appropriate by facilitator
Facilitators	Local facilitator (ideally the participant in the first Content loading workshop)
Location	To be chosen on cost/facilities
Objectives	• To develop skills in loading content onto the JOL database/website • To provide awareness of how to make best use of the JOL to promote the national journals, and local research • To provide an awareness of quality issues pertinent to this service • To build skills in using the service, and liaising with participating journals and publishers/editors • To establish a network of content-loaders within the region

Annual MB workshop

Duration	2 days
Delegates	Management Board representative from each country plus representative from INASP
Facilitators	Local MBO
Location	To be chosen on cost/facilities
Objectives	• To provide a forum for discussing the success of the JOL and agreeing developments and changes to the service • To enable decisions about participation from other countries, other journals • To agree financial contribution of Member countries • To discuss the future placement of the Central Administrator

ANNEX VI

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• Uzelać, N., 2005, 'Macedonia Report 2004-2005', prepared for Ministerial Conference on the Bologna Process, Bergen, 20-25 May 2005.

Selected Websites[45]

Albania

• Academy of Sciences Library: *www.academyofsciences.net/library/index.html*

• University of New York, Tirana Library: *www.unyt.edu.al*

Bosnia and Herzegovina

• Bosnian Institute Library: *www.bosnia.org.uk/about/library/default.cfm*

• 'Dervis Susic' Public and University Library Tuzla: *www.nubt.ba*

• University of Sarajevo, Human Rights Centre Library: *www.hrc.unsa.ba/*

• Virtual Library of Bosnia and Herzegovina: *www.cobiss.ba/*

• Open Book: *www.openbook.ba*

Croatia

• 'Ruđer Bošković' Institute Library *http://nippur.irb.hr/eng/crolibs.html*

• Electronic Journals Online Library at the 'Ruđer Bošković' Institute: *http://ejol.irb.hr/*

• Croatian Scientific Bibliography (CROSBI): *http://bib.irb.hr/*

• National and University Library: www.nsk.hr/

• Institute for International Relations (IMO), Library: *www.imo.hr/indoc/*

• Prehrambeno tehnološki fakultet u Osijeku Knjižnic: *www.ptfos.hr/ptf/hr/knjiznica/*

• Union Catalogue of Croatian Libraries (CROLIST): *http://nskcrolist.nsk.hr*

• University Library, Pula: *www.skpu.hr/*

• University Library, Rijeka: *www.svkri.hr/*

• University Library, Split: *www.svkst.hr/*

• University of Zagreb, Faculty of Philosophy, Library *http://knjiznice.ffzg.hr/*

[45] This list is based on the references cited by the author throughout the report as well as on existing regional and international on-line information relevant to the subjects treated. As such, this list is not exhaustive nor representative for the overall existing information sources at the country level.

ANNEX VI: Bibliography

FYR of Macedonia

- 'Metamorphosis' NGO: *www.metamorphosis.org.mk*
- Central Medical Library, Skopje: *www.cmb.edu.mk*
- National and University Library 'St. Kliment Ohridski': www.nubsk.edu.mk/
- 'Djurdje Crnojevic' Central National Library of the Republic of Montenegro, Cetinje *www.heritage.cg.yu/cnb_e.htm*

Montenegro

- Virtual Library of Montenegro: *http://vbcghome.cnb.cg.ac.yu/cg/vbcg_project-EN.htm*
- University of Montenegro Library: *www.ucg.cg.ac.yu/biblioteka_en.htm*
- Academy of Sciences and Arts Library: *www.canu.cg.yu/biblioteka.htm*

Serbia

- Belgrade Unit of Mathematics Didactics: *www.mi.sanu.ac.yu/regional/MathDiSajt.htm*
- Virtual Library Network of Serbia: *www.biblioteke.org.yu*
- University of Belgrade Library 'Svetozar Markovic' *http://ubbg.etf.bg.ac.yu/www/ubib/*
- University of Belgrade, Faculty of Biology, Jevremovac Institute of Botany *http://pancic.bio.bg.ac.yu*
- University of Belgrade, Technical Faculty in Bor Library *http://www.tf.bor.ac.yu/biblioteka/biblioteka.htm*
- University of Belgrade, Faculty of Organisational Sciences: *www.fon.bg.ac.yu*
- 'Communication' NGO: *www.komunikacija.org.yu*
- Journals database: *www.sac.org.yu/komunikacija/casopisi/*

Regional and International websites

- Access to Global Online Research in Agriculture (AGORA): *www.aginternetwork.org*
- Agriculture related Information in Central and Eastern Europe and former USSR: *www.agrowebcee.net*
- Balkan Library Network: *www.balkanlibraty.net*
- Central European Initiative: *www.ceinet.org*
- Central and Eastern European Online Library: *www.ceeol.com*
- Conference of European Ministers Responsible for Higher Education, Bergen, 20-25 May 2005: *www.bologna-bergen2005.no/*
- Co-operative Online Bibliographic System and Services (COBISS): *www.cobiss.net*
- Directory of Open Access Journals: *www.doaj.org*
- Electronic Journals Delivery Service (eJDS Programme): *www.ejds.org*
- GEANT Project: *www.geant.net* and *www.geant2.net*.
- Health InterNetwork Access to Research Initiative (HINARI): www.healthinternetwork.org
- International Federation of Library Associations and Institutions (IFLA) Committee on Free Access to Information and Freedom of Expression (FAIFE): *www.ifla.org/faife/*
- Open Archives Initiative: www.openarchive.org
- Public Library of Science (PLoS): www.publiclibraryofscience.org
- Programme for the Enhancement of Scientific Information (PERI): *www.inasp.info.peri*
- South Eastern Europe GRid-enabled eInfrastructure Development (SEE-GRID): *www.see-grid.org*
- South Eastern European Research and Education Network: *www.seeren.org*
- UNESCO Free & Open Source Software Portal: *www.unesco.org/portal/webworld_freesoft*
- UNESCO Libraries Portal: *www.unesco.org/webworld/portal_bib*
- UNESCO Archives Portal: *www.unesco.org/webworld/portal_archives/pages/*

ANNEX VII

List of Acronyms

AEGIS	Academic and Educational Grid Initiative of Serbia
AGORA	Access to Global Online Research in Agriculture
ALA	American Library Association
AMREJ	Yugoslav Academic and Research Network for Serbia and Montenegro
ANUBiH	Academy of Sciences and Art of Bosnia and Herzegovina
BIHARNet	Academic and Research Network of Bosnia and Herzegovina
CARNet	Croatian Academic and Research Network
CEEC	Central Eastern European Countries
CEEOL	Central and Eastern European Online Library
CEI	Central European Initiative
COBISS	Co-operative Online Bibliographic System & Services
CROLIST	Union Catalogue of Croatian Libraries
CROSBI	Croatian Scientific Bibliography
DANTE	Delivery of Advanced Network Technology to Europe
DOI	Digital Object Identifier
EBSCO	Elton B. Stephens Company Information Services (provides information access and management solutions)
eIFL.net	Electronic Information for Libraries
EU	European Union
FAO	Food and Agriculture Organisation
GÉANT	Multi-gigabit pan-European research network It is the name of both the pan-European research and education network and of the corresponding four-year project that created it.
GÉANT2	7th generation of pan-European research and education network, successor to the pan-European multi-gigabit research network GÉANT.
HINARI	Health InterNetwork Access to Research Initiative
ICSU	International Council for Science
ICT	Information and Communication Technologies
IFLA	International Federation of Library Association and Institutions
INASP	International Network for the Availability of Scientific Publications
JOL	Journals OnLine
JSCS	Journal of the Serbian Chemical Society

ANNEX VII: List of Acronyms

INIMA	Institute of Informatics and Applied Mathematics of the Academy of Sciences of Albania
IZUM	Institut informacijskih znanosti (Institute of Information Science, Slovenia)
MARNet	Macedonian Academic and Research Network
MB	Management Board
MBO	Member Board Organizations
NGO	Non Governmental Organization
NREN	National Research and Education Network
NUB	National and University Library of Bosnia and Herzegovina
OPACs	Online Public Access Catalogues
R&D	Research and Development
S&T	Science and Technology
SEE	South Eastern Europe
SEE-GRID	South Eastern European Grid-Enabled eInfrastructure Development
SEEREN	South East European Research and Education Networking project
TWAS	Academy of Sciences for the Developing World
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNESCO-BRESCE	UNESCO Office in Venice – UNESCO Regional Bureau for Science and Culture in Europe
ViBBiH	Virtual Library of Bosnia and Herzegovina
WHO	World Health Organisation

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science policy series

Accessing and Disseminating Scientific Information in South Eastern Europe

The unimpeded flow of information is one of the prerequisites for the advancement of science and the building of the knowledge societies. It is also a condition for strengthening the scientific capacities and creating the technological tools necessary to transform data into assets of empowerment and production at national and regional levels.

With the aim of joining the European Knowledge Area, countries of South Eastern Europe are taking the steps necessary for the modernisation of their information systems allowing access to international and national information and enabling production and dissemination of scientific information. Based on expert visits to the region and extensive consultations at national levels, this Report presents the situation with regard to these issues in Albania, Bosnia and Herzegovina, FYR of Macedonia, Montenegro, and Serbia. It reveals that while some of the countries of the region are already in an advanced stage of catching up with European and international standards, intensive efforts for improvement still need to be initiated in others. The Report provides also a broad series of recommendations for action at a national level and ideas for regional cooperation.

This publication is part of the UNESCO's Strategy for Strengthening Scientific Cooperation in South Eastern Europe.

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