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in the area of 'land and water'**

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## **Sakia.org - An on-line knowledge exchange and communication initiative in the area of 'land and water'**

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### **INTRODUCTION**

Sakia.org<sup>1</sup> was designed to be the overarching Internet service providing hosting, technical as well as functionality support (e.g. search, structure, user management etc.) for a number of different technically related services in the area of 'land and water'. As an independent service it provides free access to knowledge spanning across institutional and resource type boundaries for the land and water professionals and the industry. It allows a closer interaction and exchange between providers and users of knowledge, bridging the gap between research and application. The core of the Sakia.org system is operational and accessible on-line while new modules are under development or in the projecting phase.

### **OBJECTIVE**

The main objective of Sakia.org is to provide a freely accessible unified information and communication portal on the Internet leading to quality and freely accessible knowledge and services within the technical area of 'land and water'.

### **BACKGROUND - RESEARCH AND THE ON-LINE INFORMATION SITUATION**

The 'information world' is dramatically changing as electronic means of accessing information are rapidly gaining importance. Not only has the desktop PC revolutionised information processing and handling, but the enormous growth of the Internet has also increased the speed of national, international and intercontinental information exchange. The Internet, often called the network of the networks, is growing exponentially allowing scientists and users to move closer together irrespective of time and distance. Despite the enormous general growth of the Internet, the availability of scientific valid and approved information is disproportionally low and is far from being sufficient to meet the steadily increasing demand and growing expectations.

Even electronic means are now widely being used by the scientific world and governmental organisations, relatively little has changed conceptually and policy wise in the way scientific information, e.g. for journals, is being handled and knowledge managed by the individuals as prime knowledge producers as well as by the respective institutions or groups. This is a crucial point which needs to be addressed when looking into information and knowledge management, handling and distribution in dedicated areas such as 'land and water'.

Modern and fast communication systems transferred onto a global scale have caused an immense flood of information being circulated globally. However it is misleading to believe that the information flow has also taken place from within the scientific community outwards to the professional public or that it has been delivered to the poor in the same extend as it has reached the developed part of the world. This accelerated technological development has not only increased the possibilities to access and transfer information but it has also created a huge and widening gap between technologically developed and/or financially well placed (research) groups and those countries and (research) groups which do not have funds or the technology to buy in into

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<sup>1</sup> The Sakia.org service and site has been named after an ancient water lifting device. Sakia is an Egyptian scoop-wheel.

the delivery of relevant scientific information. This is especially true for the agricultural water sector with a tendency to decreasing lobbying and decreasing support through donors and institutions (on a global scale).

With the 'drying up' of traditional sources of information much hope is being put into the emerging Internet to become the biggest source of free information worldwide. A closer look into technical information e.g. on irrigation and drainage or water management and use unfortunately reveals that this is only the case in the foreground! Quality information available in full-text, freely accessible through the Internet is only 'trickling in' on a very low volume. Even taking that relatively low volume of information it becomes clear, that it shows a very distorted distribution picture with an overrepresentation of less relevant and less important information. Core information needed to effectively e.g. develop and use water for the production of agricultural products is still far from being in any way sufficiently available and freely accessible on-line.

While the general boost in the information development has caused a general increase of information development and distribution on the Internet it has also created a situation of diluted content in the sense of a discrepancy between quality and relevance on one side and quantity and low quality on the other side. As traditional sources of information become financially unavailable many users turned towards the Internet in the search for good quality information. Publishing information electronically and then distributing it globally has never been as easy as it is today. Free web-space and email providers for example have opened up a tremendous opportunity of information delivery but have also created a source of uncertainty in respect to technical quality of the information delivered.

Based on traditional thinking and the misconception that scientific output needs to go through well established publishers who are considered to be the only ones who may assure an independent quality control through peer reviewing, is causing the freeing-up of resources to be blocked. Publishers are charging a very high price for this service and by applying rigid copyrights to all their publications causing the information to be solemnly distributed through them to a price they dictate. Most peer reviews are done for free by scientist only delegated through the journals. The main costs are therefore related to publishing and distribution of hard copies. As to Harnad (2003a) the quality control process through peer reviewing would only make up one third of the total costs. It is also suggested that the review process may be left with the publisher but that the publishing and distribution in electronic form could be done by the various institutions (self archiving) providing that service for free. Some universities and other organisations have already joined one of the initiatives such the 'EPprints.org', which publishes electronically on-line and accessible for free.

Harnad (2003a) states that "with modern research output, it pays to advertise electronically" for free as it maximises research access causing a bigger impact as it is faster and has a greater extent. A study by Lawrence (2001) reveals that an average of 336% more citations to on-line articles than to off-line articles published in the same venue were found. While this study was conducted in the computer science publishing section it clearly indicates the potential impact on-line publishing has on the uptake of research results. Harnad (2003b) also estimates that the impact of the at least 2 million annually peer reviewed articles could be 4.5 higher if they would be self-archived and hence freely available on-line.

Apparently there seems to be a gradual shift toward more open handling of copyright issues by publishers allowing more articles be placed on-line. Harnad (2003b, 2004) states that 55% of the publishers already may agree to some self-archiving. The reality, especially in the area of land and water, looks far less promising. A pre study on the availability of on-line publications in the area of land and water conducted on one major research institution (Stein, 2003 unpublished) revealed that only approximately 17 % of all articles and other publications published between

2000 and 2002 were actually found on-line and were accessible to the general public, which seems to be above average. The number of articles which were published on-line as well as by one of the renowned peer reviewed journals was negligible.

An extensive study commissioned by the Wellcome Trust (2003), comes to the conclusion that the current scientific journals market and their objectives are not wholly aligned with those of the research community. It is not expected that the different forces operating in the market will necessarily produce better outcomes of themselves and that they will supply a system suitable for current and future needs of the research community.

The World Summit on the Information Society was held under the high patronage of the UN Secretary-General in December 2003. It clearly recognised the urgent need for free access to scientific knowledge stating: "We strive to promote universal access with equal opportunities for all to scientific knowledge and the creation and dissemination of scientific and technical information, including open access initiatives for scientific publishing." (World Summit on the Information Society, 2003: Paragraph 28).

Numerous technical services have already been established on-line mainly aimed at screening, classifying and indexing predominantly existing on-line resources (e.g. WCA infoNET<sup>2</sup>). Sakia.org as well as its integrated services, such as the Virtual Library Irrigation and Hydrology or the Sakia.org e-publish services are fostering the open and free access to knowledge in support of the 'land and water' community. The main emphasis is laid on providing free access to services and knowledge not yet accessible on-line elsewhere.

### SAKIA.ORG - CURRENT AND FUTURE SERVICES

The Internet has tremendously evolved over the years but has also left a great demand in providing professional services and knowledge in the area of 'land and water'. This demand was addressed by the redesign and launch of the 'Sakia.org' services and system on-line in November 2003. While the original 'Sakia' and its precursor services date back as far as 1994/95, the new 'Sakia.org' has now been redesigned to be the overarching Internet service providing targeted hosting, technical and as well as functionality support (e.g. content, search, structure, user management etc.) for a number of different technically related services in the area of 'land and water'. As an independent service it provides free access to knowledge and functionality spanning across



Figure 1: The Sakia.org website providing access to several dedicated services such as the Virtual Library Irrigation or IRRIGATION-L.org site.

<sup>2</sup> WCA infoNET - Information Service on Water Conservation and Use in Agriculture at IPTRID/FAO. <http://www.wca-infonet.org/>

institutional and resource type boundaries. It also provides tools and interactive services on various levels and pathways of knowledge communications and exchange. The services have been growing ever since with new communication and knowledge layers under development such as the 'land and water' open access e-publishing, on-line applications in irrigation and drainage and others. All services within the Sakia.org system are provided free of charge to the end user. A brief summary of current as well as projected services or those under development within the Sakia.org system, are given below.

## **WWW VIRTUAL LIBRARY IRRIGATION AND HYDROLOGY**

### **Objective:**

The main objective of the Virtual Library Irrigation and Hydrology is to increase the amount of dedicated and quality controlled knowledge available on-line and for free by providing the supply and access framework mainly for information not yet published on-line elsewhere.

### **Outline:**

Long before automatic indexing and search services such as Google™ etc. started to emerge, catalogue sites were established, thematically categorising the on-line content world wide leading to the establishment of the World Wide Web Virtual Library Catalogue<sup>3</sup>, the oldest distributed catalogue system on the net. Subsequently the WWW Virtual Library Irrigation and Hydrology was established as a subsection of this catalogues in 1995. Initially the VL Irrigation and Hydrology consisted mainly of manually screened, technically classified and described links pointing to relevant sources on the Internet. With the time it became apparent that researchers, extension staff and farmers would need more on-line information and that not enough relevant information was actually available and freely accessible on-line. With the reestablishment of the WWW Virtual Library Irrigation and Hydrology in November 2003 as part of the Sakia.org system, a shift towards the provision of more freely accessible full text on-line publications was made.

The new Virtual Library Irrigation and Hydrology is a the thematic catalogue for on-line publications within the Sakia.org system. While still modest in its extent it unifies publications and information of different type and origin within a defined structure. It opens up the opportunity to republish and share relevant and reviewed articles on-line. All publications are fully indexed and searchable.

This republishing facility is available under the following conditions;

- Article/publication must be of relevance to the thematic scope of the site;
- Article/publication must have undergone a review process whereas different levels are accepted;
- Permission to 'republish' it on-line (with free access) needs to be obtained/available by the copyright holder (original publication details and copyright will not change);
- Submitter must be one of the authors or have authority to submit;
- Article/publication needs to be available in appropriate electronic form.

Articles accepted for on-line publishing through the Sakia.org e-publish system e.g. eLWRA (see below) will also be accessible through the Virtual Library section.

### **Status:**

Operational, content filling stage

### **Envisaged activities:**

- Promotion of republishing of articles as a form of 'self archiving' within the VL.
- Agreements with institutions and publishers for republishing of e.g. 'older' articles.
- Establishment of a small editorial team.

### **Access:**

<http://www.vl-irrigation.org/>

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<sup>3</sup> The WWW Virtual Library main catalogue: <http://www.vlib.org/>

## **IRRIGATION-L & IRRIGATION-L.org**

### **Objective:**

The main objective of IRRIGATION-L is to support the national and international irrigation community and industry by providing a dedicated information and exchange service intended for discussions in the field of irrigation theory and practice.

### **Outline:**

IRRIGATION-L is one of the two oldest and major e-mail discussion lists in the field of irrigation worldwide and was established in 1994. It has been active ever since. It provides the facility and platform for national and international exchange on issues related to the field of irrigation theory and practice. It is an important platform for research communication and information exchange amongst user from various backgrounds. For many users, especially from remote regions and countries, it is a convenient way of technical communication and information exchange with colleagues as only a low bandwidth access line is needed. Currently the list has more than 600 members from different backgrounds and countries. The concept of this discussion list is based on the cooperativeness of its members to share their knowledge freely across borders and institutional boundaries and to assist each other in solving technical problems. The IRRIGATION-L history has proven the validity of this concept.

IRRIGATION-L.org is the home website of the IRRIGATION-L e-mail discussion list with fully searchable and threaded on-line archives of all postings since the establishment of the list in 1994 (more than 5,500). While all discussions take place exclusively through the email based discussion list all new postings are sorted into the threads instantly and may be reviewed and searched on-line shortly after they were sent out to the list.

### **Status:**

Operational

### **Envisaged activities:**

- Establishment of a small technical support team providing hands-on support through practical advice as well as through current and up-to-date scientific knowledge communication to and through the list.

### **Access:**

<http://www.irrigation-l.org/> (website and archives)  
[irrigation-l-request@listserv.dfn.de](mailto:irrigation-l-request@listserv.dfn.de) (email for free subscription)

## **NEW IRRISOFT - ON-LINE APPLICATIONS IN IRRIGATION & HYDROLOGY**

### **Objective:**

The main objective of the *NEW IRRISOFT* service is to provide on-line versions of applications in the field of irrigation and hydrology which will allow users to compute on-line rather than on a downloaded version. In addition quality controlled and reviewed software descriptions and download facility for irrigation and hydrology software shall be made available.

### **Outline:**

The original IRRISOFT was/is an on-line Irrigation and Hydrology Software Database established in 1996. Numerous irrigation, drainage and hydrological programs have been written by individuals or groups over the years but finding the right application was and is still a time consuming and difficult process. Hence information on more than 100 dedicated irrigation, drainage and hydrology programs was collected, compiled and presented in a unified structure on-line allowing scientist and practitioners to find the tools needed and even download some selected packages. Cooperations with institutions such as ILRI (The Netherlands) and the ICID were initiated to update, extend as well as to merge existing knowledge on irrigation, drainage and hydrology programs world wide. This service is currently dormant and access is provided for historical reasons only.

The *NEW* IRRISOFT server is intended to extend the traditional range of services by providing additional services in the range of dedicated on-line applications. The majority of applications in that field so far have been written as standalone versions to be run on PCs or on small networks. Improved and extended on-line versions are far more effective in reaching a wider audience of users as well as allowing a far extended functionality and linkage of data. Integrated packages are to be developed allowing one application to cover a wider spectrum e.g. crop water use, irrigation scheduling, climate prediction, growth model etc. Customised logins will allow users to store previous sessions as well as personalised data on crops, soils etc. The *NEW* IRRISOFT provides the framework for a new generation of on-line applications thematically placed with the 'land and water' area.

**Status:**

*Software database:* Old site currently dormant and not updated anymore.

*Dedicated on-line applications:* Prototype under development

**Envisaged activities:**

- Review of software applications and reestablishment of the IRRISOFT database.
- Development of on-line tools and full featured on-line applications.
- Establishment of a core support and editor team.
- Cooperation with institutions.

**Access:**

<http://www.irrisoft.org/> (currently historic site)

**eLWRA: E-JOURNAL OF LAND AND WATER RESEARCH AND APPLICATION****Objective:**

The main objective of the e-Journal of Land and Water Research and Application (eLWRA)<sup>4</sup> is to increase the amount of dedicated and quality controlled knowledge available on-line and for free to the user by providing the supply and access system as well as the organisational structure for scientific publishing to the 'land and water' research community.

**Outline:**

Core and scientifically valid information, which is needed to assure an effective sustainable development, is still far from being in any way sufficiently and adequately available on-line and for free. The e-Journal of Land and Water Research and Application (eLWRA) will provide a scientific on-line publishing facility within the area of 'land and water'. This service will be provided with free access for the end user (Open Access). Manuscripts may be submitted on-line and will have to pass a standard peer review process assuring that quality standards are met accordingly. The applied review process will clearly be labelled alongside the article once accepted for publication. The journal will be registered with an ISSN number and will be listed and referenced in the commonly used citation indices. It will have its own web section providing catalogued access to the full text as well as advanced search facilities allowing the full text of all publications to be searched. In addition all articles will be linked to a thematically structured catalogue of the Virtual Library providing wider and improved access to the knowledge generated.

With Sakia.org as a hosting services, a modern and flexible content management system was established capable of providing the steadily increasing demand of functionality and server capacity for the journal.

The technical scope of the e-Journal of Land and Water Research and Application (eLWRA) is to provide in depth knowledge by integrating the various aspects of 'land and water' management and conservation from the research, application and use perspective.

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<sup>4</sup> Working title for the journal.

**Status:**

Project stage

**Envisaged activities:**

Establishment of an editorial board.

Cooperation with institutions and agencies.

**Access:**

Not yet provided but will be available through:

<http://www.sakia.org/>

## CONCLUSION

Evolving from a widespread user demand for knowledge in the area of 'land and water', and the fact that current publishing and knowledge delivery practices do not meet the ever growing demand in this area, several services within the Sakia.org environment could be established on the Internet and others are under development or in the projecting phase addressing the issue of improved accessibility and knowledge exchange in the area of 'land and water'. While the original 'Sakia' and its precursor services date back as far as 1994/95, the new 'Sakia.org' was redesigned and launched in November 2003 taking into account new user needs and improved system facilities.

While most knowledge exchange support services have nowadays moved from paper to electronic forms they are still based on communication pathways, governed by policies and recommendations within frameworks of agreements set out by the parties involved some time ago. While the media has changed many policies and frameworks are only slowly being adopted to suit new and modern knowledge exchange concepts. This is especially true when it comes to core scientific knowledge or knowledge generated by science outcomes. While everybody agrees that 'websites' are needed little agreement is then found in respect to the presentation or accessibility of scientific works and results, which predominantly still takes place in rigid traditional ways. A lot of work is needed to elaborate more appropriate frameworks and policies related to e.g. copyright issues, accessibility, exchange and communication pathways of internal as well as external streams of knowledge generated by the science community, etc., in order to maximise the outcomes of publicly funded research and activities in cooperation with the community and the industry.

Sakia.org is only a modest initiative set out to improve this situation by providing the platform as well as a set of services in support of the 'land and water' community. The current setup is only a subset of what could be done and its success and growth will greatly depend on the degree of community involvement and cooperations with partners from within the wider 'land and water' community.

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