

## BRIDGING THE DIVIDE: THE WORLDFISH CENTER INITIATIVES

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### **Abstract**

Over the past few years, there have been numerous reports of initiatives taken by governments, corporations, foundations and non-governmental organizations in tackling the digital divide. Most of these initiatives tend to focus on just computers and Internet connections. Providing computers to the technology “have nots”, however, is not the complete solution to the digital divide.

In many poor developing countries, their national priorities are different. These people need remedies to problems such as poverty, food supply, hygiene, sanitation, etc. They do not see how having access to the Internet is going to improve their situation. One solution is using the Internet to disseminate critical research results to people who are able to interpret it and turn it into knowledge for the community they serve.

This paper describes the current initiatives taken by the WorldFish Center in helping the groups of people that are lagging in the digital world, particularly those in developing countries. It does this by using its current resources and ITC abilities to develop high quality research-based information on living aquatic resources and making them freely available, via the Internet, to policy makers, researchers, extension workers, and farmers/ fishers worldwide. These activities are being developed collaboratively with its partners and are aimed at promoting access to and the dissemination of scientific information and knowledge. Other initiatives taken are increasing the general access to Center electronic publications and promoting its training program in information production and dissemination.

**Keywords:** Digital divide; Information and Communication Technologies; Information gap; Global public goods; Knowledge products; Living aquatic resources; WorldFish Center

## **Introduction**

There have been many discussions and reports on the digital divide over the past few years (Brides.org report, 2003). Most of it revolves around the effects of the information revolution and how it affects people who do not have access to information and communications technologies (ICT). Thousands of initiatives taken by various governments, the private sector and non-governmental organizations in closing or narrowing the gap have also been reported. Many of the initiatives reported are about using ICT to transform people's lives and the implementation of government policies to resolve the problem. In all these reports, multiple definitions of the digital divide are used to justify the approach taken to tackle the issue. Similarly, various interpretations of success have been reported that it is difficult to really ascertain whether the gap has been narrowed or is widening.

## **Disparities in ICT Use**

According to the UN Human Development Report of 2003, 88% of Internet users are based in the developed countries and they constitute only 15% of the world's population. Less than 1% of people in south Asia have online facilities while in Africa, only 14 million out of 739 million people have phone lines. Needless to say, computer ownership is greater in the developed countries. In 1998, it was reported that there were 311.2 personal computers per 1,000 people in the developed countries, 7.5/1000 in Sub-Saharan Africa, 2.9/1000 in south Asia, and only 0.7/1000 in countries such as Mali (World Development Report, 2000/1). A major factor for the disparity is the affordability of ICT. In Bangladesh, for example, the cost of purchasing a computer costs more than eight years of income of an average earner, compared to one month's wage of an average American (Williams and Choo, 2002). The disparities in ICT usage is causing the information gap between the information "have" and "have nots" to widen and is the main factor for the exclusion of the world's poor from the information revolution.

The rapid growth of the Internet and ICT has changed the way information is being delivered and disseminated. People who have easy and quick access will be able to make use of vital information being disseminated to improve their decision making, accelerate economic progress, research, etc. Whereas those being denied access because of affordability reasons or resistance will be deprived of information – information that is essential for economic growth and improved quality of life.

For people in the developing countries, the issue goes beyond the provision of connections and computers. The illiteracy, poverty and resistance issues need to be properly addressed if they are to be included in the information revolution. It is difficult for them to see how access to the Internet will help them improve their situation when their priorities are for safer drinking water, better medical

provisions, etc. Thus, any initiatives taken to narrow the divide should also include access to quality information and best practice knowledge that will be beneficial to their decision making process. For the scientists, they need to be provided with relevant, high quality and current scientific and scholarly information and knowledge so that technology transfer and innovations can take place.

This paper will focus on initiatives taken by the WorldFish Center in helping the groups of people that are lagging in the digital world, particularly in the developing countries. The initiatives revolve around using ICT to produce and disseminate research-based information and knowledge to people who need it, and to encourage networking and information exchange.

### **Importance of Knowledge**

Initiatives aimed at bringing knowledge and information to developing countries are as important as - if not more important than - capital as an engine of economic development. According to Picciotto (n.d.), knowledge is replacing land and capital as the major source of national wealth. The rich countries are those having information rich society. Poor nations with connectivity problems and thus low Internet usage will inevitably be marginalized as they are deprived of access to information resources. An effective way of accelerating development is providing knowledge to people who need it. This involves more than just providing training and education. It also means giving easy access to knowledge network. For many organizations and individuals in developing countries, accessibility to scientific information is difficult and too expensive. This situation tends to put researchers of developing countries at a disadvantage for they are not able to contribute as co-equals in international research networks. To be able to produce “cuttingedge” science and to induce researchers to publish their work in international journals, they need access to the latest scientific findings and literature. This is not only the most basic prerequisite for intellectual development, but also for human development in general.

### **The WorldFish Center**

The WorldFish Center (formerly known as ICLARM -The World Fish Center) is an autonomous, nonprofit, international scientific and technical center, which has been organized to conduct, stimulate and accelerate research on all aspects of fisheries and other living aquatic resources. It is committed to improving the lives of present and future generations of poor people in developing countries. It aims for poverty eradication; a healthier, better-nourished human family; reduced pressure on fragile natural resources; and people-centered policies for sustainable development. It achieves this through research, partnerships, capacity building and policy support.

The Center's work is spread geographically in Africa, Asia, the Pacific and the Caribbean. Staff members are similarly spread around the world to cover these regions. The Center's 9 outreach sites by region are: -

Asia: Penang - headquarters, Bangladesh, the Philippines, Vietnam

Africa and west Asia: Egypt - regional headquarters, Malawi, Cameroon

Caribbean: British Virgin Islands - regional office

Pacific: New Caledonia (France) - regional office, Solomon Islands

## **Knowledge Products**

The WorldFish Center has been playing an important role in bringing the information revolution to developing nations. It uses its experiences, current research resources and ICT abilities to develop high quality research-based information in fisheries and living aquatic resources and making them freely available, via the Internet, to policy makers, researchers, extension workers, and farmers/ fishers worldwide who can then use them to address the food insecurity problem. Many of these initiatives have been put into place through the collaborative actions of a network of partners and are primarily intended to lower the barriers to research collaboration in the developing world. Such initiatives are regarded as “Global Public Goods” and thus made freely available to those who need it. The user of such information, however, should be for noncommercial purposes and proper citation is required.

## **WorldFish Library**

The library uses the web site to create a strong presence. It incorporates the traditional functions of librarians, i.e., that of selecting information resources, organizing them and then providing the access. In this case accessibility is provided through the web. The library's web site is designed to provide free and open access to information for all its users. It provides links to Center and other information resources, and access to the library's online catalog and databases. The aim is to bring the rich information resources to its information seeking users.

The library plays a pivotal role in facilitating quick and easy access to the Center's knowledge databank. It is a strong promoter of open access literature whereby Center publications are provided free of charge to everyone. Users are allowed to freely download the documents for unrestricted readings, copy them and share the information with others. The aim is to disseminate critical research results to people who are able to interpret it and turn it into knowledge for the community they served. To fulfill this role, the library records and stores all publications/ documents published by the Center, storing them electronically and making them available on the Web. For publications that are not available electronically, efforts are currently being undertaken to digitize them for posting on the Web. CD-ROMs are provided to countries where Internet connectivity is unreliable or costly. The library is also currently developing a database of staff

publications printed in external sources whereby their works are recorded and stored electronically. Such works, however, will only be posted on the Web when the library has obtained permission from the publishers to do so. Photocopies are only provided freely to requestors from developing countries.

A key issue in improving the transfer of information on fisheries is the training of library staff. The librarians need to understand fully the mechanisms of information management and dissemination and their role as information providers. Only when they have sharpened their skills in collecting, storing, retrieving, presenting and managing information can they act effectively as the provider of links between people and knowledge. To address this issue, the library conducts a capacity building program to train of fishery librarians from developing countries. Topics covered include traditional librarianship skills and also ICT applications, as computers, databases, and the Internet are now the coin of the realm.

### **CGIAR-FAO InfoFinder**

A free Internet resource that provides instant access to full-text digital information available on the web sites of the 16 Consultative Group on International Agricultural Research (CGIAR) and the Food and Agricultural Organization of the United Nations (FAO). It is available at <http://infofinder.cgiar.org/>. It is a good resource site for accessing the “grey literature” of the CGIAR centers because the documents are unpublished in journals and the copyrights are held by the collaborating institutions. The InfoFinder is intended to meet the information needs of scientists and researchers, academicians and university students, and journalists who are involved in various research and development activities in the field of agriculture and fisheries. Search results appear as a collection of records with links to either full-text documents or web pages. The benefit to users is that they could access information generated by the 16 CGIAR centers and FAO in one search, with few clicks. The WorldFish Center is one of the 16 CGIAR centers and the WorldFish library indexes the Center electronic documents for the InfoFinder.

### **FishBase**

FishBase, regarded by many users as the world's premier database and information system on all the world's fishes has been developed by the Center together with a large number of international personal and institutional partners<sup>1</sup>. It is available in several editions of a book (Froese and Pauly, 2000)<sup>2</sup> in English, French, Spanish, and Portuguese, in both CD-ROM and also freely available on the worldwide web (<http://www.fishbase.org>) through its main web site at CGNET

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<sup>1</sup> Adapted from Fabres (2003). Building responsive networks to manage tropical fisheries through international public goods: the contributions and role of FishBase.

<sup>2</sup> Froese, R. and D. Pauly (eds). (2000). FishBase 2000; concepts, design and data sources. ICLARM: Los Banos, Laguna, Philippines.

in the USA and four mirror sites. The CD-ROM version was introduced in 1995, and the Internet version in 1998, with mirror sites in Germany and France. It is generally recognized as a unique global encyclopedia of structured biological and ecological information and key facts needed for fish conservation and management. It has grown to a multi-media encyclopedic product (an interactive database of over 3.1 million records) in 139 thematic database tables, e.g., fish production, aquaculture, trade, local names, taxonomy, population dynamics, genetics, morphology, diseases, fish health, diet, images, ecosystems and fisheries ecology with structured numerical data, free text, images, graphs, maps, and over 100 customizable reports. It caters to different professionals such as research scientists, fisheries managers, zoologists and many more. **FishBase receives over 4 million Internet hits a month.**

### **ReefBase**

ReefBase, which is freely available on the worldwide web at <http://www.reefbase.org/>, is a global information system on coral reefs<sup>3</sup>. The aim is to provide easy access to summary information relevant to coral reef management. Although the primary target audience is managers and policy makers, it is also an increasingly important resource for researchers, upper secondary, tertiary and post-graduate students and teachers as well as the public. ReefBase offers four major types of information. They are:

1. Summary information on the status, threats and management of coral reefs at the country level;
2. User friendly access to reports and maps on key data sets including coral bleaching, coral diseases, marine protected areas, and monitoring programs;
3. Maps generated by an online Geographic Information System (GIS) which provides access to reef locations, Reefs at Risk results; Reef Check results, marine protected areas and key data sets; and
4. Online resources such as literature, reef-related photos and contacts.

In the last two years ReefBase has shifted its emphasis away from the production of CD-ROMs offering the ability to drill down to find data on particular sites. It now offers a Web-based information system, which provides higher-level summaries of reef condition and management, and search facilities to obtain information on specific themes on a country or regional scale. In the future, ReefBase will increasingly focus on becoming a repository for high quality, up-to-date information on specific topics (e.g. coral bleaching) and providing summaries of other important issues together with links to other sources for details. **ReefBase receives over 22,000 hits monthly.**

### **The Fisheries Resource Information System and Tools (FiRST)**

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<sup>3</sup>Adapted from Noorderloos and Oliver (2003). ReefBase: A global information system to promote sustainable use and management of coral reefs.

A database system developed and designed to complement FishBase and ReefBase and also to provide fisheries managers with information on the status and distribution of fish stocks and options (levels) for restoring production of coastal fisheries resources<sup>4</sup>. Developed initially to serve as a data management system for extant trawl surveys, it now includes an analytical routine to approximate biomasses and generic socio-economic data, as well as catch and effort statistics for coastal fisheries. The database system has become an important regional repository of information for sustainable management of coastal fish stocks in eight Asian countries, namely Bangladesh, India, Indonesia, Malaysia, the Philippines, Sri Lanka, Thailand and Vietnam. The FiRST (version 2001) software is distributed by the WorldFish Center to interested countries/institutions. However, access to country-specific data contained in FiRST requires permission from relevant government institutions in the participating countries. Further information on the database system is available at [http://www.worldfishcenter.org/trawl/update\\_oct2001/FiRST Manual/first manual.htm](http://www.worldfishcenter.org/trawl/update_oct2001/FiRST Manual/first manual.htm).

### **LarvalBase**

A global information system on the morphology and biology of fish larvae. Information in LarvalBase is supported by more than 1,428 published articles, with references available on the LarvalBase website. The general objective of this project is to provide fishery and hatchery managers in developing countries with quick and easy access to relevant information on the identification and rearing of fish larvae for aquaculture and stock enhancement; and for the conservation and reestablishment of depleted fish populations. LarvalBase was available since February 2001 on CD-ROM as part of FishBase2000. Since then, it has been distributed to over 1000 users, mostly in developing countries. LarvalBase is available at <http://www.larvalbase.org/>

### **Resource Assessment Tools**

The WorldFish Center has been instrumental in making length-frequency-based methods available to tropical developing countries (WorldFish Center annual report, 2001). The need arose because of the difficulty in obtaining stock assessment methods as those available were from the temperate north and traditionally based on age-structured information. The Center's prominent role was based on collaborations with other fishery scientists since 1978. Since its inception, there has been much conceptual and methodological advances to understand and manage fisheries resource systems. New approaches and techniques developed were distributed through computer program routines, which are now widely used by researchers in developing and developed

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<sup>4</sup> Adapted from Garces and Silvestre (2002). An overview of the Fisheries Resource Information System and Tools (FiRST) version 2001: A database management system for storing and analyzing trawl survey data.

countries. Advances include the ELEFAN (Electronic Length-Frequency Analysis) software, windows –based version of ECOPATH (available at <http://www.ecopath.org/>) and FiSAT (FAO-ICLARM Stock Assessment Tools) available at <http://www.fao.org/fi/statist/fisoft/fisat/index.htm>. These tools can be downloaded from the web sites.

### **RESTORE (Research Tool for Natural Resource Management, Monitoring and Evaluation) software**

The need to integrate environmental concerns into agriculture and food production systems is growing, but is still largely unaddressed, and this is of concern to many national and international research and development agencies<sup>5</sup>. The challenge is to find ways to bring the respective knowledge and skills of scientists, extensionists and farmers together in a collaborative process focused on the incorporation of natural resource management concerns into farming systems development. RESTORE was developed in 1991 to address this need. So far the procedures have been tested with farmers in only the hot wet tropical climates of Bangladesh, Ghana, Malawi, Cameroon and the Philippines. However, this approach should also be applied to semi-arid and arid tropical areas as well.

RESTORE has now become an established tool in on-farm research and monitoring activities on the introduction of integrated aquaculture-agriculture. This software and its manual can be requested from the WorldFish Center. There are plans to post it on the Internet in the near future.

### **Training Aids**

Education and training are an integral part of the Center's activities and are closely associated with research. The focus is on capacity building for fisheries/ biodiversity and policy making. Over the years many training materials, courses and on-the-job trainings have been conducted. An example of a highly successful and useful training program is the TRAIN-SEA-COAST. This program uses the standardized training package, based on the United Nations training methodology. This training package is the main training aid used to enhance the understanding of participants on a particular subject. Another example is the Genetic Improvement of Farmed Tilapias (GIFT) training manual produced in 1998. This manual contains methodologies and policy guidelines that can be applied or adapted to a wide range of finfish species in national fish genetic improvement programs. The library is still receiving requests for copies of the manual from academicians teaching fish genetics or from scientists involved in fish genetics research. The training manual titled "Training resource book for agro-ecosystem mapping: process documentation of an experiential learning exercise in agro-ecosystem mapping" published in 1989 is also a much

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<sup>5</sup> Adapted from Lightfoot, C. et.al. (2000). Research Tool for Natural Resource Management, Monitoring and Evaluation (RESTORE)

requested document. Originally published as a training aid to assist farming systems researchers in eastern India, the manual is now being used by researchers in other areas of agro-ecosystem mapping.

## **Conclusion**

The digital divide is a complex problem and what works best in industrialized countries might not be applicable for developing countries. Any initiative taken to tackle this issue should take into consideration the prevailing local conditions and needs. For the WorldFish Center, its efforts to narrow the information gap has revolved around producing high quality research based information and knowledge on living aquatic resources and disseminating these freely to the information seekers. The poor might not have direct access to these information, but the focal points in their countries can use the Center as an international reference point for real-time information and best practice knowledge to assist them in their decision-making and other strategic planning processes. The information network established by the Center has also become an effective tool to address the social problems of poverty, underdevelopment and deprivation.

The WorldFish Center has been pioneering aquatic resource management research for over 25 years. It is in a good position to use its experiences, resources and advanced technologies to help bridge the information gap between the information rich and information poor societies.

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