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07

INFORMATION AND COMMUNICATIONS TECHNOLOGIES BENEFIT FISHING COMMUNITIES

POLICIES TO SUPPORT IMPROVED COMMUNICATIONS FOR DEVELOPMENT

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

INFORMATION AND COMMUNICATIONS TECHNOLOGIES BENEFIT FISHING COMMUNITIES

The aim of this policy brief is to:

Show how new information and communications technologies (ICTs) can link with established methods to enhance opportunities for development

Review the uses and potential impact of existing and emerging information and communications technologies in fisheries and fishing communities

Suggest policy strategies and partnerships to encourage access to and usage of ICT for fisheries management and for livelihood support and poverty reduction

Cover photo courtesy of Blythe McKay

USES OF INFORMATION AND COMMUNICATIONS TECHNOLOGIES IN FISHERIES

New information and communications technologies (ICTs) are being used across the fisheries sector, from resource assessment, capture or culture to processing and commercialization. Some are specialist applications such as sonar for locating fish. Others are general purpose applications such as Global Positioning Systems (GPS) used for navigation and location finding, mobile phones for trading, information exchange and emergencies, radio programming with fishing communities and Web-based information and networking resources. A wide range of technologies can be adapted and introduced in all but the most remote communities and, once appropriated by users, can have positive impacts on their lives.

ICTs can be defined as "technologies that facilitate communication and the processing and transmission of information by electronic means"[1]. Responsible use of ICTs can contribute constructively both to livelihoods enhancement and poverty reduction in fishing communities. Access to and exchange of key information can assist fishing communities in making informed decisions on a variety of matters from whether to engage in specific fishing operations to trading at a local market to participating in a meeting – decisions that can help reduce their vulnerability and improve their opportunities. ICTs can also assist people to be heard, encourage networking and knowledge-sharing and increase access to the governance process and political agency.

ICT usage has evolved in an unstructured way through a combination of market forces, the ingenuity of civil society and varyingly favourable government frameworks. There is concern that marginalized and vulnerable communities may not benefit equally, and that ICTs can contribute to widen the gap between rich and poor, the powerful and the exploited. Functional literacy may also be needed for many digital technologies, which in turn requires new skills and capabilities. Rising demand, falling equipment prices, the growing integration and interconnectivity of ICTs suggests the spread of these technologies will accelerate.

Given the enormous potential of ICTs, this brief argues that there is an urgent need to focus *strategically* on ensuring that:
- the exploitation and spread of the new technologies in fisheries is oriented explicitly towards meeting the needs of the poor; and,
- the use of new technologies in fisheries is integrated into participative, people-centred communications for development and knowledge sharing approaches.

KEY FACTORS FOR "REAL AND MEANINGFUL" ACCESS TO ICTs BY THE POOR AND VULNERABLE

- **A successful mediation process by an effective and local intermediary is required so that ICTs can contribute meaningfully to improve the livelihoods of the poor;**
- **ICTs have to be locally appropriated by poor communities, in order to facilitate their empowerment; and**
- **ICTs have to build on and strengthen existing social and organizational community structures, so that they can lead not only to the individual but the collective empowerment of poor communities.**

Photo courtesy of Radio Alakal Media Society

Source: Gigler, Bjorn-Soren. "Including the excluded - can ICTs empower poor communities? Towards an alternative evaluation framework based on the capability approach", paper presented at the 4th International Conference on the Capability Approach 5-7 September, 2004 University of Pavia, Italy. http://cfs.unipv.it/ca2004/papers/gigler.pdf

[1] This refers to the widely-accepted definition from the Department for International Development (DFID) of the United Kingdom of Great Britain and Northern Ireland (2002) and encompasses the full range of ICTs, from radio and television to telephones, computers and the Internet.

FISHING AND TRADING ACTIVITIES

Fishing operations

A range of increasingly affordable electronic technologies can be used:

- as navigational aids and satellite-enabled communications systems such as GPS to mark fishing spots for easy return, saving time and fuel;
- once on fishing grounds, fish-finding equipment such as sonar and echo sounders can be employed to locate specific shoals of fish.

FISH-FINDING EQUIPMENT

Although traditionally expensive technologies used on larger boats and/or by wealthier fishers, sonar-based 'fish finders' are getting steadily cheaper, with local non-governmental organizations (NGOs) and fishing associations promoting their use for small-scale fishers. They can also be shared, whether between boats fishing together or through installations in telecentres, as in this example from a M. S. Swaminathan Research Foundation pilot in Veerampattinam, Pondicherry, South India.

Photo courtesy of Pete Cranston

Market and price information

Good and timely knowledge is essential for competing in local and global markets. Information about prices and availability can be shared across value chains, increasing the power of smaller or otherwise disadvantaged groups while reducing the volatility of fish prices and wastage of fish. Key ICTs are:

- *community or loudspeaker radio* – price information received by the radio station or researched via specialist Web sites at the local telecentre is passed on to the community through established communication channels; and
- *mobile phones* – providing there is network coverage, fishers, buyers and merchants communicate through voice calls, via SMS messages or by accessing specialist WAP services; catch can be sold while still out at sea; buyers and processors can be informed of catch details before landing.

Advice and services

Valuable information that can be made available through ICTs includes fishing and processing techniques and equipment, sales and marketing advice, financial advice and services and legal issues. A needs assessment can define areas of interest and how best to respond to them.

MANOBI – A RANGE OF INNOVATIVE SERVICES FOR SENEGALESE ARTISANAL FISHERS

In 2003, in collaboration with Sonatel (the Senegalese phone operator), Alcatel, IDRC and InfoDev, the Senegalese telecommunications company Manobi began to provide fishermen with real time weather reports and market prices using WAP and SMS technology via mobile phones. The interactive technology enabled fishermen to input fish stock information for marketing as well as departures and estimated times of return so that local fishing unions could be alerted in emergencies. The project successfully persuaded Sonatel to install a phone base station near the beach, ensuring network coverage up to 14km from the shore.

In 2005 Manobi launched a GIS system, using GPS and GSM technologies to increase protection at sea for fishermen and their boats, in partnership with insurance companies. It provides precise real-time localization up to 45km offshore. Fishers pay an insurance premium based on time spent at sea, and their mobile phone acts as security for both them and the insurance company.

Sustainability and business models
There is significant work and cost involved in collecting and disseminating market price information, whether by a community group, an NGO, the government or a private company. A key feature of Manobi's innovation, as with other mobile service providers in the development sector, is a revenue-share contract with the telecom provider. However, margins are small and their fisheries projects in Senegal are too small to be profitable. Manobi is now looking into setting up a franchise system to expand its market information services to a range of countries, working with local implementation partners and coordinating the platform itself. The alternative would be to seek public sector support, designing and building multistakeholder partnerships to scale-up such initiatives.

Source: http://www.manobi.net

Photo courtesy of Manobi © 2001

e-credit

The spread of mobile phones has brought easier and cheaper communication among the various actors (fishers, traders, etc.) in the fishing value chain. Field research carried out in Senegal in July 2006 pointed to a need for mobile-enabled payment systems to facilitate this, based on the rapid growth of varieties of e-money, such as Selpay in Zambia, G-Cash in the Philippines and No Borders in a number of South American countries. The same technology also shows huge potential to facilitate the sending of remittances from migrant workers.

e-government

Potentially significant efficiency improvements can follow networking of relevant government services as illustrated in Senegal, for example, where computers and software packages are being used in fish markets to speed up and improve their administration and monitoring, with plans to link markets to each other and to relevant government offices via the Internet.

Post-harvest

ICTs can be integrated into different stages of the fish distribution chain. On Lake Victoria, a Ugandan Nile perch exporter now includes computers and specialist software on board larger fishing vessels and quality control in the factory to reduce waste and help ensure compliance with strict export standards.

PEOPLE AND COMMUNITIES

The uses of ICTs for development go beyond direct support for income-generating activities. ICTs for pro-poor development can be a powerful means of reducing people's vulnerability, of fostering equity and social inclusion and in mobilizing communities to take charge of their own development. In conjunction with traditional communications activities such as meetings and theatre, community radio, video/television, mobile phones, telecentres and print publications can be used to share information and knowledge, as well as raise awareness and stimulate discussion of issues such as gender, health, education, local development and diversification of income-generation. ICTs (particularly mobile phones and the Internet/telecentres) also have an important role to play in connecting migrants with their home communities.

Food and livelihoods security issues and the lack of extension support for fishers and fish farmers can be addressed through information networks. New opportunities can emerge from combining mobile and newer networking technologies such as WiFi and WiMax, digital radio satellite broadcasting (such as WorldSpace or the Indian national satellite systems) and continuing developments in low-cost, low-power computers. This can enable access to a range of government services (e-government), for example, by marginalized, mobile and/or remote fishing communities. If supported by capacity-building, this also opens up educational, health and other content of crucial importance to livelihoods.

For example, the pilot Fishnet set up by the Ilaje local government in Ondo State, Nigeria, used meetings, television, leaflets, radio, posters and other methods, supervised by fisher cooperative groups, to share user-driven content on fish production techniques. The success of the project's listening groups also showed the value of targeting such ICT products to groups rather than individuals.

Vulnerability reduction

The vulnerability of fishing communities is highly linked to the sensitivity of their livelihoods systems to risks. These risks, the means to recognize and address them, as well as the confidence to do so, need to be identified and communicated to reduce vulnerability,

Increasing safety

According to the International Collective in Support of Fishworkers, "fishing is probably the most dangerous occupation in the world …the tragic consequences of accidents at sea are borne by the fishers' dependants and the fishing community at large"[2].

ICTs are increasingly being used to ensure safety at sea. Fishers can have access to up-to-date weather information before setting out, through community radio stations, loudspeakers and telecentres collecting and broadcasting information. Mobiles and radios also allow better communication with other boats and the shore.

The December 2004 tsunami increased awareness of the value of ICTs, and the Indian Ocean tsunami early warning system is to involve seismic and wave sensors, satellite links and relay centres triggering sirens, radio and other alerts. At local level, post-tsunami reconstruction and development by international NGOs such as WorldVision India has included distribution of ICT equipment together with boats and nets. Fishers from Cuddalore villages, for example, are now able to chart and report locations more securely using GPS and can communicate more easily to avert risks.

Social inclusion

Different groups within fisheries, such as women and youth, can use ICT to meet their own specific content and networking needs. For example, "women in fisheries" networks have been developed in a number of regions, from the Pacific to Latin America and Europe. The success of mobile phone microbusinesses run by women, (e.g. Grameen phone project) has now been widely reported. However, disadvantaged groups may also have less access and be constrained by basic issues such as literacy. Support measures may be needed.

YOUTH AND ICTs

Young people are a key resource and audience for ICTs – responsible for much of its innovation and entrepreneurialism. ICT access and its opportunities are often associated with urban lifestyles, encouraging migration. However, with appropriate capacity building and services, ICTs may help create local opportunities for education and income generation. When used to document and share elements of traditional culture in a creative way, they may also help awaken the interest of young people in their own roots.

The Escola de Mídia (Media School), run by the NGO Aldeia in northeast Brazil, engages young people (16-19) in critical perspectives through discussion and video-making. In the Mucuripe neighbourhood of Fortaleza, many young people are from fishing families. Several recent videos deal with fishing themes, such as illegal fishing in artisanal areas by large boats, celebrations for the patron saint of fishing, the role of women and the relationship between fishers and the sea. These have been shown in a number of international film festivals.

Source: http://www.aldeia.org.br

[2] ICSF, "Dangerous Calling. The life-and-death matter of safety at sea: A collection of articles from SAMUDRA report", 2003.

GENDER-RELATED ISSUES WHICH MUST BE TAKEN INTO ACCOUNT WHEN DESIGNING ICT PROJECTS

- **women often do not have money to buy equipment or pay for access;**
- **ICTs are often considered outside women's domain, may only be available in places where women do not feel comfortable, or during unsuitable hours;**
- **rural women rarely find content that is in a local language or relevant to their context and needs;**
- **lack of time and skills and costs mean women often do not use ICTs for potentially the most relevant uses such as business or education;**
- **a lack of data and indicators for success make understanding the situation and scaling up good practice difficult; and,**
- **ignoring men's perspectives can also lead to failure if men, who tend to hold power, feel excluded and stand in the way of programmes targeted at women.**

Source: Summary of 'Gender and Agriculture in the Information Society' (CTA), Helen Odame (2004). http://www.id21.org/society/s6aho1g1.html.

Social mobilization: empowering fishing communities in owning and communicating information

When community radio and participatory video are used, the approach and process are at least as important as the final product. There is a strong shift in emphasis from radio programmes or videos *for* fishing communities to those *by* them, and from passive receivers to active participants. Community radio and participatory video can also be used for exchanges between occupational groups or communities to address directly various fishing-related or broader development questions. Low-cost digital cameras and editing equipment can put technology in the hands of local communities, a key step in fostering appropriation of technology use.

Successful community radio stations, information centres and telecentres are more than places where ICTs are used and information is accessed. They can serve as hubs or catalysts for a range of learning, mobilization, information and knowledge-sharing work in a community. Locally relevant content is a critical success factor.

COMMUNITY RADIO: SHARING INFORMATION FOR LIVELIHOODS AND EMPOWERMENT IN GHANA

Since 1998 Radio Ada in southeast Ghana has been broadcasting in the local language of Dangme. It develops programming with and for different occupational groups, in particular fishermen and (female) fishmongers through facilitating discussions within each group for broadcast. Fishmongers lobbied for their programme to go on air immediately after the fishermen's programme, often using this opportunity to address a message to the men of their community. Such two-way communication enables key issues of gender and power to be tackled openly. Research found widespread agreement among women and men that the women had been listened to and that it had influenced fishermen to change. Greater participation in communal activities has also been attributed to the impact of the radio broadcasts.

Radio Ada works alongside other media and informal community networks in providing information and communication services to strengthen fishers' livelihoods, through broadcasts on market prices, financial advice, peer learning and information on fishing, fish-smoking techniques and marketing advice, and facilitating linkages with local civil society and advocacy groups on strategic local issues. Radio Ada became a UNESCO Community Multimedia Centre (CMC) in 2005, incorporating the Internet and related technologies into its work.

Source: http://www.unesco.org/webworld/cmc

Photo courtesy of Blythe McKay

Advocacy

ICTs can empower fishing communities in local and national campaigning and advocacy work to facilitate dialogue with policy-makers. In Senegal and Chad, for example, the Sustainable Fisheries Livelihoods Programme (SFLP) ran workshops and a photo exhibit to showcase post-harvest fisheries, targeting representatives of local and central government authorities. Radio, and particularly participatory video, are valuable tools for empowering people to speak to wide audiences in a direct and emotionally charged way. In larger campaigns, around trade negotiations, for example, an intermediary organization such as an international NGO can be involved and a much wider range of ICTs used, including podcasting and blogging. A recent Action-Aid campaign used 'advo-casting', using free software to enable low-cost video-conferencing to link grassroots actors directly with researchers and policy-makers.

RESOURCE MANAGEMENT AND CONSERVATION

ICTs can contribute very tangibly to Monitoring, Control and Surveillance (MCS) strategies and data collection – two vital components of responsible fisheries management and highly relevant to global campaigns to control Illegal, Unregulated and Unreported fishing (IUU).

Monitoring, control and surveillance

To address the disruptive impact of illegal fishing, ICTs and electronic fishing technologies are increasingly used to improve MCS. The choice of tools depends on the context and the human and technical resources available – in many cases capacity-building is required. In addition, some of the technologies required for MCS may be costly and difficult to implement where there are a large number of vessels or locations to cover. ICTs can be used to support MCS through:

- protecting local fishing grounds from poachers, using tools such as GPS, radio and mobile phones to locate and report abuses (see box on SFLP activities);
- direct monitoring of activity in national and regional fishing territories with satellite-enabled tools such as the Vessel Monitoring Systems (VMS) used by the European Union and the South Pacific Forum Fisheries Agency;
- enhancing research to set reasonable catch quotas, feeding into MCS strategies, such as the Lake Victoria Fisheries Organisation in East Africa which has used hydro-acoustic surveys to assess fish stocks to develop a more effective fisheries management plan for the lake;
- promoting education or awareness-raising on the need for more responsible or sustainable fishing, e.g. in the use of radio in Kayar, Senegal, through the 'Coasts West Africa' subproject of the Nature and Poverty programme coordinated by Friends of the Earth, the World Conservation Union (IUCN) and the Global environmental conservation organization (WWF); and
- supporting local-level advocacy involving links between telecentres or local community radio stations and civil society groups.

FISH, PEOPLE AND WATER – COMBINING DEVELOPMENT COMMUNICATION AND FISHERIES TECHNOLOGIES IN BRAZIL

Photo courtesy of PPA

Projeto Peixes, Pessoas e Águas (Inland Fisheries, Sustainable Livelihoods and Conservation) in Brazil involves 40 Brazilian and 15 Canadian partners from communities, government, academia, industry and NGOs. It aims to create and implement a model for sustainable socio-environmental management of the São Francisco River basin, and combines the transfer of 'hard' fisheries technologies with a significant social component, dealing not just with threatened fish stocks but also with the lives of the people who depend on them. Public awareness and communication is one of the project's themes and activities have included training in community radio and participatory video. The project also includes capacity development on fish telemetry (radio telemetry) for improved understanding of migratory fish and improved impact mitigation, with the participation of local researchers and fishers.

Source: http://www.worldfish.org/Brazil/PPA_Index.html

Co-management of fisheries resources

Co-management, partnerships between government and fishers, is a key approach in sustainable fisheries, and requires data to be collected and shared across a range of stakeholders. Different methods can be used, depending on the context, including telephones, diskettes, CD-ROMs, e-mail and the Internet. The integration of data collection into a wider information strategy, using a range of tools and methods, can greatly strengthen collaboration and engagement. This array varies depending on stakeholder capacity, including access to technology.

• Where there is good Internet access, tools may include Web portals, online databases, e-mail newsletters and new interactive tools to support collaboration such as blogs, Wikis, podcasting, social bookmarking and mapping.

• For more limited Internet access, ICT tools can support more traditional print and written communication, such as digital versions of translated and repackaged information on CD-ROM, or audio media circulating via established communication mechanisms and informal networks.

• Research tools may include participatory fisheries assessment technologies to support co-management projects, ensuring greater local ownership of the work and its findings. Tools such as GPS may also be used to map community fishing grounds and other territories.

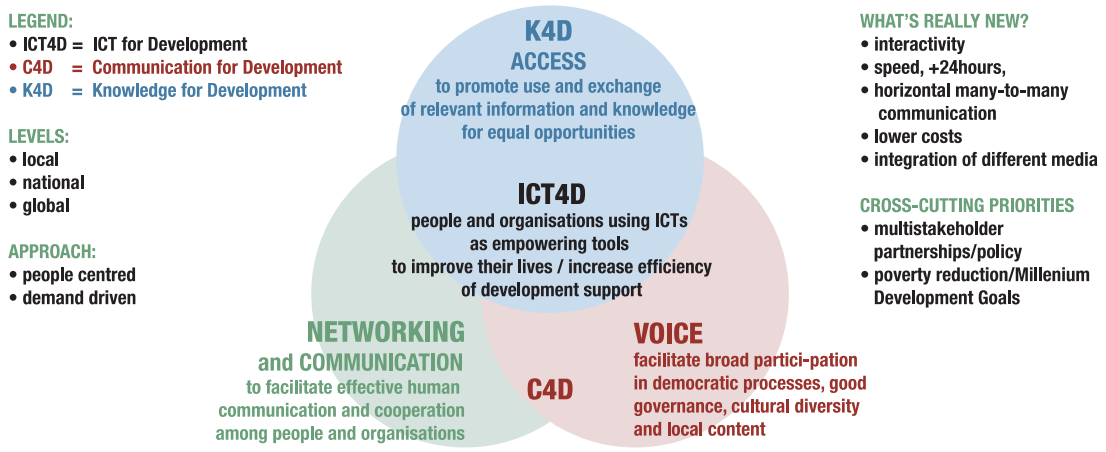
TECHNOLOGIES FOR INFORMATION AND COMMUNICATIONS IN DEVELOPMENT

Digital and other electronic technologies are transforming our economies, societies and lives, with an especially profound impact on the information and communications activities that are central to sustainable development. However, there may be risks and potentially negative impacts arising from their introduction in a fishing context. ICTs are claimed to be "accelerating the decline of fish populations, in that they enable commercial fishing vessels to exploit stocks in areas once considered too difficult to fish"[3]. Furthermore, well resourced developed countries and larger enterprises can gain competitive advantage as they apply ICTs, threatening the livelihoods of local fishers, especially in developing countries. As technology improves, small-scale fishers may also take greater risks, seeking more distant fishing grounds or competing with larger vessels. All of this activity increases pressure on fish stocks. While these implications must be considered in development planning, some important lessons can also be identified at this stage.

Priorities

1. **Radio and other broadcast media such as video and TV are effective in supporting awareness raising, information sharing for livelihoods, disaster mitigation, informal education and the promotion of rights.** Their use should be expanded systematically, learning from accepted leaders in these sectors, such as AMARC[4].
2. **Mobile phones offer the most potential of the new ICTs.** The value of mobiles is in their increasing ubiquity – through shared ownership, they are becoming available in all but the most remote communities. Usage is surging without any consistent public or civil society intervention beyond a supportive legislative framework and open markets.
3. **The Internet remains the most powerful tool for accessing and sharing knowledge through access to email and information resources.** It also opens new possibilities for engagement of southern actors with global audiences and processes.

ICT FOR DEVELOPMENT: KEY DIMENSIONS AND MAIN GOALS (SDC)



Source: G. Weigel, Swiss Agency for Development and Cooperation (SDC), April 2004.

Many ongoing activities already illustrate the importance of building the capacity of local intermediaries such as fishing associations and local NGOs to support fishery communities in the use of ICTs to strengthen their livelihoods as well as for advocacy and campaigning, networking and marketing of their produce. Some of these activities may be undertaken directly by the people using ICTs, and in other cases the local intermediary may undertake the work on their behalf.

KERALA: FISHING FEDERATION SUPPORTS ITS MEMBERS THROUGH A RANGE OF ICTs

In partnership with the Indian Social Institute and the South Indian Federation of Fishermen Societies, the Kerala Swathanthra Malsya Thozhilali Federation (Kerala Independent Fish Workers Federation) in south India has trained people in the use of computer-based applications, Internet, e-mail, GPS, fish finders, mobile phones and hand radios. It is also setting up information centres to provide its members with information on fishing and commerce and has made its fortnightly publication, Alakal, available online at www.alakal.net. Radio Alakal (http://alakal.free-knowledge.net/), a community radio run by youth, narrowcasts information on weather, sea conditions and disaster warning (sourced from Web sites) plus discussions and interviews on livelihood options and market information to a network of kiosks located near fish landing points and in communal spaces. Plans to link up with a local FM station will broaden the range out at sea. The radio uses open source software and its programmes can be downloaded from the Internet as podcasts.

Source: www.keralafishworkers.org

[3] CTA, March 2004
[4] Association Mondiale des Radiodiffuseurs Communautaires/World Association of Community Broadcasters

EXAMPLES OF ICT-RELATED ACTIVITIES SUPPORTED BY THE SUSTAINABLE FISHERIES LIVELIHOODS PROGRAMME (SFLP) IN WEST AND CENTRAL AFRICA

- **In 2000, SFLP supported a Guinean fishing community in the monitoring, control and surveillance of artisanal fishing areas, in partnership with the Guinean coastguard. The fishermen used hand-held GPS receivers to calculate the location of poachers and radioed the information to the nearest coastguard station. Between 2000 and 2002, observed incursions by industrial (often foreign) vessels fell from 450 to 81; disputes at sea dropped from 240 to 35; accidents were down from 200 to 15 and deaths resulting from these accidents down from 12 to 0.**
- **SFLP worked with local radio stations and their listeners in Burkina Faso (near Lakes Bagréand Kompienga), Ghana (Lake Volta) and Mali (Lake Sélingué) to help make programming more useful to fishing communities by addressing appropriate topics and granting different local groups (fishermen, women fish-sellers and women fish-smokers) their own airtime. This radio work complements other training and awareness-raising.**
- **In Burkina Faso, the impact of radio can be seen in changes in perceptions and behaviour, for example better understanding and awareness of the need to protect limited fishing resources by using appropriate materials and combating harmful fishing practices (which have fallen as a result), as well as greater involvement in community activities such as planting and protecting trees and supporting the local association through regular meetings. A key success has been the SFLP-promoted establishment of two aquatic zones for economic development management committees, bringing together all the actors from the Bagré and Kompienga lake regions.**
- **In April 2006, representatives of fishing cooperative unions on the Lake Chad basin in Nigeria contacted local mobile phone operators to explore the feasibility of mobile coverage in the area. Facilitated by SFLP, installation of equipment has begun in Baga and will provide coverage over a radius of 34 km, benefiting 20 fishing communities. The unions will train their members in the use of the phones and are also planning to set up a microcredit scheme to help them in purchasing the phones.**

Source: http://www.sflp.org

WHO CAN DO WHAT – AND HOW?

Information and communications technologies are a fundamental development tool to support information sharing, collaboration and dialogue leading to increased participation and ownership. Programmes and policies supporting further development of ICTs in fishing communities and across the sector more broadly must link effectively between relevant stakeholders from local to international levels, be designed to cater for the needs of the poor and lead towards more responsible fisheries.

Governments, agencies and NGOs working with fishers should:

1. Audit their current information programme communications activities,

consider the links and balances between traditional and emerging approaches, and work systematically to prioritize and integrate communications and information sharing using appropriate ICTs.

2. Develop a strategic approach to the integration of information, communication and ICTs that:

- includes the full range of fisheries actors and ICTs, taking account of the needs of different groups and actively engaging them in defining and managing communications activities;
- sets out connectivity and cost-reduction strategies to cater for differential costs of access (Internet, mobile and fixed telephones) and equipment, as well as coverage of less densely populated and more remote regions;
- incorporates experience from the radio for development sector about techniques to maximize engagement and learning that increase impact for longer-term change;
- seeks to integrate mobile phone use into extension and advice services;
- encourages communications networks that use a range of tools to reach and involve people in the most appropriate way, integrating the Internet with other established tools and methods;
- builds on the convergence of electronically mediated communications, such as in the UNESCO Community Multimedia Centre (CMC) initiative, integrating community radio, Internet and computers; and,
- improves availability of computer and Internet technology within government departments,and their stakeholders to realize the benefits associated with e-government.

3. Integrate ICT into fisheries projects and programmes using people-centred and pro-poor approaches that:

- are based on a careful appreciation of the differentiated communities involved in fishing (in terms of gender, age, ethnicity, etc.), and their different information and communication needs;
- use locally supportable, appropriate and affordable technologies;
- build on and strengthen established communications networks, serving as an extension of face to face and informal networks;
- integrate capacity building and support; and,
- support communities in owning and managing facilities, based on their own aims and goals.

4. Work collaboratively to support needs-based services and content relevant to fisheries enterprises and fishing communities accessible in terms of language and cultural context through:

- encouraging wide sharing and repackaging of content in different formats;
- increasing fisheries livelihoods-related content through "direct training for public radio staff in pro-poor content creation and through support to NGOs who are developing content independently of the sector"[5] as well as capacity building for local content generation;
- supporting development of fisheries related applications and services such as market pricing, security and other alerts, location management and national innovation networks;
- developing integrated programmes within government to facilitate dissemination of health, educational and livelihoods-related information;
- taking action to increase the availability of local content, supporting and scaling existing indigenous knowledge and information sharing programmes; and,
- encouraging the use of multimedia facilities and exploiting the Internet as a content exchange platform for sharing video and audio materials accessible on CD-ROMs, mobiles and computers (podcasts).

5. Promote the adoption of modern fisheries-specific technologies, ensuring their potential is realized by all communities, through:

- supporting local intermediaries such as local fishing associations in building the capacity of their members to use appropriate fishing technologies and ICTs, encouraging innovative financing mechanisms such as microcredit schemes to support the acquisition of the technology;
- ensuring research components of co-management projects involve the participation of fishing communities, for example in data collection, with accompanying capacity building; and,
- include a commitment in agreements with research institutions from developed countries to identify and share new technologies.

6. Build multistakeholder partnerships (MSPs) to address sustainability issues at national and regional levels. MSPs are key to the innovation and sustainability of fisheries-specific ICTs for livelihoods and may be the most effective way of supporting the often high capital and maintenance costs, as well as the capacity-building, networking and content needs of technology interventions.

Policy-makers concerned with information and development should:

- make connections between international and national regulations and their effects on regional and local legal frameworks to support an integrated, ICT-supported approach to fisheries management;
- develop mechanisms with the private sector to ensure mobile coverage in all national territories and in offshore waters and affordable Internet access in all national territories;
- work with the insurance and banking sectors in the development, regulation and monitoring of mobile phone payment and money transfer systems;
- reinforce and update legal and regulatory frameworks to ensure individuals are able to express opinions and ideas, and share information freely when using ICTs; and,
- ensure transparency and accountability by placing publicly relevant information that they produce and manage in the public domain[6].

[5] DFID, 2006
[6] For further information and debate on Internet rights see http://www.apc.org

RESOURCES

Online fisheries information resources

(only considers systems and resources which are freely available)

Regional programmes that give high priority to the provision and dissemination of fisheries information online:

- Network of Aquaculture Centres in Asia-Pacific (http://www.enaca.org/)
- Secretariat of the Pacific Community's coastal fisheries programme (http://www.spc.int/coastfish/Countries/countries.htm), which links to information from more than 20 Pacific Island member countries
- The International Collective in Support of Fishworkers (http://www.icsf.net) works with NGOs in different regions to share and disseminate information such as the collaboration with CeDePesca (http://www.cedepesca.org.ar) in Argentina on the initiative El Foro Latinoamericano de Pesca Artesanal (http://www.cedepesca.org.ar/foroclara)

Global or thematic portals on fisheries information:

- oneFish (http://www.onefish.org)
- FreshwaterLife (http://www.freshwaterlife.org)
- FAO Fisheries and Aquaculture Department (http://www.fao.org/fi/default.asp

Databases and full-text information systems:

- FishBase (http://www.fishbase.org)
- The Digital Library of the Commons (http://dlc.dlib.indiana.edu/)
- IAMSLIC (http://www.iamslic.org/) proposes to build the Aquatic Commons to cover fisheries publications from around the world and provide better opportunities to share information

Women in fisheries networks:

- ICSF site on Women in Fisheries (http://wif.icsf.net)
- Women in Fisheries Network in the Pacific (http://www.spinifexpress.com.au/fasiapub/fiji/fiji2.htm)
- FEMMES (European women in fisheries network) (http://www.fishwomen.org/)
- Red Latinoamericana de las Mujeres del Sector Pesquero (http://mujeres.infopesca.org/)

Photo courtesy of Aldeia

ICT for Development

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Useful Web sites

Association for Progressive Communications http://www.apc.org
Communication Initiative http://www.comminit.com
Eldis ICT for Development Resource Guide http://www.eldis.org/ict/index.htm
FAO Bridging the Rural Digital Divide (BRDD) http://www.fao.org/rdd/index_en.asp
International Association of Agricultural Information Specialists blog http://www.iaald.blogspot.com
ICT Update http://ictupdate.cta.int/
Information Society Research Group http://www.isrg.info/
Knowledge Management for Development http://www.km4dev.org
Remittances Info http://www.remittances.info

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ICT GLOSSARY

Digital radio satellite broadcasting the use of radio waves to carry digital data. With special radios that are able to download data to personal computers the satellite radio can also broadcast multimedia content.

Echo sounding sound pulses directed from the surface or from a submarine vertically down to measure the distance to the bottom by means of sound waves. It is used for navigation and in fishing to detect schools of fish and places where fish congregate.

Fish-finder a device that uses active sonar (see below) to detect fish and the sea bottom and displays them on a graphical display device.

Global Positioning System (GPS) 24 satellites that orbit the Earth and make it possible for people with ground receivers to pinpoint their geographic location.

Global System for Mobile Communications (GSM) the most popular global standard for mobile phones, it makes international roaming very common between mobile phone operators, enabling subscribers to use their phones in many parts of the world.

Hydro-acoustics the study and application of sound in water. Hydro-acoustics, utilizing sonar technology, is most commonly used for detection, assessment, and monitoring of underwater physical and biological characteristics.

Narrowcasting the dissemination of information (usually by radio or television) to a narrow audience, not to the general public.

Personal Digital Assistant (PDA) a handheld electronic device, often incorporating a touchscreen, which can include some of the functionality of a computer, a mobile phone, a music player and a camera.

Podcasting the distribution of multimedia files, such as audio or video programmes, over the Internet, for playback on mobile devices and personal computers.

Short Message Service (SMS) protocol for sending short messages (also known as text messages) between mobile phones, other handheld devices and even landline telephones.

Sonar uses sound propagation under water to navigate or to detect other vessels.

Telecentre a public place where people can access computers, the Internet and other technologies. While each telecentre is different, the common focus is on the use of technologies to support community and social development.

Telemetry the remote measurement and reporting of information of interest to the system designer or operator. Telemetry typically refers to wireless communications but can also refer to data transfer over other media, such as a telephone or computer network or via an optical link. When used to study wildlife, animals or fish under study may be fitted with instrumentation ranging from simple tags to cameras, GPS packages and transceivers to provide position and other basic information to researchers.

Vessel Monitoring Systems (VMS) satellite technologies used for monitoring fisheries vessels

Voice over Internet Protocol (VoIP) (also known as IP Telephony and Internet Telephony): the routing of voice conversations over the Internet or through any other IP-based network.

Weblog or Blog a technology that allows people to easily create online diaries or commentaries. Blogs often provide commentary or news on a particular subject; some function as more personal online diaries. A typical blog combines text, images, and links to other blogs, Web pages, and other media related to its topic.

WiFi networking technology that enables computers, telephones, or PDAs to connect without wires (using radio waves) to each other or a device that is connected to the Internet. Coverage (or 'hot spots') can range from one room to many square miles of overlapping hotspots.

Wiki a type of Web site that allows users to easily add, remove and otherwise edit and change some available content, sometimes without the need for registration.

WiMax a technology (based on a global standard) that increases the range, capacity and security of Wi-Fi. It can connect Wi-Fi hot spots, provide a wireless alternative to cable and DSL for "first mile" broadband access and high-speed mobile data and telecommunications service

Wireless Application Protocol or WAP an open international standard for applications that use wireless communication that enables access to the internet from a mobile phone or PDA.

compiled from Wikipedia.org

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For more information, contact:

SFLP Coordination Unit

Sustainable Fisheries Livelihoods Programme
Food and Agriculture Organization of the United Nations
Viale delle Terme di Caracalla, 00153 Rome, Italy
E-mail: SFLP-PCU@fao.org

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