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Regional Fisheries Livelihoods Programme
for South and Southeast Asia (RFLP)

Lessons learned notes

# Information and communications technology

## for small-scale fishers and fishing administrations

**Information and communications technology** can greatly benefit both fisheries administrations and fishing communities alike. The Regional Fisheries Livelihoods Programme for South and Southeast Asia (RFLP), funded by Spain and implemented by the Food and Agriculture Organization of the United Nations, has utilized information and communications equipment in a wide range of initiatives. This paper highlights some of the benefits, lessons, tips and recommendations RFLP has learned through the use of technology including:

- Personal locator beacons for tracking IUU fishing
- GPS navigation devices
- Echo sounders
- Communications devices
- GPS equipped cameras

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# Tracking and navigation devices

## SPOT tracker – personal locator beacon

**A hand-held tracking device that automatically records its position every 15 minutes in real time via Global Positioning System (GPS) satellite. These devices are usually used by outdoor enthusiasts such as walkers or adventurers.**


*A SPOT tracker unit used by RFLP in Timor-Leste*

### What can it be used for?

SPOT units were used by RFLP as part of a community Illegal, unreported and unregulated (IUU ) reporting and safety-at-sea pilot in Timor-Leste. If fishers saw IUU they would push one button and if they were in an emergency situation they would push another button. Pushing the button would immediately mark the position of IUU that could be viewed on an online map. Meanwhile, the rescue button would deliver an instant message to an emergency focal point.


*Data from SPOT units can be tracked online in close to real time.*

### Benefits

- A very affordable option. SPOT units can cost as little as USD 100 each (plus service fee of approximately USD 50 per year). Larger commercial VMS systems can cost upwards of USD 3,000.
- Engages fishers so they can see clear benefits for themselves and their families (i.e. rescue, families can know where fishers are at any time).
- Makes fishers a partner in reporting IUU and forges relationships between them and the authorities.
- Reports of IUU fishing and vessel movements appear in real time on online maps.
- Provides solid data upon which policies or management strategies can be based.
- Hand held units can be circulated between boats so that illegal fishers do not know who has one.
- Reporting IUU becomes safer as there is no need to make any open transmission over the radio that illegal fishers may hear.
- Increases the likelihood that illegal fishers will be apprehended when a patrol vessel goes out, making patrolling more self-financing.
- Can be issued to fisheries observers working on commercial fishing vessels, allowing cross-checking against written log-books.

*Lourenco dos Reis Amaral of Timor-Leste's National Directorate for Fisheries and Aquaculture monitors tracking data online.*

## Things to consider

- Hand-held units are not suitable for every situation. Fixed units may be more appropriate for patrol boats etc.
- Battery life is limited. Although SPOT uses standard alkaline batteries these are not always available in more remote places.
- It's only a tool. Who will come when you press the rescue button? Where will the IUU data provided be collected? Who will analyze it? Its use needs to be part of a more comprehensive system.

### Tips

- For IUU reporting to succeed, units need to be given to the right boats operating in areas where they are likely to encounter IUU. Fishers may say they are operating in such areas in order to receive a unit but in reality fish elsewhere. By viewing the tracking data you will see exactly where the boats are operating and can reassign the unit if it is not being used as agreed.
- The SPOT unit is simple to use but still needs training and follow up e.g. fishers in Timor-Leste fitted a unit at the top of mast as they thought it needed to be high up for good reception/transmission.
- Local language instructions should be provided on how to operate the SPOT.

### Take care!

Technology in action

An emergency alert was broadcast from a SPOT Tracker issued to a commercial fishing boat operating in waters south of Timor-Leste during April 2012. Efforts to raise the vessel on the radio failed and an Australian Coast Guard aircraft responded to the alert. The vessel was found to be in no distress and one of the crew had simply pushed the emergency button by mistake, while the radio had been switched off.

# GPS navigation devices

A GPS navigation device is any device that receives Global Positioning System (GPS) satellite signals to determine its location.

*A Sri Lankan fisher consults his GPS*

## What can it be used for?

GPS navigation devices are used to determine latitude and longitude information. For fishers they can be used to mark specific points (landing sites, fishing spots, FADs etc.) and navigate easily between them.

## Benefits

- Units are relatively inexpensive.
- Fuel costs reduced as fishers don't waste time finding fishing spots.
- Improves safety at sea by directing fishers back to port/ landing site, particularly in poor weather and visibility conditions.

## Things to consider

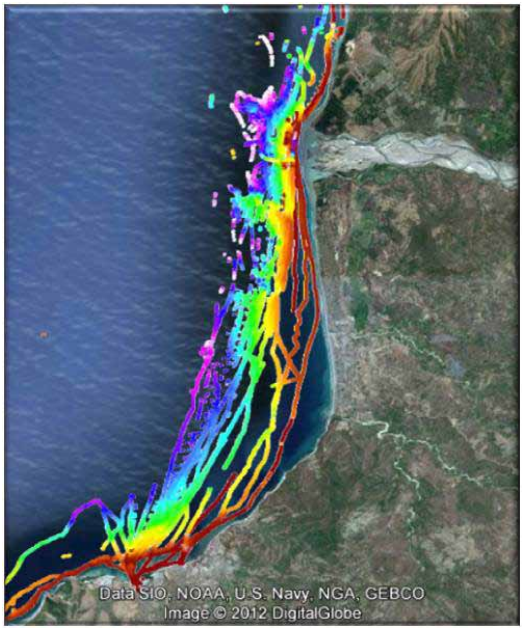
- Making it easy for fishers to return to good fishing spots may result in over-fishing.
- Possible safety implications from fishers operating further from shore.

# Echo sounders (fish finders)

These instruments display measurements of reflected sound on a graphical display, allowing operators to interpret information to locate schools of fish, underwater debris, and the sea bottom. They may also be integrated with GPS navigation systems.

## What can it be used for?

Fishfinders were used by RFLP in Timor-Leste to gather bathymetric data such as depth and water temperature. Vessel movements and fishing patterns were also recorded with data revealing fishing effort being concentrated on near shore reef areas. Information gathered was used to map dangerous places such as shallows, rocks, areas of strong current etc., and also to help calculate fishing effort. Fishers use the equipment to find existing or new fishing spots.




*Bathymetric data recorded in Timor-Leste is available online at the National Fisheries Statistical System www.peskador.org*

## Benefits

- One-time payment only – no annual service charges to pay.
- May help fishers locate new fishing spots, possibly further out to sea, reducing reliance on well known or overfished areas.
- Can help build relationships between the authorities and fisher communities, potentially providing data for years.
- Provides solid data upon which policies or management strategies can be based.
- The growing adoption of this equipment and its impact on fishing patterns may encourage authorities to develop/ strengthen fisheries management plans.
- The equipment may locate key fishing features like sea mounts, which can potentially extend Exclusive Economic Zones (EEZ) coverage.
- Easy to install on almost any size boat and fairly easy to use with a small amount of instruction.

## Things to consider

- By making it easy for fishers to find and return to good fishing spots the equipment may result in over-fishing.
- Possible safety implications from fishers operating further from shore.
- Valuable equipment may become the target for thieves.

## Tips

- ► Install a wooden or plastic box around the screen to make it easier to read in the sun and to provide protection from the elements.
- ► Buy a version that supports a language that the fishers can read and provide local language instructions and as well as hands on training on how to operate it.
- ► Treat the cables (between the sounder and the on deck equipment) with care: they are sensitive.
- ► Get feedback from fishers. In Timor-Leste, fishers using the sounders could find fish using the sounder but could not catch them. As a result, training on better fishing techniques was given.

### More fish, more easily, more cheaply…

Technology in action

Where RFLP has introduced GPS navigation devices or fish finders they have been very warmly embraced by fishers who realize the immediate benefits of finding more fish, more easily, more cheaply. In Sri Lanka, those catching cuttlefish were able to reduce fuel costs considerably while in Timor-Leste catches by some using RFLP-supplied fish finders have increased so much that they have been able to purchase their own unit. The clear benefits of this equipment and the increasing affordability are likely to lead to rapid adoption by more and more small-scale fishers – without management measures in place this may cause problems. RFLP is working with the National Directorate of Fisheries and Aquaculture in Timor-Leste on policies to limit fishing effort of boats equipped with fish finders.

*Consulting the fish finder in Timor-Leste*

# Communications devices

## Mobile phones

### What can it be used for?

There are a wide range of existing mobile phone applications worldwide for fishers. In Indonesia, RFLP is working with local partners to develop an online fisheries information and marketing system that will communicate market and weather information to fishers via SMS.

### Benefits

- Widely used and cheaper than satellite systems.
- Sharing information on aquatic product prices, market demand, etc., can help fishers get better prices for their catch.
- Notification of extreme weather patterns and calling for assistance in emergencies.
- Allows inshore fishers to communicate with each other and with the shore while at sea.

### Things to consider

- Coverage may be patchy and unreliable with coverage black spots.
- Don't expect it to work in the open ocean. Reception falls off with increasing distance from the shore.
- Generally not weather/water proof.

### Keep it dry, it may save your life!

Technology in action

Mr. Jose Guereiru used his mobile phone to call to a fisher friend and the Maritime Police for help when the boat he was travelling on in Timor-Leste began to sink. He had remembered his training from RFLP's safety at sea consultant Ms. Nao Tusjimura who had advised fishers to always take their mobile phones to the sea covered in plastic bags. His was the only mobile phone on board that was usable as all of the others were damaged by water.

*Mr Jose Guereiru*

# Marine VHF radios

Marine VHF radios can be used for a wide variety of purposes, including summoning rescue services and communicating with other vessels or users.

## Benefits

- Can help fishers communicate with large vessels at sea and/or other fishers with similar equipment.
- Can be GPS enabled and so also act as navigation devices.
- Designed for use at sea – will float and are weather and water proof.

## Things to consider

- Can be complex to use. Training is important to ensure users understand which channels to use and monitor.
- Can only communicate with other VHF radios and cannot be used to contact shore or other small-scale fishers, unless they are similarly equipped.
- Government regulations may control the use of certain communications equipment including VHF radios.
- Can be expensive.

Technology in action

### VHF radios receive poor reception

In Sri Lanka RFLP provided VHF radios to some 30 fishers in a pilot scheme to assess their use. Early feedback however was largely negative. Recipients found the units complex to work while the distribution of the radios over too wide an area resulted in fishers being unable to communicate with each other. Extra training was provided so that recipients could make full use of the units, including the built in GPS navigation and distress call features.

# Radio repeater

*The radio repeater in Toeuk Chhou District of Cambodia's Kampot Province*

A radio repeater receives a weak or low-level signal and retransmits it so that the signal can cover longer distances.

## What can it be used for?

In Cambodia, RFLP has installed a repeater station so that Communities Fisheries (CFis) can better communicate with each other and the authorities using walkie talkies in order to counter illegal fishing activities.

## Benefits and things to consider

- Enhanced communication aids safety (calling for help or reporting accidents); coordination (reporting IUU); marketing (demand, price information etc).
- Not all equipment is compatible. Make sure that those who need to speak to each other are properly equipped.
- A radio repeater requires a regular power supply.

# GPS tagged photographs

## GPS devices equipped with cameras


A GPS navigation or tracking device which is equipped with a camera. It takes 'geotagged' photographs which have GPS data including latitude and longitude and possibly compass bearings attached to the images.

### What can it be used for?

'Geotagged' photographs of boats and owners were taken as part of a national census of fishing boats in Timor-Leste. These show the boats' exact location and can be viewed on Google Earth. This information has proven highly useful during search and rescue operations for missing fishers or when empty boats have washed ashore.


*Fisher census data from Timor-Leste*

### Benefits and things to consider

- Units do not look like cameras and therefore they are good for taking shots when it is necessary to be discreet.
- Is also a GPS device so can be used to find the way home etc.
- Image quality may not be as high as a standard camera.

## Cameras equipped with GPS

A standard camera that has the ability to geotag photographs.

### What can it be used for?

In Timor-Leste photographs of catch species caught by fishers were taken, alongside a paper giving the daily market price and local name of the landed fish. The GPS data recorded the exact location of the catch and can be used to build up a picture of fish catch locations.

### Benefits and things to consider

- Normal camera that is simple to use.
- Excellent quality pictures.
- Pictures may contain less positional data than those taken with GPS device (e.g. often no compass bearing).


*Fish price and name data displayed online*

# Questions to ask before committing to any information or communications technology

- Does it do what you really need it to do? If it doesn't meet your needs then don't buy it. Don't just listen to the salesperson!
- What are the benefits? – Do not expect fishers to embrace trackers, GPS etc., if they cannot see any benefit for themselves. If they feel the end result will be them having to pay more tax etc., their cooperation is unlikely. Likewise, will it make people's jobs easier? If not, don't expect them to embrace it.
- Will intended users be able to operate/understand it and how much training and mentoring will be needed? Displays and instructions need to be in a language users can read.
- How much will it cost not only to buy but also to run and maintain? Has this been planned/budgeted for? Some equipment may not realistically be repairable. If it is broken it may need to be replaced.
- How can effective and fair beneficiary selection take place? It is important to have communities involved in an open and transparent process to select beneficiaries. Don't forget women like technology too – consider gender when planning and implementing.
- What happens if it's not used properly? Don't hesitate to reclaim equipment if it is not being used as should be, or as it was said it would be.

- Is there a power supply? It is vital to have a reliable power supply as well as the means of paying for electricity (or fuel for a generator). Specialist equipment may be needed if the electricity supply is irregular to protect against power surges.
- How will relationships be developed and maintained? The use of technology can be an excellent means of building long-lasting relationships with communities, don't just 'stop and drop' equipment.
- Where will data go? Who will analyze it? How will it be acted on? In many cases technology is only a tool, information gathered should feed into a more comprehensive fisheries managment system.

## About RFLP

The Regional Fisheries Livelihood Programme for South and Southeast Asia (RFLP) sets out to strengthen capacity among participating small-scale fishing communities and their supporting institutions in Cambodia, Indonesia, the Philippines, Sri Lanka, Timor-Leste and Viet Nam. By doing so RFLP seeks to improve the livelihoods of fishers and their families while fostering more sustainable fisheries resources management practices.

Regional Fisheries Livelihoods Programme for South and Southeast Asia (RFLP)

The four-year (2009–13) RFLP is funded by the Kingdom of Spain and implemented by the Food and Agriculture Organization of the United Nations (FAO) working in close collaboration with national authorities in participating countries.

For more information about RFLP, **see www.rflp.org**
or contact **steve.needham@fao.org** (Information Officer)