



PHOTOS BY R. UWATE

Video documentation of fish releases, such as the grouper fingerlings pictured here, is an effective education and communication medium for policymakers and the public.

Video Technology Applied to the Management of Bahrain's Marine Resources

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Video technology has been used as a tool in research for many years. However, its widespread use as a fisheries management tool has been limited due to its relatively high cost. This is changing as video technology becomes a household commodity now widely available throughout the world.

Introduction

In mid-1994, Bahrain's Directorate of Fisheries joined the video age by acquiring a video camera and underwater housing. Since then, this video camera has been used in a wide range of applications.

Illegal Activities

There are many difficulties and constraints faced by the marine resources of Bahrain. These were documented in a survey of opinions by fishers which was completed in 1993. The top of the list included: illegal driftnet (*hayali*) fishing, shrimp fishing during its closed season, dredging in fishing areas, lost or stolen fishing gear (from illegal fishing), as well as lack of enforcement of regulations.

The Directorate of Fisheries is mandated with the management of Bahrain's marine resources, while surveillance and enforcement of fisheries regulations are the Coast Guard's functions. The Directorate of Fisheries lacks the mandate and the resources to support surveillance and enforcement operations. The Coast Guard is also in charge with national security issues. Its resources for fisheries surveillance are limited.

Dredging

In Bahrain, dredging is needed to keep the main shipping channel open. In addition, dredging is used to collect sand for land reclamation and building construction. In Bahrain, dredges are allowed to operate in one specific area.

Prior to 1994, dredger operations included areas several miles north of the permitted area. This was extremely detrimental to the fisheries, since dredgers operated in seagrass beds which are prime areas for shrimp, a major fishery in Bahrain. Fishers complained to the Directorate of Fisheries. However, when confronted, dredging companies denied operating outside their permitted area.

In mid-1994, the Directorate of Fisheries initiated a periodic surveillance operation as part of other sea activities. Surveillance included videotaping of dredgers in operation with their GPS (Global Position Satellite) readings. Video evidence was sent to management at dredging companies. The result: day time illegal dredging operations ceased.

Unfortunately, some dredgers began wandering outside their permitted area at night.

This was reported by fishers to the Directorate of Fisheries. The Directorate of Fisheries then initiated periodic night surveillance with their GPS and video camera. Once video records were made of night operations, night dredging operating outside the permitted area ceased.

Since late 1994, there have been no reports of dredgers operating outside their permitted area in fishing areas. Thanks to the eyes of concerned fishers, and video and GPS technology, dredging operations outside the permitted area have ceased. Damage to the shrimp grounds has been halted.



Illegal foreign fish trawler operates in shallow fish trap (gargoor) fishing area with their nets in the water, caught on video.

Fish trawl operations in shallow waters

In Bahrain, fish trawlers are not permitted to operate in waters shallower than 20 m. The reason for this regulation is so that fish trawlers stay out of fish trap (*gargoor*) areas.

Prior to 1994, *gargoor* fishers often complained about fish trawlers operating in fish trap areas. Complaints were against Bahrain registered industrial fish trawlers and foreign fish trawlers. In Bahrain, there are eleven industrial fish trawlers which are permitted to operate.

In response to these fishers' complaints, the Directorate of Fisheries initiated periodic surveillance of fish trap areas. Again, video documentation was made of fish trawlers and their position (using GPS). This evidence was presented to company management. Illegal fish trawler operations were reduced. Complaints by *gargoor* fishers against illegal fish trawling operations are now only occasionally heard.

Illegal nets

In Bahrain, driftnets and multimesh gillnets are banned. However, over the past 10 years or so, they have become very popular. Prior to 1994, efforts to reduce or stop illegal nets had no impact.

In 1994, video documentation was made of a lost driftnet which was tangled in rocks. In this net were numerous fish bones as well as turtle parts. The video tape was passed to high officials. After viewing the video tape, the police and Coast Guard were directed to confiscate illegal nets.

As a direct result of this tape, about 80 illegal gillnets were confiscated and burned. For the first time, there was clear and decisive action against illegal nets.

In 1995, a multimesh gillnet was reported with 19 dead birds. A video record was made of the net and the tape was forwarded to the Wildlife Committee. This video supported Directorate of Fisheries actions to ban the sale of nylon (including monofilament) nets in Bahrain.

Fisheries Research and Development

Video documentation has also been used to record various fisheries research and development activities.

Shrimp by-catch

In early 1995, the Directorate of Fisheries initiated shrimp trawl nets selectivity studies



Dredgers are now in control, thanks to global position satellite (GPS) technology and video documentation.

to try to minimize by-catch. The fishing characteristics of these modified nets were documented on underwater video. Tests of alternative net designs continue and should result in an appropriate shrimp trawl net with reduced fish by-catch.

Artificial reefs

The Directorate of Fisheries initiated an artificial reef pilot project in 1983. In 1994, tires that were deployed in 1983 were visited. A video record was made. This has been essential in educating officials about the benefits of artificial reefs to aggregate fish as well as to deter illegal fishing operations.

Additional materials were deployed in 1994 and 1995. Deployment and follow-up surveys of these materials were documented on video. Tires appear to attract groupers (*hamoor*). In addition, concrete structures have been successful in catching illegal nets. Video and photo documentation provide strong evidence of the effectiveness of artificial reefs to catch illegal fishing nets in Bahrain.

Funding for the National Mariculture Centre

Mariculture experiments have been ongoing in Bahrain for almost 15 years. In the early 1990s, the National Mariculture Centre (NAMAC) was officially opened. Budgetary support for NAMAC was limited. It was essentially a part of the Directorate of Fisheries' normal annual budget. Prior to 1995, there were no additional funds provided for operation of this facility.

In 1994, NAMAC produced surplus grouper (*Epinephelus coioides*) and sea bream

(*Acanthopagrus latus*) fingerling. Since grow-out capacity is very limited, a trial fish release program was initiated. Video documentation was made of fish release activities (including underwater videos of release fish). These were shown to top officials.

In 1995, the National Mariculture Centre received a separate operating budget for the first time. This has been attributed to the fish release project and its publicity (video documentation). Without the video education of officials, the facility might not have received funding support.

Public Education

The video records at the Directorate of Fisheries have also been put to other uses. Video tapes have been made summarizing marine resource issues in Bahrain. These tapes have been presented as part of public education seminars to the University of Bahrain, various primary and secondary schools, as well as local diving clubs.

The Directorate of Fisheries also worked closely with the Ministry of Education to produce a short educational video on the 1994 fish release program. This is now available to public schools in Bahrain for their marine education programs.

Various video presentations have also been made on marine related topics. In June 1995, a short video presentation was made on recycling activities of the Directorate of Fisheries to a locally hosted workshop.

Discussion

Videos are a relatively new tool for the fisheries manager's tool box. It has wide

application, and can support many other activities. This is especially true when policymakers are not technical people. Research, analysis, and subsequent written recommendations may have little impact on policymakers. Visual presentation of the issue supported by technical facts can be a very effective communication tool for the fisheries manager.

As illustrated above, in Bahrain videos have been used successfully in:

- deterring illegal dredging activities and reducing illegal fishing activities;
- documenting fisheries research and development activities;
- facilitating funding support; and
- educating the public on marine issues.

Video has proven very useful here in Bahrain. However, it is not the panacea for fisheries management. It does have limits.

It has not been totally effective in all applications. For example, in early 1995, several boats trawled for shrimp even during its closed season. Video records were made of these illegal activities, including vessel identification, illegal shrimp catches and shrimp trawl gear on-board. This video evidence was not effective in stimulating enforcement of the closed season for shrimp.

Despite some limitations, video has proven to be an effective tool which has had real impact on the management of marine resources in Bahrain. It has proven to be a very useful addition to the array of tools available for fisheries management. As further opportunities are identified, video will no doubt find even more diverse applications.

Further Reading

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