

Short communication

Consultation with local fishers on the Hong Kong artificial reefs initiative

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As part of an ongoing effort to rehabilitate depleted local fish stocks, the Government of the Hong Kong Special Administrative Region (SAR) has undertaken to deploy artificial reefs (ARs) to enhance fisheries resources and conserve the marine environment. A two-stage consultation programme aimed at soliciting input from fishers and minimizing potential conflicts with existing fishing operations was conducted, using local fora and information materials, prior to the second phase of artificial reef deployment outside of Marine Parks. Key findings of the consultation included recognition of the need for management and enforcement to improve fisheries resources, differences in support for artificial reefs between trawlers and small-scale fishers, and demands for compensation to offset short-term losses in income. The consultation programme provides a model for future community involvement initiatives, and has highlighted both the strengths of the artificial reef programme in Hong Kong and the outstanding issues that must be addressed to ensure future success.

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Introduction

Over the past hundred years, Hong Kong has been transformed from a small fishing and trading port into one of Asia's largest and most powerful economic and transport hubs. Nevertheless, fishing has traditionally been, and continues to be, an important industry and way of life for many inhabitants. A large proportion of the 19 000 fishers based in Hong Kong are descendants of the original Tanka and Hoklo fishing communities and still maintain strong and localized community networks, including, in some cases, separate dialects. The importance of fisheries products to the population's diet

is illustrated by the high consumption rate of fish (58 kg person⁻¹ year⁻¹), two to three times higher than most western countries (FAO, 1999).

Many aspects of the fishing industry have changed radically in the past few decades. With assistance from the Hong Kong Agriculture and Fisheries Department, a segment of the fishing fleet has modernized from traditional "junk"-style vessels to steel-hulled pair and stern trawlers. These modern trawlers are able to fish for extended periods at great distances from port, and often employ crew from the Mainland of China. As a result, the number of Hong Kong people employed in the industry has declined and fewer trawlers are relying

solely on Hong Kong waters for their catch. These and other changes have altered the characteristics of the fishing communities by causing the boat-dwelling population to fall and the number of people who depend on fishing as their primary occupation to dwindle. Many of the remaining small-scale fishers, who fish from small sampans and often use artisanal gear, are unable to exploit offshore waters and have turned to raft-based mariculture to supplement or replace their income from capture fisheries.

In parallel with these changes in the fishing industry, fish stocks in Hong Kong waters have been subjected to a variety of pressures and impacts. Since the late 1980s, the government has pursued a policy of large-scale land reclamations. The cumulative area reclaimed has increased dramatically in recent years, nearly tripling between 1976 (1900 ha) and 1996 (5950 ha). This has resulted in the loss of feeding, spawning, and nursery habitat for demersal and pelagic species. During the same period, coastal water quality has worsened owing to construction activities and increased urban and industrial sewage and waste discharges (Yung *et al.*, 1999; Wu *et al.* 1998). Despite limited historical fisheries records, available information on the species composition of local fish stocks indicates a trend of declining numbers of commercially valuable inshore demersal species and a reduction in size of those species still present (Pitcher *et al.*, 2000).

While urban development and pollution have undoubtedly contributed to the decline, fishing pressure has also been a factor. The seabed is subjected to heavy trawling pressure (Valente *et al.*, 1996; Leung, 1997; Selby and Evans, 1997) and a recent stock assessment study concluded that the current poor status of fish stocks is primarily due to recruitment and growth overfishing, and potentially, to a lesser degree, to development-related effects (ERM, 1998).

Regardless of the reason for the decline, the fishing community has grown increasingly vocal in its complaints about pollution and other development-related effects. As a result, the government has instituted a system of *ex gratia* allowances, which are granted to fishers to offset the impacts of marine development. The system is based upon calculating the notional value of 3 years' catch from the affected area based on data gathered through interviews with fishers. This sum, adjusted using fish price movement data, is then allocated to home port categories in proportion to their dependency on the affected area. Each fisher fishing from a given home port is granted a share of the *ex gratia* allowance calculated on the basis of boat size. Since the early 1990s, an equivalent of approximately 26 million USD has been disbursed to fishers as *ex gratia* payments.

In response to a growing awareness of the importance of both enhancing fisheries resources and conserving the

marine environment, an artificial reefs (AR) deployment programme was initiated by the Hong Kong SAR Government in 1996. The Government decided that the first AR would be deployed in the form of 10 vessel reefs in 2 of Hong Kong's designated Marine Parks in January 1998 (Wilson *et al.*, 2002). According to the Marine Parks Ordinance, the use of any trawl device is prohibited in the parks, and other fishing activities are allowed only under permit. Therefore, conflicts between these Phase I AR and existing fishing activities were largely avoided. In parallel, the Government conceived of a second phase of deployment outside of Marine Parks which would be the subject of a deployment and management planning study, including an extensive public consultation programme. This study would require considerable lead time prior to Phase II AR deployment and was thus initiated in July 1997 (ERM, 1999).

Obviously, the key stakeholders were local fishers who not only would be most affected but also would have the greatest influence on the ultimate success of the programme. International and regional experience has demonstrated that if fishing effort cannot be managed, AR may serve only to aggregate remaining fish and the benefits of stock enhancement will not be realized (Pitcher *et al.*, 2000; Polovina, 1991; Morton, 1996). One of the goals of the consultation was therefore to investigate the interest in, and opportunities for, community involvement in management and enforcement. Furthermore, given that these reefs would create barriers to trawl fishing and could result in regulatory restrictions for other gear types, there was concern that the fishing community would not initially welcome the programme unless it was accompanied by *ex gratia* payments. The challenge was therefore to raise awareness in the fishing community in order to allow the benefits of the ARs to be demonstrated, understood, and ultimately accepted.

We present an overview of the consultation techniques used in the Phase II study as a model for situations in which the consultation community is highly dispersed and factionalized, and where there are few precedents for democratic participation in resource management. In addition, we provide a case-study analysis of the conditions under which fishermen may accept some curtailment of fishing as a trade-off for future benefits associated with AR.

Materials and methods

The consultation was designed to be conducted in two stages (Figure 1) during the period October 1997 to March 1998. The objective of the first stage was to introduce the concept of AR, explaining the benefits and identifying key issues, whereas the second stage's goal was to seek input on specific deployment proposals.

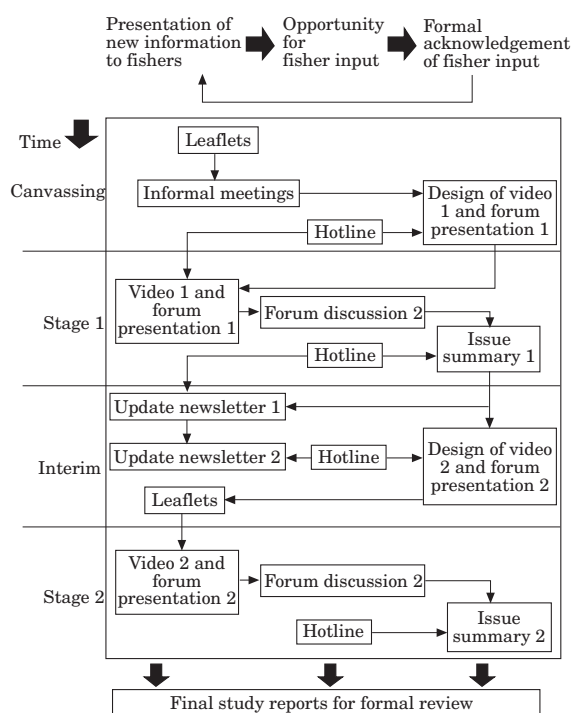


Figure 1. Fisher consultation programme design illustrating the three consultation goals (columns), the four phases (rows), and the selected tools and their interactions.

Each stage was planned to consist of a series of public fora with fishers at which information would be presented and input solicited. Tools specifically designed for the consultation included an introductory, 10-minute video in Cantonese; a simple and well-illustrated leaflet summarizing the principles and benefits to the fishery; issue summaries recording the comments raised by fishers and indicating what action would be taken; two update newsletters, to sustain interest and provide information between consultation stages; and a telephone hotline available throughout the study. This combination of tools avoided too much reliance on printed materials, which are not effective in reaching illiterate members of the community.

Fora were originally planned to be held in eight locations representing the home ports that would be affected by AR deployment (four trawler ports and four small-scale fishing ports). Given the dispersed nature of the fishing communities and lack of established mechanisms for calling public meetings with groups of fishers, the Study Team, consisting of consultants, academics, and government representatives, had to conduct preliminary reconnaissance visits to all potential forum locations. Wide dissemination of information about the programme required team members to personally canvas a large number of fishing ports, fishing vessels, mariculture rafts, and other gathering places prior to

each forum to distribute leaflets and persuade fishers to attend. Leaflets and newsletters were also posted to 27 fisher organizations throughout Hong Kong. Although this effort was time-consuming, it enabled the team to sample individual reactions and guarded against an over-reliance on a limited number of spokesmen. Initial contacts from these visits resulted in referrals and further telephone contacts that broadened the consultation exercise.

It was originally intended to hold separate consultations for trawlers and for small-scale fishers because of the expected differences in opinions and optimal scheduling times for each group. However, advice from representatives indicated that such segregation could not be achieved and thus a single forum in each home port was arranged for both the first- and second-stage consultations.

The fora were structured to consist of a brief introductory presentation followed by a facilitated discussion, which for the first-stage consultation touched upon:

- the effectiveness of AR worldwide in enhancing fisheries resources;
- the fishery and conservation benefits of AR in Hong Kong;
- the expected improvements in yields of high-value target species;
- the need for effective management in achieving fisheries enhancement; and
- the desire to obtain public input on site-selection options.

Information gathered was to be used to formulate recommendations for AR materials and design, site selection, and alternative management schemes. Information materials provided to fishers after the first-stage consultations documented, through photographs, video footage and issue summaries, that their input had been recorded and illustrated how it was being incorporated into the study. Recommendations arising were then presented for comment at the second-stage consultations, the key issues being:

- proposed deployment sites;
- alternative management options and recommendations;
- details of expected economic and ecological benefits of the strategies;
- recommended materials and deployment configurations; and
- demonstration that first-stage input had been incorporated and that further input on the proposals was encouraged.

All consultations were conducted in Cantonese, with comments recorded by a notetaker, in summary form on a flip-chart by the forum facilitator and on audio and/or

video tape. It was common for several individuals to be speaking at once and for the session to splinter into small discussion groups. Although this was initially not seen as conducive to the efficient gathering of input, it counterbalanced the tendency for certain vocal individuals to dominate the forum and intimidate others from speaking. The team adapted to this situation by joining each of the splinter groups and recording their opinions separately, and by approaching more reticent individuals as the fora drew to a close.

Results

Attendance ranged between 8 and 57 fishers (average 20 participants). Thus, in combination with the informal canvassing of fishing ports and other venues, a total of several hundred fishers was reached. Based on participant response, the most effective consultation materials were those that were visual in nature. The videos shown at the beginning focused the attention of the audience and were valuable in conveying key information. While some fishers contacted the team by telephone during the consultation period, no written comments were received at any point.

Most fora were attended by a mixture of trawlers and small-scale, artisanal fishers. From the pre-forum canvassing, trawl fishers were known to be less supportive of the programme because of the loss of trawlable seabed. In general, the trawl fishers are better organized, more numerous, and more vocal than their small-scale counterparts. Thus, fora attended by trawlers tended to focus on the negative aspects of AR deployment. In contrast, fora held in smaller fishing ports, which tend to support greater numbers of small-scale fishers, were more positive. Both groups appreciated the opportunity to express their views and suggested that the consultation process continue in parallel with the deployment initiative. A limited number of fishers' representatives were not supportive of direct consultation with fishers, presumably because this process by-passed their roles as intermediaries.

Despite the fundamental differences in perspective between trawlers and small-scale fishers, there was consensus on several issues (Figure 2). Dissatisfaction with the current state of the fish stocks was universally expressed, and the vast majority of fishers called upon the government to take action to reverse declining catches and catch value. While many fishers blamed pollution or fishing by others (e.g. mainland Chinese fishers) for the decline, some suggested that the current situation was simply one of nature's cycles and that stocks would inevitably rebuild naturally over time.

Most fishers acknowledged that AR can serve to enhance fisheries resources, but many recommended alternative or supplemental measures such as restocking

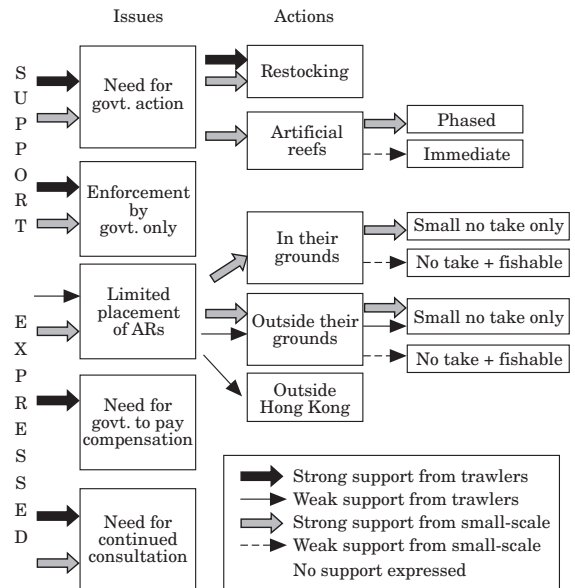


Figure 2. Issues and proposed actions arising from the fisher consultation programme and the degree of support expressed by trawlers and small-scale fishermen for each of them.

or tightening enforcement on illegal fishing by mainland fishers. Those expressing support for the programme generally advocated a cautious approach to deployment, preferring to obtain evidence of benefits before proceeding with the full deployment plan. However, some fishers remained sceptical even when shown video footage illustrating successful colonization and valuable fish assemblages on reefs deployed the previous year in Hong Kong's Marine Parks.

The prospects for community involvement in management were welcomed although the majority of fishers were not willing to assist with enforcement activities as they considered this a governmental responsibility. A few fishers indicated they would use a proposed hotline to report illegal fishing activities on the reefs, but none of the communities consulted was prepared to engage in active enforcement duties.

A final point of agreement among stakeholder groups was that the location of any AR deployed should be marked so that any areas of special fisheries regulations could be easily identified. Some groups suggested buoys, while others recognized the potential for marine collisions with buoys and suggested other arrangements, such as land-based signposts or line-of-sight boundaries. Fishers also requested to be taken to the deployment sites to better visualize the area.

Opinions on many other issues varied widely. While most fishers appreciated the usefulness of AR under some circumstances, some were highly supportive of deployment in or near their fishing grounds, whereas others were against their deployment anywhere in Hong

Kong waters. The least supportive were trawlers who reported that they already utilize all flat, open seabed areas and thus want deployment only in nearshore, hard-bottom areas (i.e. untrawlable ground), if at all. The greatest support was expressed by small-scale fishers in areas where conflicts with trawlers existed. Fishers using handlines, cage traps, and gillnets thus view ARs as trawl barriers as well as fisheries-habitat enhancement devices. Most communities were willing to indicate on maps where they felt ARs would be best placed. Trawlers generally projected reefs outside of their own traditional trawl grounds but sometimes in areas trawled by other communities, thereby complicating final site selection. In contrast, small-scale fishers usually preferred reefs to be placed near their home ports to allow them to benefit from the additional resources generated.

Fishers were also consulted on the management scheme to be implemented at the sites and were asked to express a preference for no-take versus fishable reefs, and whether there should be a permitted limited access zone around each reef cluster. Opinions varied, although initially a preference was expressed for some no-take reefs surrounded by a limited access area containing at least one fishable reef. Many fishers also initially expressed concern that the five areas in which the reefs were proposed for deployment (called Marine Special Areas: MSA), would cover up to 10% of the seabed. As the consultation progressed, opinions shifted such that most fishers expressed a preference for no-take reefs (only) deployed in considerably smaller MSA.

Fishers have come to expect *ex gratia* payments for any infringement on their right or ability to exploit fish stocks. It was therefore expected that demands for compensation would be a major issue. Fishers were informed that the current government policy is that *ex gratia* would not be granted for AR deployment because, in contrast to development projects, the initiative is intrinsically designed to benefit fishers. This point met with little active opposition in the first-stage consultation. However, subsequently fishers began to emphasize the difficulties of weathering the short-term losses that they claim would be incurred prior to the reefs' reaching full production capacity. Small-scale fishermen appear to accept that, because there will be little reduction in their traditional fishing grounds, *ex gratia* payments will not be granted. In contrast, inshore trawlers prefer that the plans be abandoned and demand compensation as a last resort.

Discussion

The results of the two consultation rounds were carefully considered when the final recommendations for AR deployment were formulated. Sites suggested by fishers were utilized whenever possible (Kennish *et al.*, 2002), and fishable reefs and line-of-sight boundaries were

provided for in the MSA as requested. Communities' reticence regarding direct involvement in enforcement was accounted for in developing the management strategy, and the consultation was extended to a third stage (August–September 1999) to maintain communication between fishers and government representatives. The issues of incremental deployment and devising means of diverting fishing effort away from inshore areas are being considered.

The consultation programme achieved its original objectives of informing fishers of the benefits of AR and soliciting input on siting and management. Perhaps even more importantly, the exercise demonstrated to fishers that they are an integral part of the decision-making process by showing that their comments were heard, addressed, and incorporated within programme planning. Initial concerns that the consultation process was flawed, because the deployment of some ARs and planning for additional reefs began prior to the initiation of consultation, proved unfounded. Most fishers were impressed by the scale of outreach mounted under this initiative and appreciated the opportunity to provide input. Although it could be argued that only a small proportion of fishers was consulted, the feedback was considered representative, in that it was cross-sectoral by gear type, vessel size, and community, and unfiltered, in that most responses came directly from the fishermen themselves rather than their representatives. The considerable effort expended in the consultation, particularly in the case of small-scale fishers which lack the organizational structure of the trawl fishery, illustrates that if this effort is to be continued it will require significant supporting resources.

The recently completed third-stage consultation exercise revealed an expressed preference of the majority of fishers for no-take reefs within small MSA. While no-take reefs are preferred to fishable reefs from a stock-enhancement perspective, some researchers (Sadovy, 1999; Pitcher *et al.*, 2000) fear that limiting the size of totally protected areas may be counterproductive. With the exception of Marine Parks and Reserves, which at the time of the consultation accounted for less than 2% of Hong Kong waters, no other marine areas are subject to fisheries regulations although some areas are off-limits to fishing because of navigational restrictions. The programme represents an excellent opportunity to introduce protection to broad areas of Hong Kong waters (up to 10%) to promote marine conservation and fisheries enhancement. The advantages of implementing limited access and/or no-take zones in combination with an incentive to fishers, such as increased production, are readily apparent. However, if fishers continue to oppose large MSA, this may force a more precise definition of the programme's objectives to determine the appropriate mix of benefits to the fishery and benefits to marine conservation.

The results of the consultation also raise the issue of compliance with management schemes at deployed reef sites. While government has been successful in brokering voluntary agreements to cease fishing activities in Marine Parks, anecdotal evidence suggests that limited fishing operations have continued at some reefs. Furthermore, although Marine Parks are already subjected to limited access restrictions, brokering similar agreements for proposed MSA is likely to be more problematic. The distinct reluctance of fishers to participate, even anonymously, in enforcement efforts may be due to the stability afforded by the existing system of relationships among different fishing communities, which could be upset by tensions arising from enforcement-based conflicts. Another issue may be latent conflicts between trawler-dominated and small-scale fishing communities such as have been observed elsewhere in Asia (Alcala and Russ, 1990; Kurien, 1993; ERM, 1999). Regardless of the underlying factors, government resources must be devoted to both education and enforcement, in the early stages of implementation at a minimum, to ensure success. As the programme progresses, and as fishermen realize the benefits, there will be the potential for increased community participation in management, monitoring, and enforcement.

Finally, the issue of compensation will continue to play a significant role in programme planning. Although it can be argued that the *ex gratia* system would not apply to a fisheries enhancement initiative, demands may still be raised. Fishers in Hong Kong have considerable political power and have expressed their demands in the past through public protests, such as harbour blockades and picketing of government buildings. Acknowledging the decline in nearshore fishery values, the government is actively engaged in examining alternative means of support for the fishing community. Resolving this issue will be one of the major challenges during the Phase II AR deployment programme.

The consultation programme was the first of its kind in Hong Kong to liaise directly with fishers in their own communities on a fisheries enhancement initiative. The programme not only provided useful insights into the dynamics, perceptions, and desires of the local population, it highlighted the major remaining issues associated with site selection, management, and administrative implementation. The greater understanding between fishers and regulators generated will serve as a useful basis upon which to build strategies for community involvement in management, a key feature of successful AR programmes.

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