Alternative Livelihoods for Small Coastal Fishers
to Reduce Near-shore Fishing Pressure in Nha Trang Bay, Vietnam

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Monitoring near-shore fishing activities in Vietnam and enforcing the corresponding fishery regulations had been among the most alarming concerns in the country's fisheries, considering that uncontrolled near-shore fishing activities had impeded all efforts in balancing the utilization and protection of coastal resources. Such concern emerged when the productivity of near-shore capture fisheries had considerably reduced not only in terms of catch per unit effort but also the decreasing average size of fish caught. With few or no other livelihood options available for coastal fishers, the benefits that they had always derived from coastal fisheries became unsustainable. Therefore, the country adopted measures to address such concern emphasizing on the concept of "learning by doing", which had been promoted at significant scale based on replicable good practices, while at the same time selective geographic and thematic approaches were also adopted which included pilot innovative schemes. Such measures had served as opportunities for moving the fishers away from the waters. Using the Participatory Rural Appraisal (PRA) method, important information were gathered from fishers in the Nha Trang Bay Marine Protected Area, whose livelihoods had shifted from near-shore fishing to other activities.

Although generally small-scale and seemed scattered along the coasts of Vietnam, near-shore capture fisheries had been traditionally practiced by many of the country's fishers. Near-shore capture fisheries had always been an indispensable part of the fishers' lives serving as their means for subsistence that had been passed on from generation to generation. Although changing the occupation of fishers was accepted, it was with great reluctance even if the fishers welcomed other job opportunities especially those related to fisheries. Many fishers had expressed their apprehension because in some alternative occupations, most fishers do not have the least knowledge, skills and experience.

Located in Khanh Hoa Province of Vietnam, the Nha Trang Bay Marine Protected Area (MPA) is the first comprehensively developed and managed MPA in Vietnam. The establishment of this MPA was aimed at protecting the marine biodiversity of the Bay while enabling the local island communities to improve their livelihoods. In partnership with other stakeholders, the MPA in Nha Trang Bay was specifically envisaged to serve as a model for the development of collaborative MPA management in other areas of Vietnam.

The Nha Trang Bay MPA is about 13,000 ha comprising many important habitats including coral reefs, sea grass and mangrove areas. In view of the value of its biodiversity, Nha Trang Bay had been considered by the Government of Vietnam as an "area of highest national priority" for marine conservation and coastal tourism. The implementation of the MPA Pilot Project in Nha Trang Bay was supported by the Global Environmental Facility (GEF) through the World Bank, the Danish International Development Agency (DANIDA) of the Government of Denmark, the International Union for the Conservation of Nature (IUCN), and the Government of Vietnam, and implemented by the Ministry of Fisheries in collaboration with the IUCN.

Map of Vietnam showing Nha Trang Bay

In Vietnam, the total number of mechanized marine fishing boats was reported to have increased from 44,000 in 1991 to 91,000 in 2005 (Hung, 2010), while the total capacity of the fishing boats had also gone up from 824,000 Hp to 5,317,000 Hp. Although this led to increased production from marine capture fisheries, which was 730,420 mt in 1991 to 1,809,700 mt in 2005, the average CPUE had decreased from 0.89 mt/Hp to 0.34 mt/Hp in 1991 and 2005, respectively.

Fishing boats <45 Hp accounted for about 72% of the country's total mechanized fishing boats, and are small-sized operating mainly in coastal areas. Moreover, over 80% of the boats <45 Hp operate in near-shore areas causing high pressure on the near-shore fishery resources and bringing about potential threats to the marine and coastal resources, and more particularly to the ecosystem. This aspect was compounded by the impacts of illegal, unreported and unregulated (IUU) fishing, the rampant use of destructive fishing methods resulting in the loss of essential fish habitats, and the increased quantities of by-catch and trash fish that included the juveniles of species which are of highly economic importance.

Promotion of Alternative Livelihoods for Near-shore Fishers

While near-shore capture fisheries in Vietnam continued to present a gloomy picture, efforts were made by the Government to implement measures that would relocate the livelihoods of the coastal fishers away from the waters. However, various constraints had impeded the continuing process of implementing such measures. Therefore, a case study was conducted at the Nha Trang Bay MPA in order to analyze the factors that would facilitate the promotion of alternative livelihoods for near-shore fishers. Various options that would encourage fishers to shift from near-shore fishing to other potential occupations had been promoted such as shifting to offshore fisheries, aquaculture, other occupations such as ecotourism-related activities, and other fisheries-related activities.

Nevertheless, based on the results of the case study which indicated that the educational level of most fishers was predictably low, without doubt, this inhibited the fishers from finding better suitable jobs. It was very common to find fishers in the study area who only finished elementary and high school levels while many were even unschooled at 41%, 37% and 7% of the total number of fishers, respectively (Chien *et al.*, 2009). In this regard, it was highly deemed necessary to provide vocational training to the fishers especially the younger generation to enable them to engage in jobs available in other sectors such as in development industries and tourism-related activities. Moreover, since the shifting process had often been confronted with financial constraints, a sound policy should be developed which could help the fishers in their new jobs by providing them channels for easy access to loans.

Furthermore, considering that each province possesses specific characteristics of near-shore fisheries as well as particular conditions for sustainable fisheries development, alternative livelihood options to be provided to fishers should be based on the natural-economic-cultural-social characteristics of the area. This approach could reduce the pressure on coastal resources since the enabling conditions could be met. Thus, varied orientations should be conducted in different provinces and areas rather than applying the same approaches everywhere, especially when it comes to local application of the measures.

Moreover, flexibility is essentially required as this would allow different solutions to be adopted in particular areas

Box 1. Summary of requirements for fishers' alternative livelihoods

- Alternative livelihoods for fishers must bring sustainability and efficiency, reduce near-shore fishing pressure and cause no damage to coastal resources and ecosystems.
- New jobs should be comprehensible and accessible for fishers.
- Small initial investment appropriate for the economic conditions of fishers could be provided.
- New jobs should yield higher or at least equal, income compared with what the fishers used to earn from traditional fisheries.
- New occupations that can reuse old fishing facilities and implements (*e.g.* fishing gears, vessels, machines) should be considered as a priority during the promotion of alternative livelihoods.

Catching high-value commodities as option to near-shore fisheries

along with cross checks. From the analysis of the case study, the characteristics of the alternative livelihoods for coastal fishers were summarized as shown in **Box 1**.

The results of the case study also suggested that the promotion of alternative livelihoods for fishers should be conducted in stages and done according to the plans with significant scale based on replicable good practices. The implementation should also go along with proper adjustments based on the experience of the fishers. Concurrently, the alternative occupations should be analyzed and assessed in terms of their feasibility, sustainability and socio-economic efficiency.

Alternative Livelihood Options for Vietnamese Fishers

Vietnam has a coastline that extends to about 3,444 km and embraces the country's major fishing grounds that include the Gulf of Tonkin which the country shares with China, the marine waters in central and southeastern Vietnam, and the waters in southwestern Vietnam which is part of the Gulf of Thailand and shared with Cambodia and Thailand. In 2009, production from marine capture fisheries of Vietnam contributed 44% to the country's total fisheries production of 4,782 thousand mt which had decreased from 46% in 2007 (SEAFDEC, 2011), which was attributed to the degrading coastal fishery resources of the country. The country's marine capture fisheries production had been largely derived from the marine waters in central and southeastern Vietnam where most of the marine fisheries are concentrated especially the waters near Khanh Hoa to Ca Mau. In order to reduce the pressure on the coastal fishery resources and at the same time sustain the livelihood of near-shore fishers, various measures had been promoted that would enable the fishers to shift their occupations from near-shore fisheries to other relevant occupations.

Shifting from small-scale near-shore fisheries to sustainable and efficient offshore fisheries

One of the approaches that would encourage fishers to shift from small-scale near-shore fisheries to offshore fisheries is for them to organize into fishing vessel teams or voluntary fishing cooperatives where their fisheries production could be combined with logistic services thus, ensuring safety net from fisheries. Since 1997, the Government of Vietnam has been developing the country's offshore fisheries as means to reduce fishing pressure on the coastal resources. Therefore, offshore fisheries could be seen as an advantage and favorable option for fishers to possibly shift from small-scale near-shore fisheries to offshore fishing. The results of the case study suggested that fishers should be encouraged to seek partners and cooperate or co-invest in purchasing larger vessels and fishing gears to operate in offshore waters while support should be provided to fishers who opt to engage in fishery logistic services and

Box 2. Objectives, principles and implementation strategies for the shift from near-shore to offshore fisheries

Objectives

- To reduce fishing pressure on the near-shore and coastal resources
- To minimize transportation costs, increase offshore time and fishing productivity of vessels, participating in the teams/ fishing cooperatives, and eventually enhance the living standards of small-scale coastal fishers
- To improve fishery products in terms of quality and competitiveness in domestic as well as international markets
- To professionalize offshore fishing cooperatives step by step

Principles

- Participation of fishers in organized fishing cooperatives should be voluntary but with condition that fishers should be able to carry out self-management and provide certain amount of capital contributions. Fishers should also be able to share with the cooperatives some information such as fishing grounds, weather forecast, fish prices as well as willing to provide mutual help and support under harsh circumstances.
- Fishers using the same fishing gears, working in the same fishing grounds or having close relationship with other members should be organized into fishing cooperatives in order for them to acquire better working environment.

Implementation strategies

- Conduct research on the real status of near-shore and small-scale fisheries, especially focusing on the inefficient, resource destructive, non-selective or poorly selective fisheries. In this regard, a quantitative analysis or cost-benefit analysis should be carried out to determine the economic benefits as well as the number of vessels and fishers working on these types of fisheries. Therefore, databases on these types of near-shore fisheries especially information on stocks, allowable catch volumes, number of vessels, gear types, production by species are necessary and should be compiled.
- Promote the specific and appropriate offshore fisheries for each province or area according to their fishing gears. A quantitative analysis should also be carried out to identify the number of vessels and fishers capable of switching to the locally potential offshore fisheries.
- Establish fishing cooperatives and call upon transparent capital contributions among fishers. Meanwhile, support from related parties/stakeholders should also be encouraged to help fishers shift to offshore fisheries.
- Establish offshore fishing cooperatives based on the potential natural resources and the socio-economic characteristics of fishers. Each locally strong fishery should be encouraged to have one team, where each team could occasionally include 3 groups with 5-7 members each to initiate the cooperation, self-awareness and self-management.
- Assess and analyze the socio-economic efficiency of each vessel team, and make adjustments step by step in accordance with the production realities.
- Multiply the effective and efficient fishing vessel teams, as this would support efforts in benchmarking the good practices that could serve as reference points and for the purpose of peer learning.

activities. In order to facilitate the implementation of this alternative option, the Government should facilitate and create favorable conditions for fishers to get access to loans at special interest rates or provide assistance in terms of initial funding for the purchase or repair of vessels, fishing gears, machines and safety equipments such as transceivers, GPS, fish detectors or to certain extent promote a "boat retirement" purchase scheme. These incentives could help the fishers in keeping their minds totally focused in their alternative jobs.

Experienced fishers are easy to adapt to changes in terms of their occupations especially if such options are quite similar to their previous occupations. Therefore, in available livelihood options fishers should be assured that they would still be able to utilize their previously used implements and facilities such as machines, electric generators, boats, and gears among others. Therefore, establishing voluntary offshore fishing cooperatives or voluntary fishing vessel teams along with provisions for safety at sea, could play a realistic role not only among the fishers but also with government authorities, as this is very much in line with the strategic orientation of the fisheries sector of Vietnam. Based on the results of the case study, the objectives, principles and implementation strategies for encouraging the fishers to shift from near-shore fishing to offshore fisheries should be focused, as suggested in **Box 2**. Some examples of effective and efficient fishing cooperative models in Vietnam are shown in **Box 3**.

In addition, lessons have been learned from the implementation of offshore fishing models, which could be considered as good practices of cooperation among the offshore fishing fleets in some provinces of Vietnam. Specifically, several lessons on the formulation and establishment of offshore fishing models could also be gleaned from such experiences.

Crews of fleets often have close relationships with each other. Normally the crews are related by blood (*i.e.* father, brother, sibling), making them willing to honestly share information about fishing grounds, weather and fishing experience, fish price and provide help for each other.

Fishers' voluntary participation is required for the establishment of offshore fishing fleets. In this regard, emphasis should be placed on fairness and transparency in the initial capital contributions for the purchase of boats and fishing gears (fixed capital), costs of production (fuel, ice and other supplies), and working capital as well as in the development of ways for profit allocation among members within a vessel and among the fleets.

Box 3. Examples of particularly efficient and effective fishing cooperative models in Vietnam

- Since 2006, seven (7) fishing vessel teams and one state-owned fishing company had been organized in Ben Tre Province. Most of the teams have operated with high efficiency resulting in increased revenues by about 5%-20% on the average, which had been attained because of mutual cooperation at sea. With decreased freezing time, fish products were fresher that command higher prices and eventually leading to higher profits estimated at VND 25 million (about US$1,300) per trip. Over the period, despite expensive fuel cost and intense competition for fishing grounds, the fishers still remained attached to the sea and continued to show efficiency in their performance (Kim Anh Nguyen *et al.*, 2010).
- Thanh Hoa Province has 129 fishing teams with 935 vessels and 8,396 laborers who continued to achieve the desired results (Thanh Hoa Department of Capture Fisheries and Resources Protection, 2010).
- In Cua Lo, Nghe An Province, over 20 fishing teams had been established, most of which are in Nghi Hai, Nghi Thuy and Nghi Tan. Each team has at least 3 and no more than 5 vessels that are efficiently operated (Minh Quang, 2008).
- Moreover, on a voluntary basis and linked to agreed fishing teams could also be found in other places such as Rach Gia in Kien Giang Province with 30 fishing teams. Hoai Nhon in Binh Dinh Province had 9 teams while several other teams had also been organized in Khanh Hoa and Phu Yen Provinces. These fleets have made good profits during the past years (Kim Anh Nguyen *et al.*, 2006, 2007 and 2010).

Each team should have three groups each comprising of 5-7 vessels. This would enable the fishers to enhance solidarity, honesty and intimacy among the members of the team, which in turn could develop and promote the strength of each team.

Shifting from near-shore fisheries to sustainable aquaculture

Vietnam possesses enormous potentials for aquaculture specifically in terms of areas in its coastal provinces and aquatic species that could be cultured. The development of the country's brackishwater and marine aquaculture had been contributing significantly to the coastal economy and played an indispensable role in meeting the future demand for seafood products by sustaining or improving the production level in the country's fisheries sector (Kim, 2008). The Government had also been playing an important role in developing capture fisheries in general and aquaculture in particular. The principles and implementation strategies for shifting from near-shore fisheries to aquaculture are shown in **Box 4**.

Aquaculture has always been considered by fishers as the second most popular occupation after marine fisheries. As a matter of fact, many fishers had been engaged in both capture fisheries and aquaculture at the same time as they

Box 4. Principles and strategies to promote the shift from near-shore fisheries to aquaculture

Principles

- Shifting from near-shore fisheries to aquaculture should promote and develop sustainable and responsible marine and brackishwater aquaculture models that could lead to improved yield and product quality as well promote risk management.
- In the development of marine aquaculture, the use of industrial feed instead of marine trash fish should be encouraged in order to reduce near-shore fishing pressure.
- The adoption of sustainable and multi-species aquaculture on the same volume of water should be promoted to optimize the aquaculture areas as well as reduce feed and labor costs.

Strategies

- Specific and detailed plans for sustainable aquaculture development in each coastal province should be established, based on which upgrading of public infrastructures should also be planned, *e.g.* irrigation and drainage systems, waste water management facilities, traffic system, an early warning system for emergency detection of and spread of diseases, and where qualified hatcheries should aim to produce high quality and more diversified seeds.
- Support should be extended to aquaculture diversification, through the promotion of new initiatives for species diversification in brackishwater areas especially the species with lower risk of culturing options (seaweeds, clam, blood cockle, blue mussels, among others).
- Training on sustainable aquaculture practices should be provided to management staff, technicians and farmers.
- Fish farmers should be encouraged to reduce the use of marine trash fish as aquaculture feeds.
- Support should be provided in the areas of marketing and disease research for new products.
- The socio-economic and environmental efficiency of the aquaculture diversification should be assessed and analyzed, in order to possibly replicate such approach later on a larger scale and used as one as of the adaptive approaches for promoting the shift from near-shore fisheries to aquaculture.

could take advantage of low-quality marine fish and trash fish as feeds for aquaculture. Aquaculture is therefore not a new knowledge for the fishers, where their production systems range from extensive to semi-intensive/intensive while culturing a diversity of aquatic species. However, it has been noted that most coastal provinces still lack the strategies for sustainable aquaculture development. With low academic level, most fish farmers still depend on experience and are reluctant to apply new technologies and modern aquaculture models.

The Government also fell short in terms of management capability, of effectively addressing the demand and serious lack of managers, scientists and skilled workers for sustainable aquaculture development, which could have served as models and guide for the shifting fishers. This could have been attributed to poor planning and poor quality of some aquaculture infrastructures. Zones for safety and hygiene production have yet received particular attention and concern in order to meet the market needs as well as reduce the risks and damage of the ecosystem from aquaculture. Moreover, there is a need for aquaculture to adapt to the impacts of climate change and volatile market conditions, and comply with the increasing international standards and requirements for food safety and traceability.

In Vietnam, some good practices on shifting from near-shore fisheries to aquaculture had been reported which could be considered as models for other fishers, although such shifting pattern would need the development of appropriate policies (**Box 5**). For example, in Dien Kim Commune of Dien Chau District in Nghe An Province, some near-shore fishers had shifted to clam farming utilizing a 10.5 ha intertidal zone. Until 2010, about 28 clam farmers have gained an average income which ranged from VND 15.4 to 28.9 million/farmer/crop (Chien *et al*., 2009). In Thoi Thuan commune of Binh Dai District in Ben Tre Province, the promotion of blood cockle (*Anadara granosa*) farming resulted in the successful shift of 7 fishers from near-shore fishing to blood cockle culture in over 3,000 m^2 of alluvial areas. Using the blood cockle culture model, the fishers were able to produce more than 1.5 metric tons of cockle seeds and after more than six months, their average income was about VND 23.5 million/farmer/crop (Chien *et al*., 2009).

In another case, near-shore fishers in Phuoc Thuan Commune of Tuy Phuoc District in Binh Dinh Province had been engaged in aquaculture using some species and culture diversification in about 13.9 ha area in Thi Nai Lagoon. The model has enabled 10 fishers to shift to aquaculture and as a result, earning an average income that ranged from VND 8.6 to 24.7 million/farmer/crop (Chien *et al*., 2009).

Fish cage culture as option to near-shore fisheries

Box 5. Policy recommendations for the advancement of marine aquaculture

- Research should be conducted on production of industrial feeds for each cultured species and each stage of development of species that can better support marine aquaculture and reduce the use of trash fish as feeds.
- The culture of species with high economic value such as lobsters, snails, grouper, and cobia (*Rachycentron canadum* or black kingfish) should be promoted. It is also essential to apply modern marine aquaculture technologies at large scale for tuna, cuttlefish, pomfret, grouper, and cobia.
- Market studies should be conducted for marine products at large scale/huge production.
- Fisheries auction markets should be established while traders/middlemen should be prevented from dictating farmers to reduce fish prices and that the capacity of farmers should be enhanced to enable them to participate in management.
- Activities should be concentrated on high quality seed production, seed selection (laboratories should be established for seed quality testing), disease control (investment for an early warning system to detect the emergency and spread of diseases should be made) and public infrastructures should be upgraded in order to better support marine aquaculture.
- Fishers should be provided with easy access to loans with preferential interest rates for marine aquaculture development.
- Marine aquaculture should be integrated with marine capture fisheries, eco-tourism and recreational fisheries in policy development and implementation of plans.

In another development, the small-scale aquaculture co-management model in Giao Xuan Commune of Giao Thuy District in Nam Dinh Province has been implemented in early 2008 by the Marine Conservation and Community Development Center (MCD). Clam seeds (*Meretrix lyrata*, Sowerby 1851) from Ben Tre Province had been raised in 4 ha area. In the beginning, the model had 10 farmers upon whom the "core team" and the "sustainable clam growing team" have been established. After two years, membership in the model had expanded to 170 fishers from the commune and surrounding areas, turning themselves into clam farmers. Under the model, Co-management Board was established together with its operation regulations. In addition, the MCD has also supported the conversion of 30 near-shore fishers into sustainable and environment-friendly aquaculturists (MCD, 2009).

Shifting from near-shore fishing to tourism and coastal transportation services

This shift could take advantage of old fishing boats to avoid spending much money for building new boats by just re-decorating the boats that could be used for travel or transportation services. Since the life of fishers is always with their boats, therefore they could easily get adjusted to new jobs such as those offered in tourism-related activities or carrying goods onboard their old but enhanced boats. Since fishers had always been used to their old life-styles, certain period of time might be necessary to enable them to adapt to new job styles. However, the knowledge and skills of fishers in tourism-related activities could still be very low thus efforts should be made to address this concern through the conduct of appropriate vocational training and the like. The strategies suggested during the case study for promoting effective shift from near-shore fishing to tourism and coastal transportation services are shown in **Box 6**.

Shifting models for alternative livelihoods outside capture fisheries had been promoted at Nha Trang Bay Marine Protected Area, specifically the Hon Mun MPA project where in 2001 it was reported that the models had contributed greatly in supporting the alternative livelihoods of fishers who depended entirely on marine and coastal resources in the Bay. The project has facilitated the promotion of 20 shifting models of which 15 models produced good results. The salient features of the successful shifting models in Nha Trang Bay included the integration

Box 6. Strategies for effective shift from near-shore fishing to tourism and coastal transportation services

- Investigating the economic performance of near-shore fishing vessels (including the number of fishing boats, types of fishing gear, number of fishers)
- Conduct of research on tourism development in each coastal province in order to determine the potentials of this occupation (especially in coming up with figures on how many fishers and small fishing boats could be moved into tourism-related services and activities)
- Establishment of shifting models and monitoring system by supervising the activities of fishers in a one-year operation (during the peak season) and make the necessary adjustments
- Evaluating the effectiveness and efficiency of the shifting models, and comparing the economic benefits of near-shore fishing with those of tourism-related services and activities

of marine aquaculture with eco-tourism and production hand-made handicrafts, and the co-management of coral reef resources for tourism development (*e.g.* scuba-diving or coral reefs viewing using glass-bottom boats). The shifting models had successfully provided stable income for 136 members (127 of whom were females) and their new jobs do not cause harm to the marine resources and the environment (www.nhatrangbaympa.vnn.vn).

Shifting from near-shore fishing to other activities related to fisheries

In addition to aquaculture which is a popular option, many fishers could also shift to other activities related to fisheries, such as in fishery logistic services, transportation of aquatic products, small-scale seafood semi-processing (*e.g.* smoking, drying, salting, frying), fish sauce production, and animal-feed production from by-products of seafood processing industry (*e.g.* fish head, fins). Moreover, the shift in labor structure could provide the younger generation of fishers with opportunities to work in processing and frozen seafood factories, which is also a long-term orientation for the shifting of activities.

Policies and Institutional Solutions to Support of Sustainable Alternative Livelihoods for Fishers

With the long-lasting characteristics of fisheries being open-access, management of marine and coastal resources in the context of sustainable fisheries is considered weak. Inadequacy in both quantity and quality of enforcement and monitoring capacity in the central and local levels, had affected the effective implementation and transformative changes at all levels. Meanwhile, the coastal resources continue to be under threat of increasing pressure and further deterioration. Vietnam had over 40 legal documents on policies and regulations including the Fisheries Laws 2003, decrees, decisions and circulars that are relevant to management and protection of the country's fisheries resources.

Promoting co-management or community rights-based management

The current fisheries management authorities of the country could not effectively govern the fisheries sector especially with the emerging more complex problems in the marine and coastal resources management, particularly the coastal resources in view of the varying objectives and subjective reasons. Therefore, co-management or community rights-based management are approaches to be considered as these could create synergy among the communities and relevant stakeholders involved in the management of coastal resources and eventually result in the sustainable development of coastal fisheries.

Co-management is an approach that could provide incentives and rights for fishers to manage their respective coastal resources by protecting the fishery habitats and limiting the entry of new comers in their areas of responsibility. Vietnam should consider promoting the co-management approach widely, when and where appropriate, to support the sustainable development of fisheries (Kim *et al*., 2004, 2006, 2009). So far, a number of successful co-management models/good practices had been reported in Vietnam, which the Ministry of Agriculture and Rural Development could use as basis for its technical and legal support for the co-managed areas to receive official recognition. In addition, to co-management rights-based management of fisheries should also be mainstreamed with suitable fisheries policies in accordance with the present trend of regional integration (Kim *et al*., 2010).

Spatial planning and allocating fishing grounds

The country's fishing grounds should be re-defined and reflected on the map of the marine waters of Vietnam, where fishing routes (onshore and offshore) should be delimited while geographic partitions (*i.e.* by province, region, area) should be enhanced and enforced. Marking buoys and signage should be installed in the delineated fishing grounds and restricted areas. Regular monitoring should also be conducted while strict punishment should be imposed for cases of violations. Furthermore, specific areas could be assigned where fishing is allowed but not permanently (conservation areas), where fishing is prohibited during a certain period of the year, where seasonal ban on fishing could be imposed, and other zones. This would require the identification of essential habitats and key areas for protection as well as the targeted activities necessary for longer term sustainability of the fisheries sector. Establishment of few additional Marine Protected Areas (MPAs) for both biodiversity protection and enhancement of fisheries could also be promoted (Quach *et al*., 2009).

Strengthening enforcement and monitoring capacity both at central and provincial levels

For the sustainability of fisheries, enforcement of regulations for fishing vessels registration and licensing should be strengthened, while legal provisions for submission of fishing vessel logbooks, and infrastructures and technical assistance should be enhanced. In addition, inspection activities at landing sites should be enforced and strengthened, and the capacity of inspection officers

to be enhanced. Development of an onboard observers program, upgrading patrol vessel capacity, and promoting vessel registration system are also among the immediate needs at all levels. Scientific studies in advanced fishing, high selective technologies, and improved fishing grounds forecast should also be promoted.

Advocacy and continuous awareness-raising of fishers on the management of the coastal resources

Along with the enormous efforts of the government to provide alternative livelihoods for fishers, advocacy and education to raise the awareness of fishers on the need to protect the marine and coastal resources must be emphasized and constantly pursued. Considering that coastal resources are protected only in the sense of protection by the fishers, therefore management authorities should implement more communication methods, and make innovations on the contents of the advocacy programs and approaches for using the various types of media on public information, education and communication. Moreover, strict punishments for illegal, unreported and unregulated operators should be enforced by the concerned government agencies.

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