

implementation of the ARs project in Malaysia in 2006-2010. These include: (a) perceptions of most people and policy makers that ARs are constructed for fishing, and as a consequence AR sites outside Marine Park areas are fished without control; (b) fishers' management responsibility of the ARs is unclear because many government agencies are directly involved in the construction and deployment of ARs; (c) conflict of interest among user groups especially between drift net and anglers in the AR areas, especially that drift nets are always entangled with the AR modules and are left unrecovered; (d) inadequate technical knowledge among officers involved in ARs project especially in marine engineering construction and physical oceanography; (e) insufficient facilities and infrastructures such as jetty, pontoon, crane and concrete batching plant; and (f) limited funding for the scheduled monitoring activities.

4.5 Responsible Fishing and Practices in Southeast Asia

Promotion of the concept of responsible fishing is not new in global fisheries as it can be traced back to the Convention on Fishing and Conservation of the Living Resources of the High Seas in United Nation Law of the Sea (UNCLOS) 1958 which explains the global concern of sustainable utilization of the marine fishery resources. Similar message was reemphasized in the articles of UNCLOS 1982 which concerned more on the conservation and utilization of the living resources, and especially the stocks occurring in the exclusive economic zones of two or more coastal States or transboundary or highly migratory species. However, the fishery resources had gradually declined year by year and in order to address the problems on stock decline, the Committee on Fisheries (COFI) organized the International Conference on Responsible Fishing in 1992 (The Cancun Declaration 1992) to consider the draft of the Code of Conduct for Responsible Fisheries (CCRF). Finally, the global CCRF was adopted in 1995, providing general principles and international standards for responsible fishery practices worldwide. Recognizing that the implementation of the CCRF is very important in ensuring sustainable fisheries in Southeast Asia, SEAFDEC also sustained its campaign for the implementation of the CCRF in the region. In order to encourage the Southeast Asian countries to adopt the CCRF, it was necessary for SEAFDEC to provide clarification on the requirements spelled out in the CCRF taking into consideration the specific situation of the Southeast Asian region.

The different fishing scenarios and issues that exist within the region, especially those related to multi-species, multi-gear and small-scale nature of fisheries are rather dominant and unique, but it is unfortunate that these issues were only superficially covered by the global

CCRF. Thus, it was deemed important for SEAFDEC to address the specificity of fisheries in the region through its program on the Regionalization of the Code of Conduct for Responsible Fisheries (RCCRF) starting in 1998. RCCRF aimed to: clarify the requirements of the CCRF; identify and prioritize the required actions; identify the issues that require special consideration from the regional point of view; formulate regional policies that would help the ASEAN Member Countries in implementing the global Code of Conduct for Responsible Fisheries; and facilitate the formulation and implementation by the ASEAN Member Countries of national codes of practices for responsible fishing operations, fisheries management, aquaculture, and post-harvest practices and trade. While the RCCRF focused on the Southeast Asian region's specific context, encompassing its culture, its fisheries structure, and the region's fishery ecosystems, the result was a compilation of regional guidelines accommodating the specific regional concerns that the global CCRF failed to highlight, and where the issues of particular importance to Southeast Asia have been amplified and elaborated on under the framework of the global CCRF.

4.5.1 Key Issues Related to Responsible Fisheries

In order to sustain the marine fishery resources and maintain marine capture fisheries in the Southeast Asian region, the RCCRF attempted to put more emphasis and strengthen Chapter 8 of the CCRF, while the hindrances confronting the development of sustainable fishing were identified. Two main issues were then focused, *i.e.* depleting fishery resources coupled with environmental deterioration, and climate change that impacts on fishing operations and safety of fishers at sea. Since the impacts of fishing operations and practices both legal and illegal had been identified as the main causes of the depletion of fishery resources and deterioration of the environment, these issues were discussed thoroughly during the Regional Workshop on the Reduction of the Impacts of Fishing on Coastal and Marine Environments in the Southeast Asian Waters organized in Thailand in January 2009, and scoped into specific issues that include: over-fishing; destructive gear; on-selective gear and practice, IUU fishing; ghost fishing; and use of fossil fuel. In addition, the 2009 Workshop also identified major fishing practices that could bring negative impacts on the coastal and marine environments hindering all efforts to achieve sustainable fishing especially in the Southeast Asian waters. These included: light fishing; use of stationary gears (*e.g.*, tidal traps, stow-net, fyke net, Japanese set net, Muro-ami, Choko-ami); use of active gears (*e.g.*, trawls, dredge, push net); use of semi-passive gear and small-scale fishing gear (*e.g.*, pot, gill net); longline fisheries; and purse seine operations associated with fish aggregating devices (FADs).

Moreover, considering that the impacts of climate change and the consequences of unpredictable weather conditions had been the main hindrances in sustaining responsible fishing activities and safety of fishers at sea, efforts are being made by the Southeast Asian countries to mitigate the impacts of fishing operations to the environment. The SEAFDEC Fishery Statistical Bulletin 2007 reported that the number of fishing boats in Southeast Asia both powered and non-powered could reach about 1,500,000 units, reflecting the fact that the fishing sector is rapidly growing and could be a major source of greenhouse gas emission and thus, should be addressed as part of the international climate change mitigation framework. Furthermore, reports have also shown that some 2.5 million out of 4.3 million vessels used in fisheries worldwide are powered by fossil fuel burning engines that consume some 42-45 million MT of fuel per year. The increasing use of fossil fuels by fishing boats led to increased emission of CO₂, providing the information on carbon footprints of fishing boats. Since the boat's carbon footprint is directly proportional to the amount of fuel burned, it is therefore necessary to reduce the use of fossil fuel to minimize the fishing boat's carbon footprint and subsequently reduce the emission of CO₂, a major greenhouse gas (GHG) that contributes heavily to global warming.

SEAFDEC recognizes that strengthening responsible fishing and practices is an approach that could sustain marine fisheries in the Southeast Asia region. In this regard, three main issues have been considered which should be addressed in future R&D activities, *i.e.* investigating the destructive manners of fishing gear and practices, optimizing energy use in fisheries, and enhancing safety at sea for small-scale fishing boats. The 2009 Workshop noted that destructive fishing gears and practices are being operated in the Southeast Asian region and thus, countries were asked to mitigate the impact to fisheries resources and ecosystem. On light fishing for example, research on appropriate use of lights in fishing (optimizing and saving), fish behavior in response to the light, visual physiology and impact on socio-economic as well as alternate light source technology should be undertaken. The outcome of such effort could be a draft policy on the use of lights in fishing.

For active fishing gears (trawl net, dredge, push net), action plans for the development of strategy on the promotion of JTEDs in trawl fishing in Southeast Asia should be strengthened, while observers program for trawls, dredgers, and push nets should be initiated. Assessment of the impact of dredge, push net and other active gears should be conducted, the results of which could be used in the development of appropriate policies. Action plans for longline fisheries should be developed to include the development of strategy for adoption of the circle hook in longline fishery and secure reliable supply of appropriate

hooks, promotion of best practices for longline fisheries, onboard observers programs as well as assessment of by-catch in pelagic longline fisheries.

Moreover for stationary fishing gear (tidal trap, stow net, Japanese set net), the action plan could include assessment of the impact of stationary gear, establishment of regional expert network to promote further extension of set net technology in the region, and dissemination and promotion the manual on good practice. For small-scale gear (gillnet, pot/trap), future R&D activities should aim to enhance sustainable fisheries, and could include: assessment of the impact of small-scale gear to marine fishery resources, mortality risk assessment of small-scale fishing activities to marine mammals, development of mitigation measures for ghost-fishing and use of non-selective fishing gears, development of management model for small-scale gears, and development of awareness building materials to mitigate by-catch in small-scale gears. As for purse seine in association with FADs, activities that had been initiated in the region should be enhanced, *e.g.* survey on the use of drifting FADs and fixed FADs in Southeast Asian countries, assessment of the impact of fixed FADs on tuna stock, materials and designs for eco-friendly FADs, and awareness building on the impacts of abandoned drifting FADs and on the use of fixed FADs in purse seine fishing. In addition, the development of best practices for drifting FADs and fixed FADs should also be pursued.

In line with the efforts of the Southeast Asian countries to reduce the impact of fishing practices to the coastal and marine environments, the establishment of the *Network for Reduction of Impact of Fishing on Coastal and Marine Environment in Southeast Asian Waters (IFCOME-Network)* has been initiated by SEAFDEC to facilitate the sharing and dissemination of information on programs and initiatives related to the reduction of the impact of fishing, and monitor the developments to be used as basis in improving the design of fishing gears and promotion of responsible fishing practices. The main role of the Network is to provide information and recommendations that could contribute to improving the current fishing gear technology and practices to reduce the impacts from fishing activities; enhancing inter-agency and inter-sectoral coordination at the national, regional and international levels for achieving sustainable fisheries management and development in the Southeast Asian region through proper development of fishing gear technologies and practices; strengthening regional cooperation on R&D, technology transfer, and resources capacity building on the issues related to reduction of impact of fishing practices; and widening the network of people, government, organizations for reducing the impact of fishing practices to the coastal and marine environments.