

that reducing fossil fuel dependence in fishing operations would entail several measures that include the development and promotion of cost effective technologies, backed up by appropriate policy structures for the management of energy use in fisheries in the region. In addition, fuel and energy source alternatives should be identified, while R&D on environment-friendly and efficient capture technologies should be pursued (SEAFDEC, 2011b).

Specifically, several projects have already been initiated in the Southeast Asian region concerning measures to reduce fossil energy dependence in capture fisheries. The project of SEAFDEC on Responsible Fishing Technologies and Practices or “Fishing in Harmony in Nature” has been promoting the use of sails in fishing operations. Moreover, SEAFDEC/TD has been conducting studies to determine the ways and means of reducing the use of fossil fuel in fisheries which include improvement of designs of boats/vessels, and increasing engine efficiency which also entails gear modifications. In terms of alternative/less inflicting energy sources, the use of biofuels which have lesser impact than other fossil fuel has also been considered for promotion in the region’s capture fisheries.

Concerns related to energy use in fisheries had become critical in the region, thus, policy intervention at the regional level would be necessary to address common interests in sustaining the fisheries industry in the midst of environmental challenges. In an attempt to address these concerns, the ASEAN developed the Plan of Action in Regional Energy Policy and Planning (APAREPP): 2010-2015, which aims to enhance national policy and planning activities of the ASEAN countries for integration into a cohesive and effective regional policy analysis and planning towards sustainable development. Moreover, SEAFDEC on its part would continue to promote alternative energy sources for both capture fisheries and aquaculture, support the use of energy savings and environment-friendly fishing technologies and sustain its projects on the reduction of the use of fossil fuel in fisheries (SEAFDEC, 2010d). Involvement of and awareness raising in the private sector should also be enhanced which will ultimately reduce the impacts while relevant programs should be promoted in collaboration with other institutions including the academe, NGOs, research institutions, especially in developing advocacies relative to minimizing the contribution of fisheries to climate change. To list a few, some specific strategies that could be adopted to address climate change could include: 1) reduce heavy dependence on oil by tapping alternative energy sources; 2) promote energy efficiency among industries and the private sector; 3) implement public awareness programs by government agencies and NGOs towards promoting energy efficiency, recycling and use of public transport; and 4) maintenance effective forest management and conservation.

## 7. HUMAN RESOURCES IN FISHERIES

### 7.1 Status of Human Resources in Fisheries

While moving towards global competitiveness, countries in the Southeast Asian region have confronted with issues and challenges that threatened sustainable development of fisheries. In view of such challenges, the availability of qualified human resources in relevant subjects and disciplines is envisaged to be one of the very crucial prerequisites for sustainable development and management of fisheries. In order to obtain information on the current status and gaps in human resources of countries in the region particularly in the government sector, a survey on the “Existing Human Resources and Expertise in Fisheries in the ASEAN Member Countries” was undertaken by SEAFDEC in early 2010. The questionnaire used during this survey primarily sought information on the availability of expertise in the areas of fisheries biology, capture fisheries, fisheries management, aquaculture, fisheries post-harvest, laws and legislations, cross-cutting issues, etc., in different gender and age groups. The inputs from countries, although doesn’t cover the whole dimension of human resources profile, indicated the tendency in inadequate human resources in several subject areas (**Box 4**).

It could be said that during the past decade, human resource expertise in fisheries in most countries have been moving towards those that provide higher economic benefits, such as aquaculture, post-harvest and processing enterprises, etc.; as well as subjects that caught attention from policy makers/planners such as fisheries management and governance. In contrary, there are tendencies in shortage of human resources in some fundamental subjects, such as fisheries biology, laws and legislation, as well as the cross-cutting and emerging issues/challenges. It is therefore necessary for countries in the region to further review and form a clear picture of the current availability and gaps of relevant expertise and human resources, and come up with strategies to balance the availability of human resources in wide ranges of disciplines in responding to their respective future requirement.

In addition to the tendency in shortage of expertise in some fundamental fisheries-related subjects, many countries in the region also faced the problem that most of the young generations had shown no interest to engage in the activities, particularly capture operations. The situation is specifically more serious under the situation where fishery production and catch has continuously declined with the degradation of fishery resources, and the drastic increase in fuel price. In some localities, only those that have no better job opportunity choose to become fishers, resulting in a tendency in increasing average age of fishers. These

#### Box 4. Fisheries Human Resource: Gaps and Requirements of Southeast Asia

From the survey conducted by SEAFDEC in 2010, based on the information provided by countries, namely Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore and Thailand, the available human resources in fisheries in the region and the gaps and areas where expertise were limited had been identified. In general, observation could be made that the available expertise in fisheries was higher for men than women in all countries; and there are only few areas where expertise was higher for women, specifically on post-harvest and trade. However, this was mainly due to the nature of most of the tasks that may suit more for men, particularly those on capture fisheries, aquaculture and fisheries biology.

In most countries, the areas where very high number of human resources with expertise was observed were aquaculture, fisheries management and capture fisheries; while the areas where scarcity of expertise was clearly found especially in the government sector were fish taxonomy, population dynamics, ecology, limnology, etc. Other important areas where expertise is available at certain levels but inadequate were laws and legislation, particularly on international cooperation and marine affairs and fisheries laws/regulation, especially for the less developed countries such as Cambodia and Lao PDR; and the cross-cutting issues, such as those on fisheries information and statistics, fisheries and food security and poverty alleviation, and climate change. The limited availability of human resources in these areas is envisaged to create impact to the development of fisheries in a long-term basis, especially under the situation where several issues and challenges have emerged from the global arena.

Under the same survey, countries also provided recommendations on actions that should be taken in order to enhance the capacity of existing human resources and ensure the availability of human resources in fisheries in the future.

The recommendations could be summarized as follows:

At national level, governments should:

- Establish clear policy and plans in ensuring long-term sustainability of human resources;
- Encourage officials to be involved in relevant national/international workshops, conferences to enhance their knowledge and expertise;
- Carry out measures to acquire expertise in areas where there are currently gaps, by supporting the existing staff in building up their knowledge and capacity in the areas outside their current expertise; and consider recruiting new staff with relevant expertise; and
- Ensure the future availability of qualified human resources particularly for the areas where shortages of expertise are envisaged, through the development of appropriate curriculum in collaboration with fisheries-related academe, and provision of scholarship or research funds on the required scopes.

At the regional level, organizations relevant to fisheries should:

- Conduct regional training programs to support human resources development activities for the existing fisheries-related officials of countries based on their priorities and needs;
- Convene technical events such as consultations, workshops, symposia and conferences to provide opportunities for officials from countries to exchange views and expertise;
- Develop and facilitate exchange programs for the region's researchers and national/regional experts;
- Conduct research activities of mutual interest in collaboration with Member Countries; and
- Arrange study visits for government/non-governmental sectors and other related stakeholders to enhance their experiences and knowledge in the required disciplines.

Sources: SEAFDEC, 2011

insufficient human resources situation if continued are envisaged to eventually create extensive impacts to the capacity of the fisheries sector in providing food supply and sustaining the future food security requirement.

## 7.2 Strategy for Human Resource Development in Fisheries in the ASEAN Region

In order to clarify the role of human resource development for sustainable fisheries development, the ASEAN Member Countries in 2004 in the midst of the implementation of the Resolution and Plan of Action adopted in 2001, also approved the "Strategy for Human Resource Development in Fisheries in the ASEAN Region" (Box 5). The development of the "HRD Strategy" was based on principles that: 1) the promotion of HRD in fisheries

#### Box 5. Strategy for Human Resource Development in Fisheries in the ASEAN Region

To ensure long-term support to human resource development (HRD) in fisheries in the ASEAN region, recommendations were made as follows:

- 1) Regional collaboration should be strengthened to improve HRD activities at the national level;
- 2) Scope of HRD requirements including objectives, target groups/areas and levels will be identified in accordance with the Resolution and Plan of Action;
- 3) The development of human resource capacity should not only be on technical issues but also integrate social, environmental, legal, and other issues as identified in the Resolution and Plan of Action;
- 4) The ASEAN Member States should conduct awareness building activities to obtain cooperation/compliance of private sector on the issues, including national requirements for sustainable fisheries;
- 5) The ASEAN Member States may conduct HRD activities to introduce new technology to private sector, through consultation/collaboration with the intended beneficiaries;
- 6) HRD activities directed towards competency/skill-based training relevant to the current fisheries situation and demands of industry can be promoted where resources and mechanisms are available;
- 7) Each ASEAN-SEAFDEC Member Country should conduct an inventory of programs for HRD in fisheries that contain essential and usable information from fisheries-related agencies and HRD programs operated by relevant institutions, including universities. Based on this inventory, a regional database can be established and regularly updated to provide a basis for networking in HRD in fisheries;
- 8) The ASEAN-SEAFDEC Member Countries and international/regional organizations should use the inventory and networking to identify gaps, avoid duplication of effort and ensure complementarity of HRD activities;
- 9) Partnership and regional cooperation, including South-South Cooperation, exchange of expertise at national and regional levels, international/regional organizations, among external funding agencies, government authorities and academe, should be developed by fully mobilizing the inventory and networking;
- 10) Cost-sharing mechanisms (either cost-recovery or cost-sharing) should be encouraged to enhance the ownership and effectiveness of HRD programs in the ASEAN Member States; and
- 11) Regular monitoring and assessment of regional HRD activities should be conducted as part of the implementation of programs under the ASEAN-SEAFDEC Fisheries Consultative Group (FCG) mechanism.

is primarily a national concern, and national capacity and resources are mobilized for maximum impact; 2) where there is insufficient capacity and/or resources available at the national level, bilateral and regional, and/or external supports should be sought; and 3) Regional HRD activities could be conducted on common needs to maximize the use of resources and benefits of the countries.

Along the line with the “HRD Strategy”, and recognizing that disparity of the social and economic well-being among/within the most of the Member Countries can be the one of the serious constraints to further promote the countries’ development; SEAFDEC during 2008-2010 undertook a project on “Human Resources Development on Poverty Alleviation and Food Security by Fisheries Intervention in the ASEAN Region”. The project aimed to enhance human capacity of fishers of selected rural fishery communities as well as relevant fisheries government officials and those working at the local level in support of fishery communities in order to alleviate the identified poverty status through fisheries intervention.

Under different thematic areas, *i.e.* Local/indigenous institution and co-management; Responsible fishing technologies; Backyard fishery post-harvest and processing; Rural aquaculture; and Inland fisheries development, activities were undertaken to identify technical issues that were critical for the poverty alleviation, develop HRD modules/materials, and conduct train-the-trainers as well as on-site training activities. Through the implementation of these activities, the post-training observations and recommendations were made to ensure success in extending future HRD program as shown in **Box 6**.

### 7.3 Way Forward

In order to ensure the long-term sustainability of fisheries development initiatives, it is recognized that the availability of human resources in wide ranges of fisheries-related subjects and disciplines is very crucial. Taking into account the recommendations made during the survey conducted by SEAFDEC, countries in the region should therefore consider establishing clear policy and plans in ensuring long-term sustainability of human resources, and exerting efforts to ensure the future availability of qualified human resources particularly for the areas where shortages of expertise are envisaged. These could be done through the development of appropriate curriculum and training

#### Box 6. Observation and recommendations from the Project on HRD on Fisheries for Poverty Alleviation

Recommendations were made to ensure success in extending HRD program at the local/national levels as follows:

- Training materials should be simplified and translated into national languages (or local languages), and the successful participants should be invited as resource persons to share their experiences with others;
- Close communication among resource persons and participants should be encouraged to ensure that the training topics and arrangements would address the problems and predicaments;
- Sufficient time should be allocated for both lecture and hands-on sessions;
- On-site training course should be followed-up by a series of training courses facilitated by extension officers in the fishing community;
- Fishery extension officers should strive to improve their knowledge and skills, not only in the technical fisheries aspects but also in extension techniques and strategies;
- National fishery agencies should have a vibrant extension program that include all aspects of responsible fishing and aquaculture, post-harvest and fish processing, fishery resources management, market development and trends, environmental issues, and socio-economic attributes of rural fishery development;
- National fishery agencies should coordinate with the provincial and local government units in disseminating up-to-date information related to aquaculture technology, market, environment especially on climate change, and government policies; and
- HRD initiative should be expanded into institutional capacity building activity where the staff of local institutions is regularly trained on the latest technologies.

modules in collaboration with fisheries-related academes, and provision of scholarships or research funds specifically on the required scopes, etc.

In addition to the initiatives at national levels, in the regional perspective, regional training programs, consultations, workshops, etc., should also be initiated to support human resources development activities and facilitate the exchange of views and expertise, based on the countries’ priorities and needs. Exchange program or collaborative researches could also be promoted to facilitate the collaboration and exchange of expertise, particularly in the areas where expertise may be strong and available in some, but insufficient and weak in other countries.

Human resources development in fisheries is an important area that every country and relevant organization should not overlook. It is very crucial that cooperation and concerted efforts are made to ensure the availability of capable and knowledgeable people, and the long-term sustainability of fisheries in the region.