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**REVIEW OF SEAFDEC COLLABORATIVE RESOURCE SURVEYS  
IN THE SOUTH CHINA SEA**

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## Introduction

SEAFDEC's Interdepartmental Collaborative Research Program on Fishery Resource Survey in the South China Sea was initiated in 1995 after acquisition of M.V. SEAFDEC from Japan. The first cruise was conducted for Area I Gulf of Thailand and East Coast of Peninsular Malaysia from September to October 1995. The studies in Area II(Waters of Sabah and Sarawak in Malaysia and Brunei Darrussalam ), Area III (West Coast of Luzon island in the Philippines) and Area IV have also been conducted consecutive way until 1999.

Since the documents (Proceedings of the First Technical Seminar on Marine Fishery Resource Survey in the South China Sea Area I, Proceedings of the Second Technical Seminar on Marine Fishery Resource Survey in the South China Sea Area II and Highlight of SEAFDEC Interdepartmental Collaborative Research Program on the Fishery Resources on the South China Sea Area I) which had been available and enabled to make a review were limited during the reviewing period, the only preliminary review was conducted based on the outcomes from the resource survey for the Area I.

## Preliminary Review

The above Survey (for Area I) conducted the following research in order to assess the fishery resource in the proposed area.

## Oceanography

1. Simulated temperature distribution contours at different depths in the Gulf of Thailand during pre-and post monsoon seasons.
2. Simulated salinity distribution contours at different depths during pre-and post monsoon seasons indicating possible occurrence of upwelling and downwelling process in the region, brought by the effects of the monsoons.
3. Dissolved oxygen distribution at different depths during pre-and post monsoon season, together with other measurement such as dissolved carbon dioxide indicating the movement of deeper water mass from and to the South China Sea.
4. Bottom characteristics.
5. Low levels of organic contents indicating low productivity in general with some exception such as near Samui Island where high productivity is envisaged.
6. Different levels of sulfide distribution, high in coastal and low in deeper areas.
7. Distribution of petroleum residues indicating the effects of human activities.
8. Distribution of metals contents are not fully analyzed.

### **Marine Biology**

1. Primary production relating to chlorophyll-a profile and light penetration in different depths. High in surface water decreasing with depth.
2. Biological study on the phytoplankton.
3. Biological study on the zoo plankton
4. Biological study on benthic fauna indicating rich in the coastal areas, indicating low productivity in the offshore due to the scarcity of macrobenthos.

### **Fisheries Resources**

1. Collection of fish larvae indicating the abundance of *Sardinella* but indicating substantial reduction of species and amount compared with previous similar surveys.
2. Some sampling survey using trawl was conducted but not systematically analyzed.

### **Fisheries Acoustic Survey**

The following observation can be derived from the out come of the research,

1. Even though the title of the surveys were called as marine fishery resource survey, very few information on the fisheries resources are collected. It apparently based on the reason that the program was not prepared to collect these informations. This situation can partly be attributed to the vessel used which are not appropriately equipped with the fishing gears for sampling of fish. Therefore the vessel was used for her capacity on the oceanographical survey, seaworthiness and large capacity of her accommodation.
2. Although the supplemental efforts to solve such constraints were conducted including using additional vessel in collaboration with the countries where the survey conducted to collect fish sample, these data to date are not systematically analyzed to assess the resource survey, but mainly used for taxonomical information (In case of Area I).
3. The most of the information collected on oceanography, marine biology including fish larvae have great value for the reference points in each subject, since such comprehensive information and data were not available in the region.
4. SEAFDEC in some senses, failed to manage the overall program due to the mainly the fact that the main research topics above are outside of SEAFDEC competence. The reporting of the survey was greatly delayed. The first documents are made available three years after the survey. If the information contained has values on the specific time, the outcomes of the research are become outdated.

Based on the above observation, the following suggestion can be made in order to further develop the information base on the fisheries resources.

The major achievement of the survey was to collect the oceanographic and marine biology information in the South China Sea Areas. These information could not be obtained in other survey. However, since these factors in the South China Sea are rather static nature and may not drastically be changed year by year, unless major environmental changes in the areas are occurred. In addition, as far as the clear

linkages of such oceanographical factors with marine fisheries resource are our main concerns, the minor change of such factors may be less prioritized from the SEAFDEC's mandate.

In this connection, it is suggested that the similar survey in the other areas of South China Sea where these have not been conducted including Cambodia coast, water between Peninsula Malaysia and Sarawak and northern and middle parts of South China Sea including Spratly Islands will not be conducted from the view point of the prioritization requirement of the SEAFDEC programs.

Although with respect to the acoustic survey, it can be concluded that the current survey on this subject could provide some information on the stock abundance in the South China Sea. However, it should be noted that the current acoustic survey alone would not provide any information on the stock size. In this connection, following steps have to be taken in order to collect more useful information which will be useful for stock assessment.

1. Considering the multi-species composition, acoustic survey may not be useful tool to assess the resource of the demersal stocks which may require many assumptions to obtain its size by species.
2. Since the methodology and equipment have been developed for single species, the acoustic survey should use for pelagic species which are normally more single species composition.
3. However, the stock assessment of the pelagic survey involve another difficulty including fecundity and recruitment mechanisms of these species. It is therefore important to make survey more frequently systematically in the certain period and for wider areas. In this connection, the data collected from the fishermen is usually more useful. The development of data collection mechanism from the industry should simultaneously be developed.
4. In order to obtain the data at species level, the species specific target strength (TS) have to be measured.
5. In addition, during the survey, it is also important that species identification has to be conducted by the simultaneous sampling.

Considering the above constraints, the survey using acoustic equipment should be more carefully programmed.

## **Conclusion**

The participants are invited to provide their views on the outcomes of the series of resource survey. It should be concluded that the series of surveys could provide great value of data and information especially in the field of oceanographical and marine biology. It is envisaged that the collected data and information will be greatly used in many ways as reference points for the future research works for South China Sea. However, it was also noted that the main purpose of the survey for fisheries resource survey may need some reconsideration to improve the outcomes.