

**APPENDIX F**

**ORGANIZATIONAL ARRANGEMENT FOR FLOOD MANAGEMENT**

## APPENDIX F

### ORGANIZATIONAL ARRANGEMENT FOR FLOOD MANAGEMENT

#### CONTENTS

	Page	
<b>CHAPTER 1</b>	<b>INRODUCTION</b>	
1.1	General Introduction.....	F-1
1.2	Data Collection.....	F-1
1.3	Review of Existing Reports and Ongoing Projects.....	F-2
1.4	Field Work.....	F-2
<b>CHAPTER 2</b>	<b>ORGANIZATION FOR CURRENT PROJECT</b>	
2.1	Agencies Involved and Responsible Projects.....	F-3
2.1.1	Project in Immediate Program.....	F-3
2.1.2	Medium – Term Program.....	F-5
2.1.3	Long – Term Program.....	F-6
2.2	Coordination Sub-committees.....	F-7
2.2.1	Sub-committee for Project Coordination.....	F-7
2.2.2	Sub-committee for Specific Issues.....	F-9
2.2.3	Coordination Mechanism of the Hat Yai District Flood Prevention Plan Administration.....	F-11
2.2.4	Operation of HYFP Sub-committees and Six Sub-committees for Special Issues.....	F-12
2.3	Implementation Programs and Progress.....	F-12
2.4	Inter-agency Coordination Problems.....	F-12
<b>CHAPTER 3</b>	<b>EMERGENCY FLOOD AND STORM DISASTER PREVENTION AND RELIEF ACTION PLANS</b>	
3.1	Flood Fighting and Organizational Problems Relating to Action Plans in Helping People Affected by Disasters.....	F-14
3.1.1	Flood Fighting and Problems at Provincial Level.....	F-14
3.1.2	Problems at District Level.....	F-15
3.1.3	Recommendations for Improving the Disaster Prevention Action Plan.....	F-16
3.1.4	Other Actions Required for Improving the Action Plan....	F-17
3.2	Flood Forecasting and Warning System.....	F-18
3.2.1	Flood Warning System.....	F-18
3.2.2	Installation of Weather Examining Radar to Minimize Flood Disasters.....	F-19
3.2.3	Government-Private Sector Meteorological Center Project.....	F-19

	Page	
3.3	Organizational Arrangement for Flood and Storm Disaster Prevention and Relief Action Plans, Songkhla Province B.E. 2545.....	F-19
3.3.1	Action Plans .....	F-20
3.3.2	Objectives of the Provincial Action Plan B.E.2545 .....	F-20
3.3.3	Policies on Flood and Storm Disaster Prevention and Relief of Songkhla Province.....	F-21
3.3.4	Organizational Arrangement for the Action Plans.....	F-22
3.3.5	Major Duties of the Command Office.....	F-23
3.3.6	Action Plans at Three Levels .....	F-24

#### CHAPTER 4

#### ORGANIZATIONAL RECOMMENDATIONS ON FLOOD MANAGEMENT

4.1	Assessment of Suitability of Organizational Arrangement for Flood Management in Songkhla Province.....	F-27
4.1.1	Relationship between the Songkhla Provincial Emergency Flood and Storm Disaster Prevention and Relief Action Plan and Hat Yai Flood Prevention Plan Administration Sub- Committee.....	F-27
4.2	Summary of Concerned Agencies .....	F-32
4.3	Recommended Organization of Flood Forecasting and Warning Agencies.....	F-33
4.4	Recommended Coordination of Land Use Control in Flood Plains .....	F-34
4.5	Recommended Coordination of Sub-committees and Disaster Prevention Command Offices .....	F-34
4.6	Components of Coordination Sub-committee for Specific Issues	F-36

## TABLES CONTENT

	<b>Page</b>	
Table 2.3-1	Projects in short-term Programs (To be implemented within fiscal Year 2002).....	F-37
Table 2.3-2	Projects in medium-term (To be completed within 2005).....	F-38
Table 2.3-3	Projects in long-term Program (To be completed after 2005).....	F-39

## FIGURES CONTENT

	<b>Page</b>	
Figure 2.2-1	Organization Chart for Hat Yai Flood Prevention Plan Administration.....	F-40
Figure 2.2-2	Actions Guideline for Flood Prevention and Solutions to Immediate Flood Hazards at Provincial Level, Hat Yai District Flood Prevention Plan.....	F-41
Figure 3.3-1	Coordination Plan for Flood and Storm Disaster Prevention and Relief, Songkhla Province A Part a Emergency Flood and Storm Disaster Prevention and Relief Action Plan, Songkhla Province.....	F-42
Figure 3.3-2	Coordination Structure of Flood and Storm Disaster Sufferer Helping Operations .....	F-43
Figure 3.3-3	Organization Chart for District Flood and Storm Disaster Prevention and Relief Action Plan.....	F-44
Figure 3.3-4	Organization Chart for Municipal Flood and Storm Disaster Prevention And Relief Action Plan B.E. 2545, June 2002).....	F-45
Figure 4.5-1	Proposed Coordination Mechanisms for Flood Disaster Prevention and Relief in Hat Yai District and in Songkhla Province.....	F-46

## APPENDIX F

### ORGANIZATIONAL ARRANGEMENT FOR FLOOD MANAGEMENT

#### CHAPTER 1 INTRODUCTION

##### 1.1 General Introduction

The organization arrangement study aims at reviewing major duties/responsibilities and current activities/future plans of the concerned agencies, based on available documents and additional information collected from the agencies. It also checks if any duplications or contradictions exist among the activities and plans of the concerned agencies. Further, it assesses the implementation progress of the proposed short-term plan and will identify the reasons when the project is being delayed, if any. Recommendations for improvement of the organizational arrangement for flood management in the study area will also be made.

##### 1.2 Data Collection

The following data and documents have been collected:

- (1) Agenda for Meeting No. 2/2001 of the Sub-committee for the Hat Yai District Flood Prevention Plan Administration. This agenda contains Minutes of Meeting No. 1/2001 of the Sub-committee which also gives some details on the organization arrangement for the Hat Yai Flood Prevention Plan.
- (2) Orders of the Special Area and Cities Development Coordination Committee (SACDEC) which appointed the Hat Yai District Flood Prevention Sub-committee (HYFPSC) and other six sub-committees which manage and administer the Hat Yai District Flood Prevention Plan (HYFPP).
- (3) Organization of Hat Yai Municipality, and the unit responsible for flood prevention and drainage systems in the Municipality.
- (4) Khlong U-Tapho Basin Flood Prevention Plan, Hat Yai, Songkhla Province, Volume 1 : Main Report, by Committee for Coordination of Royal Initiated Projects and NESDB, February 2001.
- (5) Khlong U-Tapho Basin Flood Prevention Plan, Hat Yai, Songkhla Province, Volume 2 : Programs/Projects, by Committee for Coordination of Royal Initiated Projects and NESDB, February 2001.
- (6) Songkhla Province's Flood and Storm Disaster Prevention and Relief Action Plan B.E. 2545, Songkhla Province's Civil Disaster Prevention Command Office, June 2002.

### 1.3 Review of Existing Reports and Ongoing Projects

The Institutional Arrangement Expert has collected and reviewed the reports and documents listed in Section 1.2 in order to understand the picture of flood management for the whole Songkhla province and for Hat Yai, existing projects/programs, and planned projects/programs. The existing organizations related to the Songkhla and Hat Yai flood prevention, the proposed agencies and organizations and their mandates have also been reviewed, and the results of the review are presented in Section Chapter 2.

### 1.4 Field Work

A field trip to Songkhla Province and Hat Yai District was made on 11 March 2002 by the Environmentalist, the Urban Planner/Land Use Expert and an assistant for the Organizational Arrangement Study. Besides visits to several sites where the proposed components of the Songkhla and Hat Yai Flood Protection Plans are located, the team visited Hat Yai Municipality's Bureau of Public Works to collect data on its flood prevention projects and plans, as well as the organization of the Bureau which is responsible for municipal drainage and flood prevention projects.

Another field trip was made in early August 2002, to Hat Yai and other districts in Songkhla Province including the Provincial Office of Songkhla. A report on the Emergency Flood and Storm Prevention and Relief Action Plans was collected from the Provincial Office, with district/municipal reports collected from the respective districts and Hat Yai Municipality. These reports are reviewed and analyzed together with the report of the HYFPP Administration Sub-committee, in order to assess their coordination and suitability.

## **CHAPTER 2 ORGANIZATION FOR CURRENT PROJECT**

### **2.1 Agencies Involved and Responsible Projects**

The 2000 flood has caused severe damages in Songkhla Province, particularly in Hat Yai District and Hat Yai Municipality, the capital city of this province. The causes of the flood were identified later and the government agencies concerned have created projects in order to prevent or minimize flood damages resulting from the corresponding causes. The major agencies involved in Hat Yai District flood preventive are listed as follows:

- 1) National Economic and Social Development Board (NESDB)
- 2) Committee for Coordination of Royal Initiated Projects
- 3) Songkhla Provincial Office
- 4) Royal Irrigation Department (RID)
- 5) Public Works Department (PWD)
- 6) Hat Yai Municipality (HYM)
- 7) Meteorological Department (MET)
- 8) Department of Highways (DOH)
- 9) Department of Town and Country Planning (DTCP)
- 10) Land Development Department (LDD)
- 11) Department of Accelerated Rural Development (ARD)
- 12) Royal Forest Department (RFT)
- 13) State Railways of Thailand (SRT)

According to the report by the Hat Yai District Flood Prevention Plan (HYFPP) Administration Sub-committee, NESDB is the main coordinating agency for the projects of these agencies while the Committee for Coordination of Royal Initiated Projects concentrates on coordination the projects initiated by His Majesty the King and Her Majesty the Queen. On the other hand, Songkhla Provincial Governor's Office coordinates local agencies and assists the two agencies mentioned above.

The report by the HYFPP Administration Sub-committee presents projects of different agencies, which can be summarized below:

#### **2.1.1 Projects in Immediate Program (To be implemented in fiscal year 2001)**

##### **(1) Royal Irrigation Department (RID)**

1. Dredging of 5 new drainage canals with a total length of 41.4 km (1,800 million baht).
2. Dredging of 4 drainage canals and natural canals (Khleng U-Taphao, Khleng U-Taphao Branches 1 and 2 and Khleng Tha Chang-Bang Klam (91 million baht).
3. Construction of a stream flow and flood forecasting model (19.5 million baht). A 1:10,000 topographic map needed for the model preparation will also be prepared.

- As of May 2002, design of the canals was completed. The RID has hired Kasetsart University to study and construct a flood forecasting model, and the model calibration has been completed.

**(2) Hat Yai Municipality**

There are 5 immediate projects with a total cost of 160,722 million baht, comprising:

1. Construction of Khlong Toci pumping station (M฿ 68.723)
2. Construction of Petchakasem Rd. pumping station to drain flood water to Khlong U-Taphao (M฿ 13.227)
3. Construction of automatic trash removing device at an existing pumping station (M฿ 21.614)
4. Installation of an electrical supply system for pumping stations in event of flood (M฿ 10.808)
5. Construction of street drain along Rat Yindi Road (M฿ 46.350)
  - All these project components have already been constructed.

**(3) Department of Highways**

1. Construction of 6 road bridges over the RID's new drainage canals (M฿ 65.00)
  - The construction has been about 60% complete.

**(4) Public Works Department**

1. Construction of 10 road bridges and 2 box culverts for Ban Tai-Ban Tha Nang Hom Rd. (M฿ 22.50)
  - The construction has been about 50% complete.

**(5) Meteorological Department**

1. Construction of 20 automatic rainfall measuring and forecasting stations (M฿ 19.00)
  - The construction is expected to be completed by the end of year 2002.

**(6) Department of Accelerated Rural Development**

1. Construction of an RC bridge of Highway No. SK-3066
  - The construction has been completed.

**(7) State Railways of Thailand**

1. Construction of an RC bridge (M฿ 3.749)



- The construction has been completed.

**(8) Department of Town and Country Planning**

1. Study and analysis for improving Hat Yai comprehensive plan in order to set appropriate guidelines for comprehensive area and land use improvement emphasizing prevention and reduction of floods (M฿ 4.287)
  - The work has been about 80% complete.

**(9) Land Development Department**

1. Land use planning for Khlong U-Taphao Basin with due consideration of flood prevention and reduction (M฿ 4.00)
  - The work will be completed within September 2002

**2.1.2 Medium-Term Program (Beginning in fiscal year 2002, to be completed within fiscal year 2005)**

**(1) Royal Irrigation Department**

1. Survey and design of 6 reservoir in tributaries of Khlong U-Taphao, after completion of the feasibility study
  - The feasibility study will be completed by early 2003

**(2) Hat Yai Municipality**

1. Construction of two projects to improve the existing flood protection and drainage systems: (M฿ 302.74)
  - RC flood retaining wall on the right bank of Khlong U-Taphao and Khlong Wa, to prevent flood in Hat Yai Municipality, Kho Hong TAO and Khlong Hae TAO. The construction is underway. (M฿ 185.74)
  - An RC retaining wall on left bank of Khlong U-Taphao to prevent flood in Hat Yai Municipality. The construction will begin in 2003. (M฿ 197.00)
2. Project for solving drainage problems of water draining from the mountain range to the rest of the city, consisting of 5 projects (M฿ 575.16)
  - A drainage system in Kho Hong area, drains, trash removal device, wastewater interceptor, to improve rainfall/runoff problem in Khlong Toei Basin (M฿ 99.20)
  - A box culvert under Kanchanavanich Road (M฿ 29.64)
  - A flood retarding basin for Khlong Toei area, Khlong Rian sub-basin (M฿ 185.00)
  - A flood retarding basin for Khlong Toei area, Khlong Ple sub-basin (M฿ 125.32)

- DTCP Road Kho 7 and its side drains from the municipal public park to Khlong Toei (M฿ 136.00)

The construction work of these projects has commenced since the beginning of year 2002.

3. Projects for solving drainage problems in low-lying areas, consisting of 3 projects : (M฿ 283.2)
  - Khlong Toei pumping station at the end of Rattakarn road and drain (M฿ 120.00)
  - Khlong Toei pumping station at Khlong Toei-Khlong Wa confluence, with drains (M฿ 89.99)
  - Khlong U-Taphao pumping station at the end of Sri Phawarat Road, with drains and connecting drains to Phol Phichai and Rat Uthit Road. (M฿ 73.18)

The construction of the first two projects has commenced since the beginning of year 2002, while the third project will begin in 2003.

### **(3) Department of Town and Country Planning (DTCP)**

1. Improvement of Hat Yai comprehensive plan, awaiting the study for improving the comprehensive plan. The work has commenced since the year 2002.

## **2.1.3 Long-Term Program (To be completed after 2005)**

### **(1) Royal Irrigation Department**

1. Construction of 6 reservoirs on tributaries of Khlong U-Taphao. A land acquisition survey will begin in 2003 and the construction work will begin in 2004.

### **(2) Royal Forest Department:**

1. Forest plantation and ecological management in (M฿ 100.1)  
U-Taphao Basin. This Songkhla Lake Basin Forest Management Project emphasizes integrated watershed management, with public participation. The project consists of
  - Headwater forest rehabilitation (5,000 rai)
  - Headwater ecological improvement (10,000 rai)
  - Weir construction in headwaters (5,000 rai)
  - Community conscience raising for forest conservation in 13 villages

The project is planned to be implemented in the 2002-2011 period.

## **2.2 Coordination Sub-committees**

To coordinate the flood management plan and its implementation for Hat Yai District, the following seven (7) sub-committees have been established :

### **(1) Sub-committee for Project Coordination**

1. Hat Yai District Flood Prevention Plan Administration Sub-committee (HYFPSC)

### **(2) Sub-committees for Specific Issues : They include :**

2. Public Relations and Public Understanding Sub-committee (PRSC)
3. Land Acquisition Sub-committee (LASC)
4. Construction Coordination Sub-committee (CCSC)
5. City Planning Coordination Sub-committee (CPSC)
6. Sub-committee for Career Promotion and Land Allocation to Resettlers (CPLASC)
7. Project Monitoring and Evaluation Sub-committee (PMSC).

### **2.2.1 Sub-committee for Project Coordination**

The Hat Yai District Flood Prevention Plan Administration Sub-committee serves as the main body to coordinate the Plan. It is assisted by the Hat Yai District Flood Prevention Plan Administration Coordination Center.

#### **2.2.1.1 Hat Yai District Flood Prevention Plan Administration Sub-committee (HYFPSC)**

##### **(1) Appointment and Members of Sub-committee**

The Specific Areas and Cities Development Coordination Committee (SACDEC) was appointed by Order No. 169/2544 of the Prime Minister's Office dated 11 June 2001. The SACDEC, by Order No. 1/2544 of the Prime Minister's Office dated 10 July 2001, appointed a Hat Yai District Flood Prevention Plan Administration Sub-committee (called hereinafter the HYFP Sub-committee or HYFPSC or the main Sub-committee). The HYFP Sub-committee includes 26 members, with a Deputy Prime Minister as its Chairman and a Deputy Secretary-General of the Office of the National Economic and Social Development Board (ONESDB) as a member and secretary.

##### **(2) Mandates of the HYFP Sub-committee**

1. Propose policies, measures and programs/projects for flood prevention in Hat Yai District, Songkhla Province.
2. Consider, scrutinize and approve implementation plans and budget frameworks for the six sub-committees for specific issues, namely the Public

Relations and Public Understanding Sub-committee, Land Acquisition Sub-committee, Construction Coordination Sub-committee, City Planning Coordination Sub-committee, Sub-committee for Career Promotion and Land Allocation for Resettlers, and Project Monitoring and Evaluation Sub-committee, prior to submitting them to the SACDEC for consideration and approval.

3. Coordinate administration, supervision, monitoring and evaluation of these Sub-committees in accordance with the mandate in 2) above, and help solve problems they face while performing their duties such that the Hat Yai District Flood Prevention Plan achieves its goal.
4. The HYFP Sub-committee or its chairman is empowered to appoint working groups to assist the Sub-committee in any aspect or to act on behalf of the Sub-committee in any aspect.
5. Approve budgets for administration and staff of the HYFP Sub-committee, its working groups, its action groups or action teams and the Hat Yai District Flood Prevention Plan Administration Coordination Center.
6. The HYFP Sub-committee can invite personnel from other government agencies and state enterprises to provide related data or explanations to the Sub-committee.

#### **2.2.1.2 Hat Yai District Flood Prevention Plan Administration Coordination Center (HYFPCC)**

This is an organization within the ONESDB (hereinafter called the Center) and serves as the secretariat of the Hat Yai District Flood Prevention Administration Sub-committee. Its mandates are as follows:

- 1) Coordinate with the HYFP Sub-committee, working groups, action groups and other agencies involved in the Hat Yai District Flood Prevention Plan.
- 2) Administer the Hat Yai District Flood Prevention Plan including action plans, monitoring and evaluation of tasks and activities undertaken in accordance to the Project's action plans as well as to solve problems in carrying out tasks and activities of the Project.
- 3) The Center can invite personnel of the related central, regional and local government agencies and of state enterprises to provide explanations, data and statistics to the Center, and can second personnel, materials and equipment from government agencies and state enterprises for official uses at the Center as deemed necessary.
- 4) The Director of the Center is appointed as the Administrator and Chief Executive of the Center.

- 5) Undertake other duties assigned by the HYFP Sub-committee.

### **2.2.1.3 Related Agencies**

Other related agencies, as listed in Section 2.2, are duty-bound to support the operations of the Project in accordance with the resolutions of the HYFP Sub-committee or as requested by the Center.

### **2.2.2 Sub-committees for Specific Issues**

In order to make functions of the Hat Yai District Flood Prevention Plan Administration unisonous and effective, six lower-level sub-committees have been established to take specific actions in every step of operations and to achieve quick and effective results. Each sub-committee can appoint working groups or individuals or officials to help in its activities. They are:

#### **(1) Public Relations and Public Understanding Sub-committee (PRSC)**

##### **1) Key Members**

- a) Governor of Songkhla Province : Chairman
- b) Chief PR Office, Songkhla : Secretary

##### **2) Mandates**

- a) Prepare public relations action plans to make related agencies and people understand the flood prevention plan, actions to be taken in events of flood and rehabilitation after flood events.
- b) Coordinate public relations activities, disseminate official information on progress of flood prevention and solutions to flood problems, as well as on evacuation and relocation of people, to create good understandings of the project among the local people.

#### **(2) Land Acquisition Sub-committee (LASC)**

##### **1) Key Members**

- a) Governor of Songkhla Province : Chairman
- b) Chief, Lands Office, Songkhla : Secretary

##### **2) Mandates**

- a) Prepare action plans and budget for land acquisition and in accordance with the Hat Yai District Flood Prevention Plan.
- b) Control and coordinate land acquisition activities for the Project.
- c) Monitor and supervise land acquisition activities and solve related problems.

**(3) Construction Coordination Sub-committee (CCSC)**

**1) Key Members**

- a) Director-General, RID : Chairman
- b) Director, the office of Water Resource Development 5, RID : Secretary

**2) Mandates**

- a) Prepare work plan and budget for construction of the project and costs for administration of the CCSC, with, approval of the FPSC and the Budget Bureau.
- b) Control, coordinate and expedite construction works in accordance with the master plan.
- c) Monitor and supervise construction activities, and solve related problems.

**(4) City Planning Coordination Sub-committee (CPSC)**

**1) Key Members**

- a) Director-General, Department of Town and Country Planning (DTCP) : Chairman
- b) Director, Planning Bureau, DTCP : Secretary

**2) Mandates**

- a) Study and analyze data for land use planning and improvement of comprehensive plan for Hat Yai City with respect to land use system, communications network and infrastructure systems in the Khlong U-Taphao Basin, to be consistent with the Hat Yai District Flood Prevention Plan.
- b) Control and coordinate activities related to enforcement of the city plan and land use plan, consistent with ecological system of the Project area.

**(5) Sub-Committee on Career Promotion and Land Allocation for Resettlers (CPLASC)**

**1) Key Members**

- a) Deputy Permanent Secretary of MOAC : Chairman
- b) Director, Special Planning and Projects Division, MOAC : Secretary

**2) Mandates**

- a) Prepare career promotion plans for resettlers relocated from ROWs of project components.

- b) Control and coordinate related agencies in accordance with the plans.
- c) Monitor and expedite the career promotion and land allocation activities.

**(6) Project Monitoring and Evaluation Sub-committee (PMSC)**

**1) Key Members**

- a) Governor, Songkhla Province : Chairman
- b) Chief, Songkhla Provincial Office : Secretary

**2) Mandates**

- a) Monitor and expedite activities of related agencies involved in the Hat Yai Flood Prevention Plan.
- b) Coordinate flood hazard relief efforts and activities in order to rehabilitate poor conditions and return them to normal as soon as possible.
- c) Report results of monitoring and promotion of activities according to the Hat Yai District Flood Prevention Plan to the Committee on Special Areas and Cities Development Coordination (SACDEC).

**2.2.3 Coordination Mechanisms of the Hat Yai District Flood Prevention Plan Administration**

The Director of the Coordination Center is responsible for the administration and control of the Center, which is divided into 2 parts, namely:

- (1) **Central Unit:** Use mechanisms of the Secretariat of the main Committee (SACDEC) to coordinate with related agencies.
- (2) **Local Unit:** Use mechanisms of the Southern Development Center, ONESDB, to coordinate with related local agencies.

In coordinating the Hat Yai District Flood Prevention Plan and in making decisions to solve related problems, if the Sub-committee and the local authorities face with any problem, the Chairman of the HYFP Sub-committee should be notified such that orders to solve each problem can be issued directly by the Chairman.

The Sub-committee for Career Promotion and Land Allocation for Resettlers should coordinate closely with the Land Acquisition Sub-committee in order to minimize impacts on the relocated people.

Figure 2.2-1 presents the organization for the Hat Yai District Flood Prevention Plan Administration.

Figure 2.2-2 shows actions guideline for Hat Yai District flood prevention and solution to immediate flood hazards at the provincial level. This guideline is

established by the Hat Yai District Flood Prevention Plan Administration Sub-committee.

#### **2.2.4 Operations of HYFP Sub-committee and Six Sub-committees for Specific Issues**

- (1) Meetings of the HYFP Sub-committee will be held every two months. In each meeting, each of the 6 sub-committees mentioned in Section 2.2.2 above will report its progress to the HYFP Sub-committee. In addition, more meetings of this Sub-committee can be held as requested by the Chairman.
- (2) The 6 sub-committees will submit their reports of work progress to the HYFP Sub-committee.
- (3) In FY 2002, two meetings of representatives of local authorities and local communities in the Project area will be held with representatives of the HYFP Sub-committee, particularly with related local authorities and people affected by the new canals and the new reservoirs. The main purpose of the meetings is to carry out public relations activities to establish understandings of the Project among affected people such that the Project implementation can continue without obstruction. Results of the meetings will be submitted for consideration by the HYFP Sub-committee, the SACDEC and the Cabinet, in that order.
- (4) The six sub-committees will have to establish their own action plans, administration mechanisms and budgets, which are to be submitted to the HYFP Sub-committee for consideration and approval.

#### **2.3 Implementation Programs and Progress**

The implementation programs of different agencies, as presented in Section 2.1, as well as their progress are shown in Tables 2.3-1 to 2.3-3

It can be seen that every concerned agency has tried to keep its own schedule, even though delays of some agencies, projects have occurred. The main reasons for such delays are long procurement procedures, obstacles faced in the actual field conditions, and coordination among related agencies. However, the HYFPP Administration Sub-committee, together with the Committee for Coordination of Royal Initiated Projects have been monitoring the progress of each agency, and their coordination efforts have helped expedite their progress to a certain extent.

#### **2.4 Inter-agency Coordination Problems**

The HYFP Project involves about 10 agencies and more than 25 projects, with about 16 projects in the short-term program alone. Implementation of these projects is usually affected by difficult field conditions, particularly effects of privately-owned land and properties. It normally takes a long time to negotiate with land and property owners to settle on the right-of-ways of project components and



on prices of land and properties. Effects on public infrastructure and utilities such as roads, railways, water supply pipelines and power supply lines are common, and many agencies have to be involved in solving such problems.

The implementation of the projects by each agency has also faced some difficulties, such as red tapes in procurement procedures and need for uses of right-of-ways of existing infrastructure (need to get approval of such uses from the responsible agencies which usually takes time). Budget request and approval all take lot of time, and sometimes the required budgets are not allocated or only some portions of the total budgets are approved (as reported by these implementing agencies). Nevertheless, the project has gotten special support from the Government, so most related procedures have been expedited. And, as state above, the HYFPP Administration Sub-committee and the Committee for Coordination of Royal Initiated Projects have been helping to coordinate among these related agencies, and certain coordination problems have been solved or mitigated. However, inter-agency coordination problems still exist, particularly those concerning budget approval and approval of use of right-of-ways of existing infrastructure for construction of the Project components.

On the construction side, there are needs for more coordination between the main construction agencies (such as RID and Hat Yai Municipality) and the agencies responsible for infrastructure such as the Department of Highways, the Public Works Department, the Department of Accelerated Rural Development, and the State Railways of Thailand. In designing the main drainage canals and the bridges over these canals, proper design of all related parties is required so that the bridge and its associated structures will not obstruct flood flows or should not collect debris which can aggravate flow obstruction. Field surveys by the consultant show that there is a lack of coordination of the concerned agencies at certain locations.

## **CHAPTER 3 EMERGENCY FLOOD AND STORM DISASTER PREVENTION AND RELIEF ACTION PLANS**

### **3.1 Flood Fighting and Organizational Problems Relating to Action Plans in Helping People Affected by Disasters**

#### **3.1.1 Flood Fighting and Problems at Provincial Level**

The report of the Songkhla Province Civil Disaster Prevention Command Office summarizes flood fighting helps and organizational problems in helping the people affected by flood disasters in Songkhla in year 2000. After flood had occurred the concerned agencies endeavored to urgently provide initial helps to the people suffering from the flood. Such efforts were made under the mechanisms of the Preparedness Center of the Civil Disaster Prevention Center under the Civil Disaster Prevention Command Office of Songkhla Province. The helps given comprised evacuation of affected people to safe places; distribution of relief necessities such as foods, drinking water, and medicines; medical treatment, installation of temporary electrical supply system and solving problems of communications system. Helps after the flood had receded concentrated on distribution of foods, other necessities, medicines; control of communicable diseases, expediting repairs of damaged public infrastructure and utilities, control of goods hoarding and price escalation, rehabilitation of urban environment, distribution of crop seeds to farmers, and adopting financial and tax measures to help people and commercial enterprises to rehabilitate their businesses which were adversely affected by the flood. In addition rehabilitation of tourist sites and tourism activities, the key components of Hat Yai's economy, was also undertaken and expedited.

As far as organizational problems are concerned, many areas were severely affected by the disaster, particularly Hat Yai Municipality where losses were inflicted on lives of people, privately-owned properties, and properties of government agencies and the private sector. In this Municipality, flood problems were severe and they took only a very short time to occur, thus leaving a very short time for most affected people to get prepared to fight the flood. Elsewhere, some areas received helps, but no helps were provided at all in many other areas. The Action Plan of each responsible agency lacked clarity on how each action could be taken effectively. Coordination to help solve the problems was badly hampered because related officials were also affected by the flood themselves and could not report to duty. Most infrastructure and utilities were disrupted, and coordination in the initial period after the flood had occurred could not be done. Efforts to provide helps to the affected people were faced with many problems, which can be summarized below:

**(a) Staff Problems**

**1) Staff of Songkhla Province's Ad Hoc Command Center**

1. Only a small number of clerical staff reported to duty, thus causing many tasks to be in confusing situation.
2. Several agencies thought that the tasks of the Command Center were under the sole responsibility of Provincial Disaster Prevention Unit. But in fact, that Office only served as a coordinating body within the Action Plans.
3. Once the Command Center had been established, the staff assigned to handle several tasks did not pay enough attention to their duties, such as

The responsible agencies did not send necessary them to the Center, or sent them to the Center only for short periods.

- The staff sent to the Center were only at working level and were not brave enough to make decisions or issue orders on behalf of their superiors when they were requested to take action.

**2) Staff of District and Municipal Ad Hoc Command Centers:** While Hat Yai was subject to the severe flood, the staffs assigned to work at these centers were stranded by flood at their homes. This made the District and Municipal Command Centers unable to function and help the affected people effectively in the initial period.

**(b) Problems Related to Equipment and Tools**

- 1) The available flat-bottomed boats, the main vehicles for evacuating people and their belongings were not adequately provided. In addition, they became useless when water currents were too swift.
- 2) During the first few days, the weather was very bad and helicopters could not fly.

**3.1.2 Problems at District Level**

The area where the problems were very severe was Hat Yai Municipality. In this area, the problems related to the 2000 flood disaster can be summarized below:

- (a) Staff Problems:** When the flood occurred, many chiefs of units closely related to flood prevention Action Plan could not report to their office because they were stranded at their homes. Thus, the chief District Officers and Directors of the District Disaster Prevention Command Offices could not issue orders to help affected people.

**(b) Problems Related to Tools and Equipment**

- 1) Even though trucks and boats were deployed to the affected sites, they could not work when the flood water levels were too high and the water current was too swift. Hence, these cars and boats could not be used to evacuate the affected people.
  - 2) The weather was also very bad, and helicopter could not take off.
- (c) Evacuation Problems:** During 22-24 November 2000, evacuation efforts for the affected people met with extreme difficult situations. When the water level rose and water current became too swift, the use of boats was almost impossible, so the evaluation could be done to a very limited extent only. The place, which could accommodate most evacuees, was Prince of Songkhla University Hospital.
- (d) Communications Problems:** While flooding was occurring, electric blackout also took place, thus erupting communications among related helping agencies.
- (e) Shortage of Relief Necessities:** Food and water shortage was a sever problem, particularly shortage of drinking water.
- (f) Car Parking Problems:** Since most ground areas were flooded, cars had to park on bridges and flyovers, thus hampering traffic flows in the city. As a consequence, efforts to help the affected people were also retarded.

**3.1.3 Recommendations for Improving the Disaster Prevention Action Plans**

Songkhla Province and several districts have assessed drawbacks related to ineffectiveness of the Action Plans at all levels in handling the 2000 flood in Hat Yai. The goal of the assessment is to solve the drawbacks and make the Action Plans more effective. Efforts are made to achieve better coordination among related agencies, both public and private, and as a consequence, collaboration has received. Thus, the Flood and Storm Disaster Prevention Action Plan for Hat Yai District for Fiscal Year 2001 was established, with the following emphases:

- (1) Request should be made to all related government agencies to participate and take responsibility in the Action Plan.
- (2) Efforts should be made to make responsible officials ready to take actions and raise their conscience in helping the affected people by abandoning the excuse of "being stranded at home by flood" in the next flood event.
- (3) Assignments for the related agencies and officials have been clarified, particularly those in the administrative section, by taking the following steps:

- 1) Establish the Hat Yai District Flood and Storm Disaster Relief Command Office at Conference Room No. 2, Hat Yai District.
- 2) When a flood or storm Disaster occurs, the District Officer responsible for administration and development shall work at the Command Office, to receive orders from the Chief District Office.
- 3) A News Center is established to collect and disseminate news and information on administrative activities; and the District Officer in 2) is assigned to head this center.
- 4) The District Officer for special activities is assigned to be responsible for taking actions to get rid of or relieve disasters, plan and control rescue efforts.
- 5) The District Officer for local affairs is made responsible for coordination among local government offices.
- 6) The Registration and Card Sub-division is assigned to be in charge of providing food stuffs to support action teams and of accommodating superiors who visit disaster sites.
- 7) Other officials are tasked with duties in accordance with their normal responsibilities.

#### **3.1.4 Other Actions Required for Improving the Action Plans**

In order to clarify the Hat Yai District's Action Plan and to make to the Action Plan ready for the next flood event, Hat Yai District has taken the following steps:

- (1) Appoint Disaster Prevention Officers (Chiefs of Tambons and villages in accordance with Article 22 of Civil Disaster Act B.E. 2522)
- (2) Appoint Quick Action Teams
- (3) Appoint Flat-Bottomed Boat Drivers
- (4) Request that each Tambon Administrative Organization (TAO) allocate budget to support immediate flood relief actions.
- (5) Request that every District and Tambon Police Office in Hat Yai prepare its own action plan to keep peace and order at evacuation areas and at flooded homes.
- (6) Request that District Agricultural/Livestock Offices survey agricultural and occupational data of people in risk-prone areas such that suitable helps can be made when these people are affected by disasters.
- (7) Appoint officers to be stationed at Tambon Disaster Relief Centers
- (8) Appoint officers to be stationed at the evacuation areas
- (9) Arrange a meeting of district officials and related officials as well as local private sectors on 31 August 2001 to clarify the Action Plan.

(10) Arrange a meeting of action teams in September 2001 at the People's Hall of Hat Yai District Office.

### 3.2 Flood Forecasting and Warning System

The Meteorological Department has been assigned to establish weather and flood forecasting and warning system for the project area. The Department has planned to implement the following projects:

#### 3.2.1 Flood Warning System

One of the most important measures to minimize losses of properties and lives of people in a flood disaster is flood warning. This task needs accuracy, correctness and reliability. In this connection, the Songkhla Province Civil Disaster Prevention Command Office has assigned the flood warning task to the East Coast Southern Meteorological Center and the office of Regional Irrigation 12, RID.

At present, the East Coast Southern Meteorological Center has commenced the work on weather forecasting such that it will render accurate results, and has established a project for it, as follows:

**(1) An Automatic Rainfall Measurement and Forecasting Stations Project:**

The Center has proposed to build 20 automatic remote rainfall measurement stations in 4 districts of Hat Yai, Sadao, Na Mom and Khlong Hoi Khong, at the following locations:

- 1) Hat Yai Municipal Slaughterhouse, Tambon Kho Hong, Hat Yai District
- 2) Wat Khao Kloi, Tambon Tha Kham, Hat Yai District
- 3) Na Mom District Office
- 4) Wat Bang Sala, Tambon Thung Lan, Khlong Hoi Khong District
- 5) Wat Photharam, Tambon Thung Khamin, Na Mom District
- 6) Wat Ban Rai, Tambon Ban Phru, Hat Yai District
- 7) Wat Bang Thon, Tambon Ban Phru, Hat Yai District
- 8) Wat Muang Kong, Ban Phangla, Sadao District
- 9) Ban Thung Chang, Tambon Patong, Hat Yai District
- 10) Wat Thung Prue, Tambon Patong, Hat Yai District
- 11) Khai Than Muk, Tambon Phangla, Sadao District
- 12) Wat Phru Chaba, Tambon Thung Tam Sao, Hat Yai District
- 13) Wat Phanglá, Tambon Thung Tam Sao, Hat Yai District
- 14) Khlong La Reservoir, Tambon Khlong La, Khlong Hoi Khong District
- 15) Wat Pho, Khlong Hoi Khong District
- 16) Wat Khok Liang, Khlong Hoi Khong District
- 17) Abandoned Samnak Sangha, Tambon Khlong Hoi Khong, Khlong Hoi Khong District
- 18) Khlong Ram Health Station, Ban Bo Ket, Sadao District
- 19) Tambon Prik Municipality, Sadao District

These stations are within Khlong U-Taphao Basin and their construction is underway.

- (2) **Collaboration by RID:** the office of Regional Irrigation 12 will analyze water flows, measure sea tidal levels at different stations in Khlong U-Taphao within Sadao, Khlong Hoi Khong and Hat Yai Districts. These data will be sent to the Songkhla Civil Disaster Prevention and Relief Director, and will also be used together with the East Coast Southern Meteorological Center in forecasting floods. In case floods and/or storms are forecast to occur, prior warning messages will be disseminated to the agencies concerned and the general public such that necessary measures including evacuation of people to safer places can be planned in advance.

### **3.2.2 Installation of Weather Examining Radar to Minimize Flood Disasters**

The project will procure a C-Band weather examining radar together with a radar tower, flood warning software, one remote sensing device and a data connecting system.

- Place of installation: Khao Wang Ching, Khlong Hoi Khong District
- A request for use of the Wang Ching Forest Reserve is being processed to the Royal Forest Department
- Budget: Fiscal year 2002-2003

### **3.2.3 Government-Private Sector Meteorological Center Project**

This project is to install a meteorological disaster warning station which is aimed at warning natural disasters for the east coast southern region, particularly in areas prone to natural disasters. The goal of the project is to reduce damages to properties and lives of people by employing coordination between the government sector and the private sector. The project location is the East Coast Southern Meteorological Center, Muang Songkhla District, Songkhla Province. The project is underway.

## **3.3 Organizational Arrangement for Flood and Storm Disaster Prevention And Relief Action Plans, Songkhla Province B.E. 2545**

In view of several drawbacks of the Songkhla Provincial Disaster Prevent Plan in fighting the 2002 flood, Songkhla Province has established the Emergency Flood and Storm Disaster Prevention and Relief Action Plan for the year 2002. This new organization as well as other organization associated with the Action Plans and the HYFPP Administration Sub-committee are reviewed and presented herein. Necessary recommendations for improving the organizational arrangement for flood management in Songkhla are also made.

The Emergency Flood and Storm Disaster Prevention and Relief Action Plans for year 2002 for Songkhla Province are established in accordance with Civil Disaster Prevention Act B.E. 2522, Thailand Administration Act B.E. 2534, Local Administration Act B.E. 2457 and Prime Minister Office's Regulations on National Security B.E. 2517. Details of the Action Plans and the associated institutional arrangements are presented as follows:

### **3.3.1 Action Plans**

Songkhla Province covers a total area of about 7,394 sq.km. As of January 2002, the province has 16 districts, 19 municipalities, 121 Tambon Administrative Organizations (TAOs), 124 Tambons (group of villages) and 998 villages. There were 322,482 households with a total population of 1,263,660, comprising 621,896 males and 641,764 females.

Topographically, the northern parts of Songkhla Province consist mainly of low-lying flat areas; the eastern parts are tidal flats; and the southern and western parts are hilly areas and highlands. The provincial areas generally slope downwards to the east and the north and drain to the Songkhla Lake and to the Gulf of Thailand. After heavy rainfalls, there are usually flash floods, coupled with floods from mountains and high sea tides, thus flooding residents' houses, agricultural areas, fishing grounds/aquacultural areas, public infrastructure and utilities. Livestocks, local economy and tourism in the flooded areas are also severely affected by these floods.

Thus, in order to prevent and relieve damages and adverse effects caused by floods, and to make flood and storm management in this province consistent with persistent local changes, Songkhla Province has established an Emergency Flood and Storm Disaster Prevention and Relief Action Plan B.E. 2545 (year 2002). The main goal of this Action Plan is get related agencies prepared for handling disasters during normal, peaceful periods, and to use the Action Plan as the tool to be undertaken systematically, efficiently and effectively when disasters do happen.

### **3.3.2 Objectives of the Provincial Action Plan B.E. 2545**

Songkhla Province has set the following objectives for its Provincial Action Plan:

- (1) To make the Action Plan effective in helping the sufferers and rehabilitating them and affected properties and infrastructure, with a comprehensive, systematic and effective actions and operations.
- (2) To create a system for preparedness and operations of the Action Plan in handling each disaster in three steps: before the disaster takes place, while the disaster is taking place and after the disaster has ended.
- (3) To develop capacity of the agencies and staff involved in the Action Plan to terminate and reduce damages and to rehabilitate affected people and properties as efficiently and effectively as possible in every disaster situation.



- (4) To inform related government agencies and military units in Songkhla Province of details of the Action Plan, its principles, steps to be taken and how to take actions in every step, as well as duties of each agency.
- (5) To inform the private sector, non-government organizations (NGOs), foundations, groups, associations, and people in Songkhla Province of details of the Action Plan and to request their participation in disaster prevention and relief in the province.

### **3.3.3 Policies on Flood and Storm Disaster Prevention and Relief of Songkhla Province**

Songkhla Province has formulated the following policies on flood and storm disaster prevention and relief in the province:

- (1) All District and Municipal Civil Disaster Prevention Command Offices have to establish their own Emergency Flood and Storm Disaster Prevention and Relief Action Plan for each responsible area to cover every form of risks, prescribing appropriate actions in three steps (preparation before the disaster takes place, actions while the disaster is taking place, and rehabilitation after the disaster has ended) and clear responsibilities of each concerned party. Each Action Plan will be subject to rehearsals and drills so that it can be executed immediately and effectively when any disaster actually occurs.
- (2) Protection of lives and properties of people which face sudden disasters shall be given the highest priority, in which case the Government shall be responsible for reasonable decisions made by all levels of personnel in charge.
- (3) In event a disaster has happened, the Directors of the District and Municipal Civil Disaster Prevention Command Offices shall undertake to implement the Action Plans in their responsible areas immediately, then inform the concerned superior authorities later, and request supports from nearby Command Offices or agencies if necessary.
- (4) Action teams of all parties concerned (government agencies, private sectors, NGOs, foundations, associations and people) in all affected areas shall pool necessary resources and man-power together and undertake to terminate and relieve the disasters in accordance with their assigned responsibilities.
- (5) The Provincial Command Office and other Command Offices shall adequately disseminate news and information on flood and storm damage prevention to related agencies, all large-scale industrial and commercial enterprises and people, encourage and support them in preparing themselves to protect their own properties and government properties from all forms of disasters.

### 3.3.4 Organizational Arrangement for the Action Plans

The agencies, which are responsible for the Action Plans, comprise:

1. Songkhla Province
2. All districts in Songkhla Province
3. All municipalities in Songkhla Province

#### 3.3.4.1 Operational Agencies

**(1) Directing, Commanding and Controlling Organizations:** These organizations include the Lower South Regional Civil Disaster Prevention Command Office (R.CDP.CO) and the Songkhla Provincial Civil Disaster Prevention Command Office (P.CDP.CO).

1. **Regional Civil Disaster Prevention (CDP) Command Office:** The Director of the R.CDP.CO is the Chief Administrator of this Command Office. The R.CDP.CO is responsible for coordinating, supporting and helping related agencies in training and technical aspects, providing equipment and tools as well as directly participating in termination of disasters. In addition, the Department of Local Administration (DOLA) has assigned Permanent Secretary of Songkhla Province to command, control and supervise government servants and employees and Territorial Protection Volunteer Groups which are stationed at different offices and to approve uses of equipment at the R.CDP.CO.
2. **Songkhla Provincial Civil Disaster Prevention Command Office:** The Governor of Songkhla Province serves as the Chief Administrator of this Command Office, and is responsible for directing supports and coordinating operations of all District and Municipal Command Offices, as well as for coordinating operations to help disaster victims both within and outside the disaster-struck areas.

#### **(2) District and Local Operational Agencies**

1. **District CDP Command Offices:** Each Chief District Officer serves as the commander of each Command Office. The D.CDP.CO is the main directing office in controlling, supporting and taking actions to prevent and relieve disasters in each district. If the task is beyond the CO's capability, helps will be sought from the P.CDP.CO or other nearby agencies.
2. **Municipal CDP Command Offices:** The Mayor of each municipality will head the command office in each municipality. Each municipal CDP.CO will serve as the disaster encountering team in its responsible area.
3. **Local Administration Organizations:** These comprise municipalities and Tambon Administration Organizations (TAO). They are responsible for

handling disasters in their responsible areas and have to coordinate in all aspects with the superior COs and nearby COs.

**(3) Duties and Responsibilities of Operational Agencies:** Duties and responsibilities of each operational agency include:

- 1) Establishing action teams, appointing and commanding disaster prevention staff, which will be responsible for encountering and ridding disasters.
- 2) Arranging training and rehearsals as specified in each Action Plan.
- 3) Developing capability of volunteers who will participate in the real operations of each Action Plan.
- 4) Carrying out other assignments.

**(4) Other Operational Agencies:** The Province has assigned provincial agencies, local agencies which are commanded by central government agencies, local offices (excluding military units), and state enterprises as the operation or action units. These teams shall follow orders of the CDP.CO in each area such that their efforts in disaster prevention can be made in unison with other COs in all steps.

**3.3.4.2 Support Agencies:** These include

- (1) Military Units:** They include the all important military units in Songkhla Province. Upon requests from the concerned CDP.CO, they will support the CDP.CO with equipment and manpower in handling the disasters.
- (2) Other Government Agencies:** These agencies include the office of Reginal Irrigation 12 and Songkhla Irrigation Project Office which provide water level data in Khlong U-Taphao, disseminate flood warning messages, and provide equipment and trucks. The Hat Yai ARD Operation center's Office and the Songkhla ARD Office provide manpower, equipment and car parking spaces. The Lower South Regional CDP Command Office provides manpower and equipment. Schools and Prince of Songkhla University provide car parking spaces and buildings to accommodate evacuees. The Hat Yai Airport Authority provides equipment and transport of drinking water.
- (3) Private Sector, NGOs and People:** Upon requests from the concerned CDP.DO, they will provide supports similar to that in 1) above. The private sector will provide some relief necessities such as foods, drinking water and other relief items.

**3.3.5 Major Duties of the Command Office**

The Songkhla Provincial CDP.CO as well as all other CDP.CO's of lower levels are endowed with duties to establish their individual Emergency Flood and Storm

Damage Prevention and Relief Action Plans in order to help prevent and relieve damages to lives of people and damages to properties of people and of the government including public infrastructure and utilities. Their duties will include rehabilitation of the damaged public infrastructure and utilities to their normal conditions after the disaster has ended.

### **3.3.6 Action Plans at Three Levels**

The action plans are divided into 3 levels, namely the Provincial Action Plan, the District Action Plans and the Municipal Action Plans. These action plans are established by Songkhla Province, all districts and all municipalities in the province, respectively. They are described below:

(1) **Songkhla Province's Action Plan:** The Provincial Action Plan has the purposes of relieving flood and storm disasters at the provincial level, helping people affected by the disasters and rehabilitating them and damaged properties after the disaster has ended. It has several steps of action that will be executed systematically and in unison in order to achieve high effectiveness. It also has the means to make all related civil agencies and military units in the province understand the Action Plans, their duties, related principles, steps of action and clear ways of action implementation, such that, in event of any disaster, these agencies and units can take related actions correctly, effectively and in accordance with the Action Plans.

1) **Guidelines for Actions of the Provincial Command Office:** There are guidelines for 3 different periods: before the disaster, while the disaster is taking place and after the disaster has ended.

#### **(a) Tasks to be Undertaken before the Disaster Takes Place**

1. Survey of risk-prone areas and places to accommodate evacuees.
2. Preparation of maps of risk-prone areas related to flood and storm disasters.
3. The command offices for the District/Municipal Civil Disaster Prevention should prepare their action plans, with details of actions, control mechanisms, duties of personnel and coordination.
4. Maintaining good coordination among related government agencies with preparation of staff, equipment and places.
5. Rehearsing the action plans under normal conditions in order to achieve preparedness and flexibility of operations when the real situation takes place.
6. Preparation of work schedule and use of public relations media to disseminate flood warning messages, including radio and television networks, community's message towers and internal radio programs.

**(b) Tasks while the Disaster is Taking Place**

1. The Provincial Command Office serves as the coordinating center in ridding or mitigating disasters and in sending equipment to the required areas.
2. Providing medical cares for patients and sufferers and providing sanitation services to affected people.
3. Undertaking to evacuate affected people from dangerous areas to safer places.
4. Establishing clear steps of actions such that the right actions can be taken immediately.
5. If the effects of the disaster are too severe for the Provincial Command Office to handle, inform and request necessary helps from other nearby agencies or military units.

**(c) Helping Affected People of after the Disaster has Ended**

1. The Chief District Officer will send advance money to help the affected people (an urgent matter).
2. If the amount of money required is beyond the Chief District Office's responsibility, send request for help to the Provincial CDP Command Office.
3. Requesting cooperation of other agencies to help in distributing disaster relief items to affected people.

**2) Duties of Provincial Command Office**

Songkhla Province, by the Director of the Provincial Command Office, will establish a special ad hoc Command Office to help people affected by floods and storms. This special ad hoc Command Office will have the following duties:

1. Directing flood and storm disaster prevention and relief actions in affected areas.
2. Preparing a summary report on the disaster and submitting it to the higher authority.
3. Coordinating with government agencies and private agencies outside the disaster area and requesting help if the disaster is beyond the capacity of the Provincial Command Office.
4. Coordinating with government agencies and private agencies in requesting for supports required for assisting the affected people.

Figure 3.3-1 presents the Coordination Plan for Flood and Storm Disaster Prevention and Relief of Songkhla Province.

Figure 3.3-2 shows the coordination structure of actions taken to help people affected by flood and storm disasters, Songkhla Province.

(2) **District Action Plans:** The District Flood and Storm Disaster Prevention and Relief Action Plans also comprise the plan for the period before the disasters, the plan while the disaster is taking place and the plan after the disaster has ended. The guidelines for these action plans are similar to those of the Provincial Action Plan, and their main organizational arrangement is shown in Figure 3.3-3. The guidelines for implementing the District Action Plans are as follows:

(a) **Tasks before the Disaster Takes Place**

- 1) Informing people of weather and water level situations and disseminating disaster warning messages.
- 2) Requesting related agencies to carry out public relations programs to inform related agencies and people of the information and messages in 1) such that they can get ready to prevent disasters in advance.
- 3) The District Command Office and related agencies will prepare necessary measures such as taking care of affected people, preparing necessary equipment and materials and finding appropriate measures to mitigate effects of floods and storms.

(b) **Tasks while the Disaster is Taking Place**

- 1) The District Command Office takes necessary actions such as providing affected people with foods and drinking water, requesting helps from higher authorities, rescuing people and helping them to evacuate to safer places.
- 2) Coordinating with the support units in helping the affected people.

(c) **Rehabilitation Actions after the Disaster has Ended**

- 1) Providing medical cares to sick and wounded people.
- 2) Survey of damages and reporting them to the higher authority.
- 3) Carrying at public relations programs to rehabilitate and boost moral of the affected people.
- 4) Undertaking to effect initial rehabilitation of the affected people.

(3) **Municipal Action Plans:** The Action Plan of each municipality also consists of actions in 3 periods, before the disaster, during the disaster and after the disaster. They have the action guidelines, which are similar to those of the District Action Plans. The organizational arrangement for these action plans is shown in Figure 3.3-4.

## CHAPTER 4 ORGANIZATIONAL RECOMMENDATIONS ON FLOOD MANAGEMENT

### 4.1 Assessment of Suitability of Organizational Arrangement for Flood Management in Songkhla Province

#### 4.1.1 Relationship between the Songkhla Provincial Emergency Flood and Storm Disaster Prevention and Relief Action Plan and Hat Yai District Flood Prevention Plan Administration Sub-Committee

(1) **Introduction:** In Section 2.2 of this Appendix, details of the Hat Yai Flood Prevention Administration Sub-committee (HYFPSC) are described together with its mandates. The Mayor of Hat Yai Municipality is a member of this main sub-committee. In addition, six sub-committees for specific issues have been appointed. The chairmen and some members of these sub-committees are listed below:

##### 1) Public Relation and Public Understanding Sub-committee

- |  |           |
|--|-----------|
| - Songkhla Provincial Governor                               | Chairman  |
| - Chief District Officers of Hat Yai and Bang Klam Districts | Member    |
| - Mayor, Hat Yai Municipality                                | Member    |
| - Songkhla Public Relations Officer                          | Secretary |

##### 2) Land Acquisition Sub-committee

- |   |           |
|---|-----------|
| - Songkhla Provincial Governor  | Chairman  |
| - Chief District Officers of Hat Yai, Bang Klam, Sadao, Na Thawi, Khlong Hoi Khong, Na Mom, Rattaphum and Khuan Niang Districts | Member    |
| - Chief, Songkhla Lands Office  | Secretary |

##### 3) Construction Coordination Sub-committee

- |  |                 |
|--|-----------------|
| - Director General, Royal Irrigation Department  | Chairman        |
| - Mayor, Hat Yai Municipality  | Member          |
| - Representatives of Department of Highways (DOH), Public Works Department (PWD), Department of Town and Country Planning (DTCP), Department of Accelerated Rural Development (ARD) Land Development Department (LDD), Meteorological Department (MET), Harbor Department (HD), The office of Regional Irrigation 12 (RID), The office of Budget Programming & Project Planning (RID) , State Railways of Thailand (SRT) | Member          |
| - Director, RID's Water Resource Development Office 5  | Secretary       |
| - Representative of Songkhla PAO   | Asst. Secretary |

- Representative of Hat Yai Municipality Asst. Secretary

**4) City Planning Coordination Sub-committee**

- Director General, Department of Town and Country Planning Chairman
- Representations of DOH, PWD, LDD, ARD, SRT, Songkhla PAO Member
- Director, The office of Water Resource Development 5(RID) Member
- Representative of Hat Yai Municipality Member
- Director, Town Planning Bureau, DTCP Secretary

**5) Sub-committee on Career Promotion and Land Allocation**

- Deputy Permanent Secretary, MOAC Chairman
- Chief District Officers of Hat Yai, Bang Klam, Sadao, Na Thawi, Khlong Hoi Khong, Na Mom, Rattaphum and Khuan Niang Member
- Representatives of LDD, Songkhla's ARD Office, Fisheries Department, The Office of Regional Irrigation 12 (RID), Agricultural Land Reform Office (ALRO), Department of Agricultural (DOA), Royal Forest Department (RFD), Department of Agricultural Extension (DAE), Department of Livestock) Member
- Director, The office of Water Resource Development 5 (RID) Member
- Director, Planning and Special Projects Division, MOAC Secretary

**6) Project Monitoring and Evaluation Sub-committee**

- Songkhla Provincial Governor Chairman
- Representatives of the following ministries Interior, Finance, Industry, Labor and Welfare Member
- Representations of: NESDB's Southern Development Center; BOI, Budget Bureau, Bank of Thailand, Thailand Industrial Council, Thailand Chamber of Commerce, Thai Banks Association Member
- Chief, Songkhla Provincial Office Secretary

**(2) Review of Mandates of the Main Sub-Committee and the Six Sub-committees in Relation to the Songkhla Province's Emergency Flood and Storm Disaster Prevention and Relief**

**1) Hat Yai District Flood Prevention Plan Administration Sub-Committee (Main Sub-committee):**

- Appoint working groups to assist the main Sub-committee
- Approve costs for administration and personnel for the operation of the main Sub-committee, other subcommittees, working groups, operations teams and HYFPP Administration Center



- The HYFPP Administration Center shall coordinate with the sub-committees, working groups and operations teams and the agencies involved in the HYFP Plan

**Comments:** It can be seen that, in the mandate of the main sub-committee or the HYFP Plan Administration Center, there is no mention of the Songkhla Province's Emergency Flood and Storm Disaster Prevention and Relief Action Plan. Likewise there is no mention of the main sub-committee in the report on the Action Plans. Thus, the relationship of the two organizations can be created though Songkhla Provincial Governor who is the Director of the Provincial Civil Disaster Prevention Command Office and a member of the main Sub-committee. The Governor also serves as the Chairman of three sub-committees under the main sub-committees, namely those on Public Relations, Land Acquisition and Project Monitoring and Evaluation.

Therefore, there should be clear and effective means of coordination between the HYFP Plan Administration Sub-committees together with the other six sub-committees and the the Songkhla Province Civil Disaster Prevention Command Office such that the work of the two organizations will not overlap or become redundant in the three important periods, i.e., before the disaster takes place, while the disaster is taking place and after the disaster has ended. It is recommended that the duties and operations of each organization and its sub-organizations be revised such that they support one another. Related timings of their operations should also be planned together such that they are consistent and agreeable with one another, in order to prevent overlapping, vacuum and ineffective operations.

- 2) **Relationship between Six Lower-Level Sub-committees and Municipalities:** According to the Songkhla Province's Action Plans, there will be district and municipal Action Plans as well, which will be administered by the respective Chief District Officers and Mayors. The review shows that the Mayor of Hat Yai Municipality, the hardest-hit area, serves as a member of the main Sub-committee and of the Public Relations Sub-committee and the Construction Coordination Sub-committee, while representatives of Hat Yai Municipality serve as members of Construction Coordination Sub-committee and the Town Planning Coordination Sub-committee. The Mayor is appointed as the Director of the Hat Yai Municipality, Civil Disaster Prevention Command Office and is responsible for the Municipality' Action Plan. Again, there is no clear relationship between this Municipality Command Office or its Action Plan with the main Sub-committee or with the lower-level sub-committees, and such relationship should also be clearly established.

As for other smaller municipalities (at the Muang and Tambon levels), the situation is somewhat worse than Hat Yai Municipality. There are no representatives of these municipalities at all in either the main Sub-

committee or the lower-level Sub-committees on the HYFP Plan Administration. Thus, they have to coordinate with these Sub-committees through the province and through the Provincial CDP Command Office.

- 3) **Relationship between Districts and HYFP Plan Administration Sub-Committee:** No district is represented in the main Sub-committee. Thus, the related districts can coordinate with this sub-committee through the Governor and the Chief of the Songkhla Provincial Office, and such coordination is easy.

The Chief District Officers of Hat Yai and Bang Klam Districts are members of the Public Relation Sub-committee, while the Chief District Officers of Hat Yai, Bang Klam, Sadao, Na Thawi, Khlong Hoi Khong, Na Mom, Rattaphum and Khuan Niang are member of the Land Acquisition Sub-committee and the Career Promotion Sub-committee. The only sub-committee which will have activities in the Emergency Disaster Prevention Action Plan is the Public Relations Sub-committee. Therefore, the relationship of all districts should be established with the Flood and Storm Disaster Prevention and Relief Action Plans and the main sub-committee and its sub-committee.

### (3) Relationship between Other Agencies and the Main Sub-committee

Chief administrators of several agencies are members of HYFP Plan Administration Sub-committees, including the Directors general of the following departments: Irrigation, Public Works, Highways, Town and Country Planning, Local Administration and Meteorology. For policymaking and administration, such representation is good. However, it is interesting to see that these agencies work together comprehensively and effectively in every necessary step to ensure that the objectives of the Sub-committee are met.

- 1) **Public Relations Sub-committee:** In the Public Relations Sub-committee, it recommended that a representative from the Meteorological Department be made one of its members. The local office of this department will be responsible for weather monitoring and flood and storm forecasting, so its involvement in the Public Relations Sub-committee will be necessary. In addition, the Chief District Officers of other districts mentioned above, or their representatives, should also be appointed as members of this sub-committee because, they too have to know of the situation to be able to inform their residents of the expected risks and how to deal with them. The majority of key municipalities should also play this role. In addition, all of them will be in charge of the Action Plans in their corresponding responsible areas.
- 2) **Land Acquisition Sub-committee:** Consideration should be made to appoint a representative of Hat Yai Municipality a member of this Sub-committee. The Municipality should be able to handle land acquisition activities by itself, but the Sub-committee will be in a better position to

expedite the work and to solve related problems. This Sub-committee may not be involved directly in the Emergency Disaster Prevention Action Plan, but can be useful if land acquisition in the Municipality is needed very urgently.

- 3) **Construction Coordination Sub-committee:** No district or municipality (except Hat Yai Municipality) is represented in this Sub-committee, while construction is likely to take place in several districts and municipalities. Hence, the Deputy Governor and the representative of the Songkhla PAO have to coordinate with these district and municipalities. To help reduce their burden, a representative from the Local Administration Section (Municipal Affairs) should be appointed a member of this Sub-committee.
- 4) **Town Planning Coordination Sub-committee:** This sub-committee will be important for medium-term and long-term flood mitigation. For the comprehensive plan of Hat Yai Municipality alone, a few nearby municipalities and TAO's will be involved. At this stage, the Sub-committee will concentrate their efforts on the Hat Yai comprehensive plan only. Thus, consideration should be made to prepare comprehensive plans for other flood-prone urban areas as well.

Another important point is that public involvement is needed in formulating comprehensive plans in all major urban areas. Therefore, it is important that due attention be paid to the involvement of the related local authorities in comprehensive area planning.

The process for comprehensive area planning will begin soon and has to be agreed upon by the majority of local residents. Hence, there should be good coordination among this sub-committee the Public Relations Sub-committee and the Action Plans.

- 5) **Career Promotion Sub-committee:** One of the main duties of this Sub-committee is to promote careers and allocate land to flood evacuees to make a living. For those subject to permanent evacuation and resettlement, the goal of such undertaking will be to provide them medium-term and long-term career promotion plans. But for those subject to temporary evacuation and short-term rehabilitation, immediate career promotion will be important. Thus, the Action Plans should coordinate with this Sub-committee to be able to take care of temporary evacuees effectively after the disaster has ended, so as to achieve the most desirable results for the evacuees.
- 6) **Monitoring and Evaluation Sub-committee:** This is one of the important Sub-committees. Their activities should be as down-to-earth as possible in order to be able to monitor and evaluate real situations. Therefore, the emphasis should be given to appointing local representatives of the agencies concerned rather than representatives from

the central organizations. In addition, a representative of the regional or local meteorological office should be made a member of this sub-committee because he will have insight of performance of the Action Plans in relation to the weather and disaster forecasts made by this office.

- (4) **Flood Prevention Administration of Hat Yai Municipality** : Hat Yai Municipality does not have a separate unit responsible for flood prevention administration of its own, in spite of the fact that this Metropolis is the heart of flooded area with respect to population density, social and environmental impacts and economic losses.

The office of the City Clerk is responsible for flood encountering and helping flood victims after the flood disaster has ended. On the other hand, the Bureau of Public Works is responsible for preparedness and solving/mitigating flood problems by implementing a flood control system and by pumping the flood water out of flooded areas. The Sanitary Division has been responsible for flood protection in the metropolis in the last years, but the unit actually responsible for flood prevention is usually the real responsible agency. Staffs to handle floods are not adequate. In the past the metropolis was assisted by the RID in draining flood water out of flooded areas.

Therefore, it is recommended a new unit be established by Hat Yai Municipality to be specifically responsible for flood prevention and drainage systems of the Municipality. This unit should be the "**Drainage and Flood Protection Division**" Their main function should include:

- Implementation of drainage and flood protection systems in the Municipality
- Operation and maintenance of these systems
- Serving as the Secretariat of the Hat Yai Municipality, Civil Disaster Prevention Command Office
- Emergency Flood and Storm Prevention and Relief Action Plan
- Coordination with the HYFPP Administration Sub-committee, other Sub-committees and other agencies involved in flood prevention and relief in Hat Yai District

#### 4.2 Summary of Concerned Agencies

In a broad picture, there are two main organizations responsible for flood prevention and relief in Songkhla Province. They are

- (1) **HYFPP Administration Sub-committee**: This Sub-committee serves as the coordination agency of the highest level. It coordinates project implementation of about 10 different agencies relating to flood prevention and relief. Under this main Sub-committee, there are 6 lower level sub-committees for specific issues. The functions of these sub-committees are adequate, and the coordination among them, through NESDB and the Committee for

Coordination of Royal Initiated Projects, is satisfactory. However, coordination between the sub-committees and related agencies and among the agencies themselves needs to some improvement. For example, the City Planning Coordination Sub-committee needs to coordinate with the agencies, which affect land use in every area. Moreover, some Sub-committees require representation from additional government agencies.

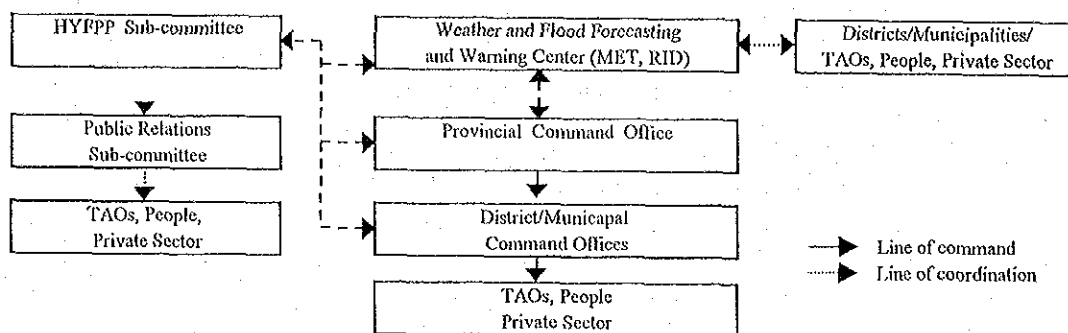
- (2) **Songkhla Province's Disaster Prevention Command Office:** This organization is responsible for all District and Municipal Disaster Prevention Command Offices, as well as of the Provincial, District and Municipal Emergency Flood and Storm Disaster Prevention and Relief Action Plans. Figure 2.2-2 shows Action Guidelines for Flood Prevention and Solutions to Sudden Flood Hazards to the provincial level. However, there is no clear linkage or coordination between these command offices and the HYFPP Sub-committees. Hence, necessary coordinating mechanisms should be established among them.
- (3) Other important support agencies are those dealing with **Weather and Flood Forecasting and Warning.** The Meteorological Department is assigned as the main agency responsible for weather and flood forecasting and warning, and the RID will give necessary assistance. This assignment has not yet been completed, so the effectiveness of this weather and flood forecasting and warning program has not yet been tested with the real flood and storm disaster events. Therefore, monitoring and evaluation of the program and appropriate modifications of the program should be made regularly after it has been used.

#### 4.3 Recommended Organization of Flood Forecasting and Warning Agencies

As stated above, the Meteorological Department and the RID are tasked with weather and flood forecasting and warning. The following improvements are recommended in to make the functions of these agencies more effective:

- (1) The proposed program should be assessed, whether the three projects proposed by the Meteorological Department are adequate. The emphasis should be placed on: the adequacy of the 20 remote sensing stations and their distribution to cover all flood-prone areas, the location of the main station at the Flood Forecasting and Warning Center, the software used and its verification and calibration with real conditions. The software used should cover all disastrous weather and flood conditions. Close coordination with the Royal Irrigation Department, which is responsible for measuring stream flows and sea tides, has to be established. The RID should also undertake to obtain good and reliable stream flow and tide data. Lives of people and properties can be saved significantly if accurate forecasting is achieved, and timely and clear warnings can be made.
- (2) Good coordination should be established between the main control station with other agencies such that warning messages can be disseminated as quickly as possible. Such agencies include the Command Offices at all levels, the Public

Relations and Public Understanding Sub-committee, all districts, all municipalities, all TAOs, the private sector and people in Songkhla. Good communication linkages between the main station and these agencies should be established and maintained. The following coordination chart is proposed:



(3) The Weather and Flood Forecasting and Warning Center should get feed-backs on its performance from all relevant agencies regularly, so that necessary improvements of the program can be made.

#### 4.4 Recommended Coordination of Land Use Control in Flood Plains

The Department of Town and Country Planning (DTCP, mainly in urban areas) and the Land Development Department (LDD can plan Land use control in each flood plain mainly in rural areas). The respective local agencies such as each municipality and each TOA should participate in such planning. The land use planning in each area should take into consideration flood prevention and control such that flood ways should be clear of present and future developments. And if such developments cannot be avoided, appropriate flood control measures have to be easily provided. The local agencies should prepare their own land use plans with adequate coordination with the agencies concerned and local residents in order to use public participation as an important part of the planning process. Future development plans of infrastructure and utilities of in each area have to be taken into account in land use planning. The DTCP and the LDD should make critical reviews and comments on such local land use plans so that necessary and appropriate modifications can be made.

In addition, a land use plan in each area should be modified every 5 years to be consistent with the actual current developments of each area of the whole planning area.

#### 4.5 Recommended Coordination of Sub-committees and Disaster Prevention Command Offices

(1) **Coordination Mechanisms:** Appropriate mechanisms should be made to establish proper linkages and coordination between Action Plans/Command Offices at different levels and the HYFPP Plan Administration Sub-committee

and the six lower-level sub-committees. The linkages should be made through the Director of each Command Office such that confusion, overlapping and vacuum among these offices can be avoided. It is recommended that the main Sub-committee and the Provincial Command Office jointly prepare short-term Action Plan and regular implementation plans for the Hat Yai District (and Khlong U-Taphao Basin). The Provincial Command Office then assigns the short-term or Emergency Action Plans to the district and municipal command offices. The Sub-committee should supervise, monitor and evaluate the performance of these command offices, and make recommendations for improvements through the Provincial Command Office. The main Sub-committee will still be responsible for regular short-term implementation programs for Hat Yai District. The regular implementation programs for areas outside Hat Yai District and the Khlong U-Taphao Basin, which are beyond the Sub-committee's responsibility, will be under the responsibility of the concerned agencies and the Provincial Command Office.

Such coordination mechanism is presented schematically in Figure 4.5-1, and can be summarized below.

- 1) The HYFPP Administration Sub-Committee and the Provincial Disaster Prevention Command Office jointly prepare the short-term (emergency) Action Plans and the regular implementation programs for Hat Yai District and for the whole Songkhla Province. The Provincial Command Office and the concerned agencies prepare the Emergency Action Plans and regular implementation programs for areas outside Hat Yai District. Other agencies, the land use planning coordination agencies, the weather and flood forecasting and warning agencies will take part in these planning processes.
- 2) The HYFPP Administration Sub-committee is responsible for coordinating the regular short-term, medium-term and long-term implementation programs for Hat Yai District and for monitoring and evaluation of the Emergency Action Plans undertaken by the Provincial Command Office.
- 3) The Provincial Command Office implements the Emergency Action Plans for Hat Yai District and for all other districts in Songkhla Province, while the concerned agencies and the provincial command office implement regular flood prevention programs for areas outside Hat Yai District.
- 4) While implementing the Action Plans and the regular programs as stated above, both main agencies will closely coordinate with each other, with the collaboration and participation of the concerned agencies, TAOs, private sector and people, so that effective execution of the Action Plans and the Regular Programs is achieved and inter-agency coordination problems are avoided or minimized.

- 5) Each main agency will monitor and evaluate the Action Plans and Regular Programs under its own responsibility, and will make recommendations for necessary improvements.
  - 6) For the Action Plans or the Regular Programs, which affect the functions and duties of both main agencies, joint monitoring and evaluation will be carried out by the responsible units of each agency. The monitoring and evaluation results are then submitted to the HYFPP Sub-committee and the Provincial Command Office for consideration, modifications, improvement and implementation in the next stage.
- (2) **Improvement of Action Plans:** In the 2000 flood period, the Provincial Civil Disaster Prevention Command Office was plagued with many problems, including problems due to staff and equipment and tools. Even though the Action Plans for 2001 have been established with improvements made for solving the problems faced in 2000, they seem to have been formulated with inadequate coordination with the HYFP Plan Administration Sub-committee as already stated. In addition, it has not yet been tested with the real flood. Therefore, training in peaceful time prior to each major flood season should be undertaken in accordance with the Action Plans such that necessary improvements can be made in advance, particularly by using accurate flood forecasting results. Advance flood messages should be used in adjusting the Action Plans such that lives and properties of people can be saved.

#### 4.6 Components of Coordination Sub-committee for Specific Issues

In order to make the Sub-committees function better, additional members of some sub-committees should be appointed, as follows:

- (1) **Public Relations Sub-Committee**
  - Representative of Meteorological Department, to provide information on weather and flood forecasting and warning.
- (2) **Land Acquisition Sub-committee**
  - Representative of Hat Yai Municipality, to handle land acquisition within the Municipality.
- (3) **Construction Coordination Sub-committee**
  - Representative of the Provincial Local Administration Section, to coordinate construction works within municipalities.
- (4) **Department of Town and Country Planning**
  - Involvement of concerned agencies, such that town planning is properly prepared.
- (5) **Monitoring and Evaluation Sub-committee**
  - Local representative of the Meteorological Department, to monitor and evaluate compliance of concerned agencies to the flood warning system.



**Table 2.3-1 Projects in Short-Term Program (To be implemented within fiscal year 2002)**

No.	Responsible Agency/Project	Fiscal Year					Progress 1/
		2001	2002	2003	2004	2005	
<b>1.</b>	<b>Royal Irrigation Department</b>						
1.1	Natural Canal Dredging Project (4 canals)	—					Completed
1.2	Study and Master Planning of Flood Management System in Khlong U-Taphao Basin (with Meteorological Department)	—					Ongoing
1.3	New Canal Dredging Project (5 canals totalling 41.4 km)						
1.3 (1)	Land Acquisition and Construction of Drainage Canals	—					Royal Command has been promulgated
1.3 (2)	Survey for Design of Drainage Canals	—					Completed
<b>2.</b>	<b>Hat Yai Municipality</b>						
2.1	Khlong Toei Pumping Station	—					Completed
2.2	Petchakasem Road Pumping Station	—					Completed
2.3	Automatic Trash Removal Device at Existing Pumping Station	—					Completed
2.4	Electrical Supply System Installation for Pumping Stations in Case of Floods	—					Completed
2.5	Drains along Rat Yindee Road	—					Completed
<b>3.</b>	<b>Department of Highways</b>						
3.1	Six Bridges over RID's Drainage Canals	—					60% complete
<b>4.</b>	<b>Public Works Department</b>						
4.1	Bridges for Ban Tai-Ban Tha Nang Hom Road B29d	—					50% complete
<b>5.</b>	<b>Department of Accelerated Rural Development</b>						
5.1	An RC Bridge	—					Completed
<b>6.</b>	<b>Department of Town and Country Planning</b>						
6.1	Study and Analysis for Hat Yai Comprehensive Area Improvement	—					80% complete
<b>7.</b>	<b>Land Development Department</b>						
7.1	Land Use Planning for U-Taphao Basin	—					
<b>8.</b>	<b>State Railways of Thailand</b>						
8.1	An RC Bridge	—					Ongoing Completed
<b>9.</b>	<b>Meteorological Department</b>						
9.1	Installation of 20 Automatic Rainfall Measuring and Forecasting Stations	—					Ongoing

**Source:** Khlong U-Taphao Flood Prevention Plan, Hat Yai, Songkhla, by NESDB and Committee for Coordination of Royal Initiated Projects

**Note:** 1/ Report as of 31 May 2002.

Table 2.3-2 Projects in Medium -Term Program (To be completed within 2005)

No.	Responsible Agency / Project	Fiscal Year					Progress 1/
		2001	2002	2003	2004	2005	
1.	<b>Royal Irrigation Department</b>						
1.1	Dredging of 5 New Drainage Canals (41.4 km.)						Land acquisition is in progress
1.2	Survey and Detailed Design of 6 Reservoirs						Survey is underway
2.	<b>Hat Yai Municipality</b>						
2.1	Retaining Walls						
2.1 (1)	Retaining Wall on Right Bank of Khlong U-Taphao and Khlong Wa						Construction commenced in March 2002
2.1 (2)	Retaining Wall on Left Bank of Khlong U-Taphao						Construction commenced in March 2002
2.2	Projects for Solving Problems of Flood Water from Eastern Mountains						
2.2 (1)	Improvement of Drains along Kanchanavanich Road.						Construction commenced in March 2002
2.2 (2)	Khao Kho Hong Drainage Improvement						Construction commenced in March 2002
2.2 (3)	Khlong Toei/Khlong Rian Flood Retarding Basin						Land acquisition to be completed in Sept 2002
2.2 (4)	Khlong Toei/Khlong Ple Flood Retarding Basin						Construction is underway
2.2 (5)	DTCP Roa+B36d. Kho 7 and its Drains						Construction is underway since March 2002
2.3	Projects for Solving Flood in Lowlying Areas						
2.3 (1)	Rattakam Rd. Pumping Station						Construction is underway since March 2002
2.3 (2)	Khlong Toci-Khlong Wa Pumping Station						Construction is underway since March 2002
2.3 (3)	Sri Phuwat Rd. Pumping Station						Construction is underway since March 2002
3.	<b>Department of Town and Country Planning</b>						
3.1	Hat Yai Comprehensive Area Improvement						Ongoing, awaiting immediate program to be proposed

Source: Khlong U-Taphao Flood Prevention Plan, Hat Yai, Songkhla, by NESDB and Committee for Coordination of Royal Initiated Projects

Note: 1/ Report as of 31 May 2002.

**Table 2.3-3 Projects in Long - Term Program ( To be completed after 2005 )**

No.	Responsible Agency / Project	Fiscal Year											Progress <u>1/</u>	
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011		
<b>1.</b>	<b>Royal Irrigation Department</b>													
1.1	Construction of 6 Reservoirs													
1.1 (1)	Survey and Land Acquisition			_____										Has not commenced yet
1.1 (2)	Construction of Reservoirs			_____										Has not commenced yet
<b>2.</b>	<b>Royal Forest Department</b>													
2.1	Songkhla Lake Basin Forest Management		_____											Ongoing

Source Khlong U-Taphao Flood Prevention Plan, Hat Yai, Songkhla, by NESDB and Committee for Coordination of Royal Initiated Projects

Note: 1/ Report as of 31 May 2002.

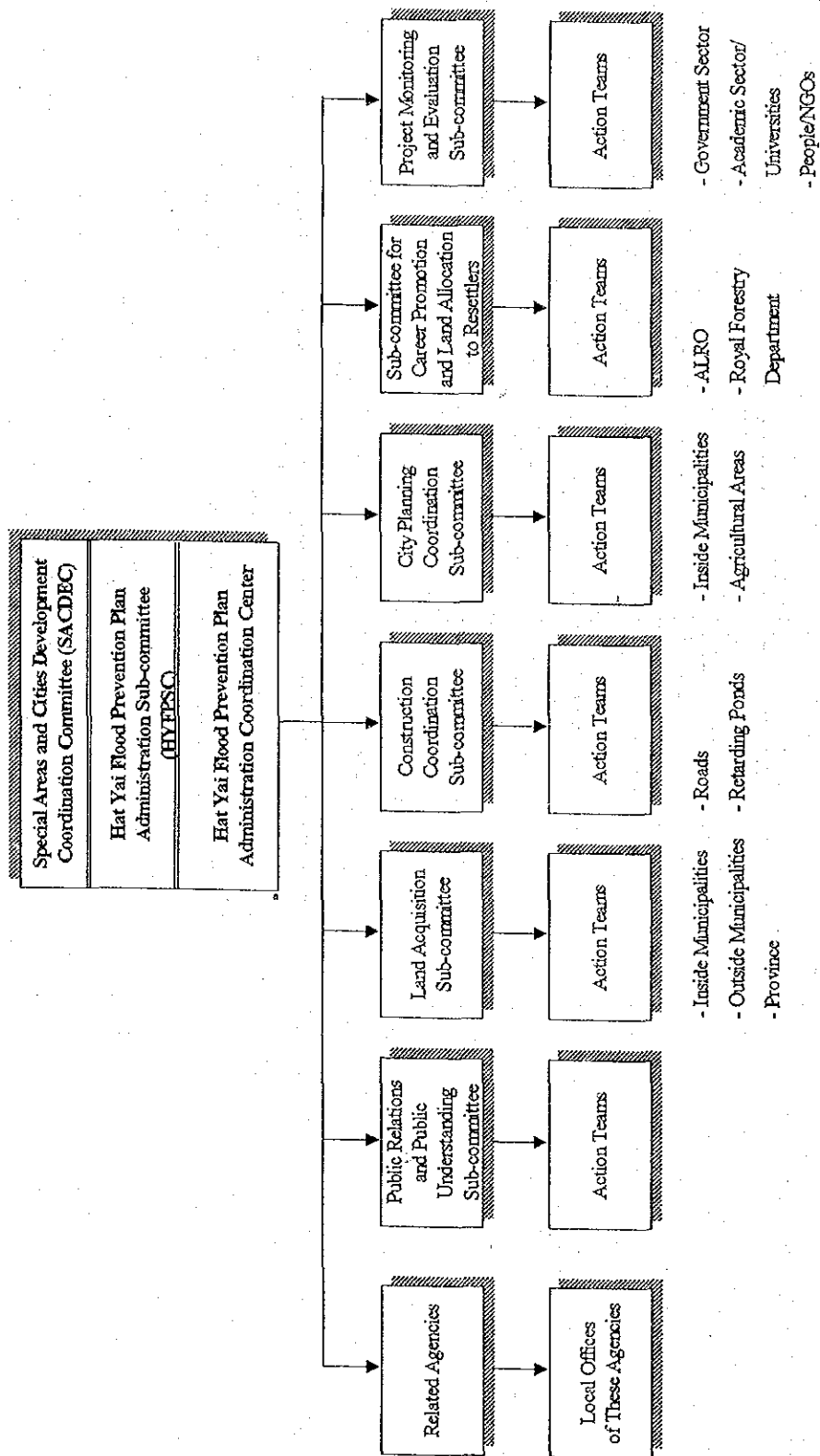


Fig. 2.2-1

Organization Chart for Hat Yai Flood Prevention Plan Administration

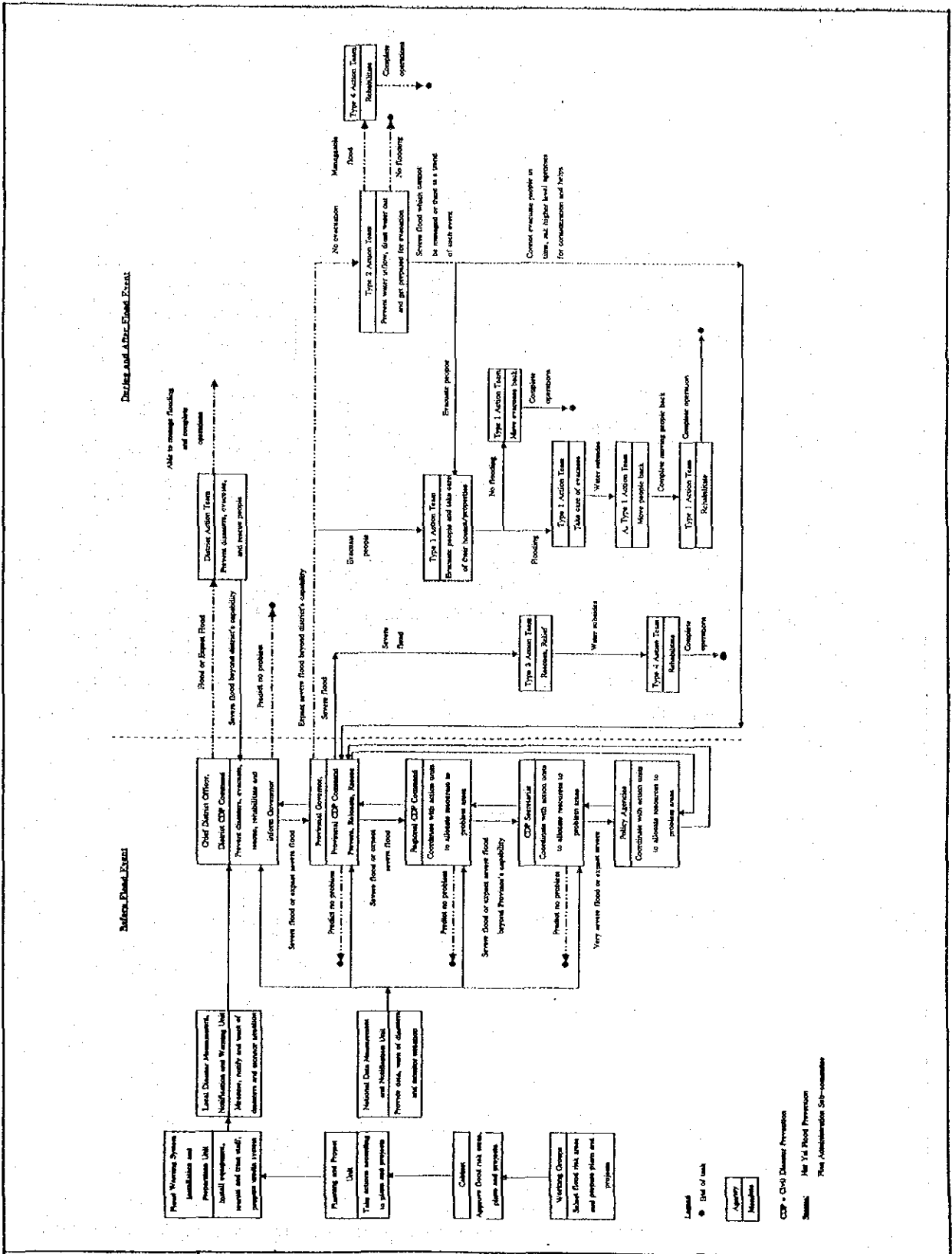
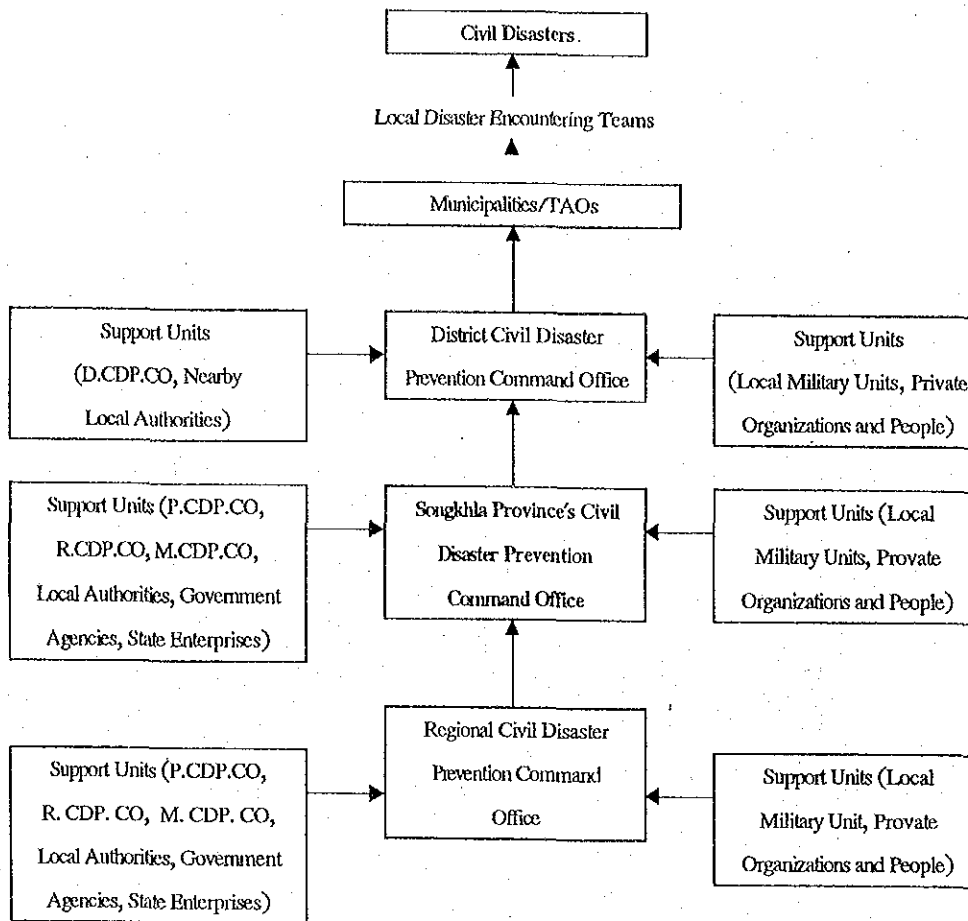


Fig. 2.2-2

Action Guideline for Flood Prevention and Solutions to Immediate Flood Hazards at Provincial Level



Notes: P. = Province, D. = District, R. = Regional  
 M. = Ministerial; ° CDP = Civil Disaster Prevention

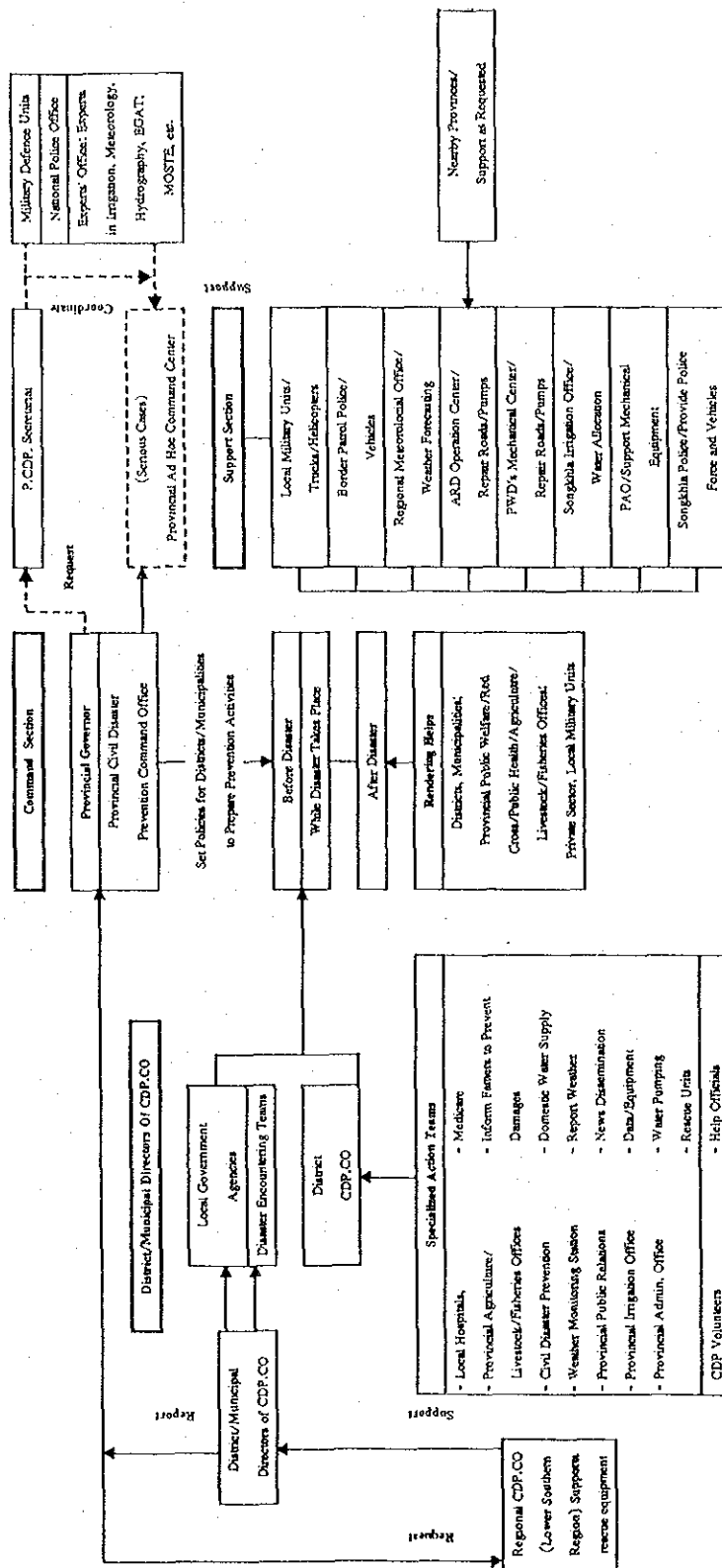
(Source: Report on Songkhla Province's Emergent Flood and Storm Prevention and Relief Action Plan  
 B.B. 2545, June 2002)

Fig 3.3-1

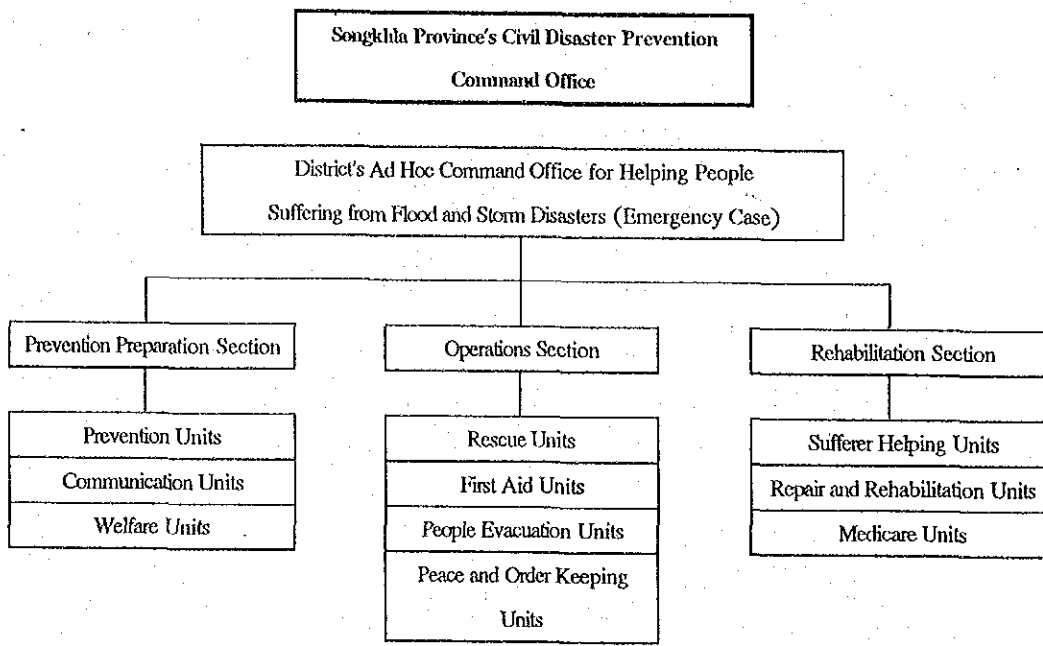
Coordination Plan for Flood and Storm Disaster Prevention and Relief, Songkhla Province, a part of Emergency Flood and Storm Disaster Prevention and Relief Action Plan, Songkhla

Fig. 3.3-2

Coordination Structure of Flood and Storm Disaster Sufferer Helping Operations



(Status: Report on Songkhla Province's Emergency Flood and Storm Prevention and Relief Action Plan B.E. 2545, June 2002)



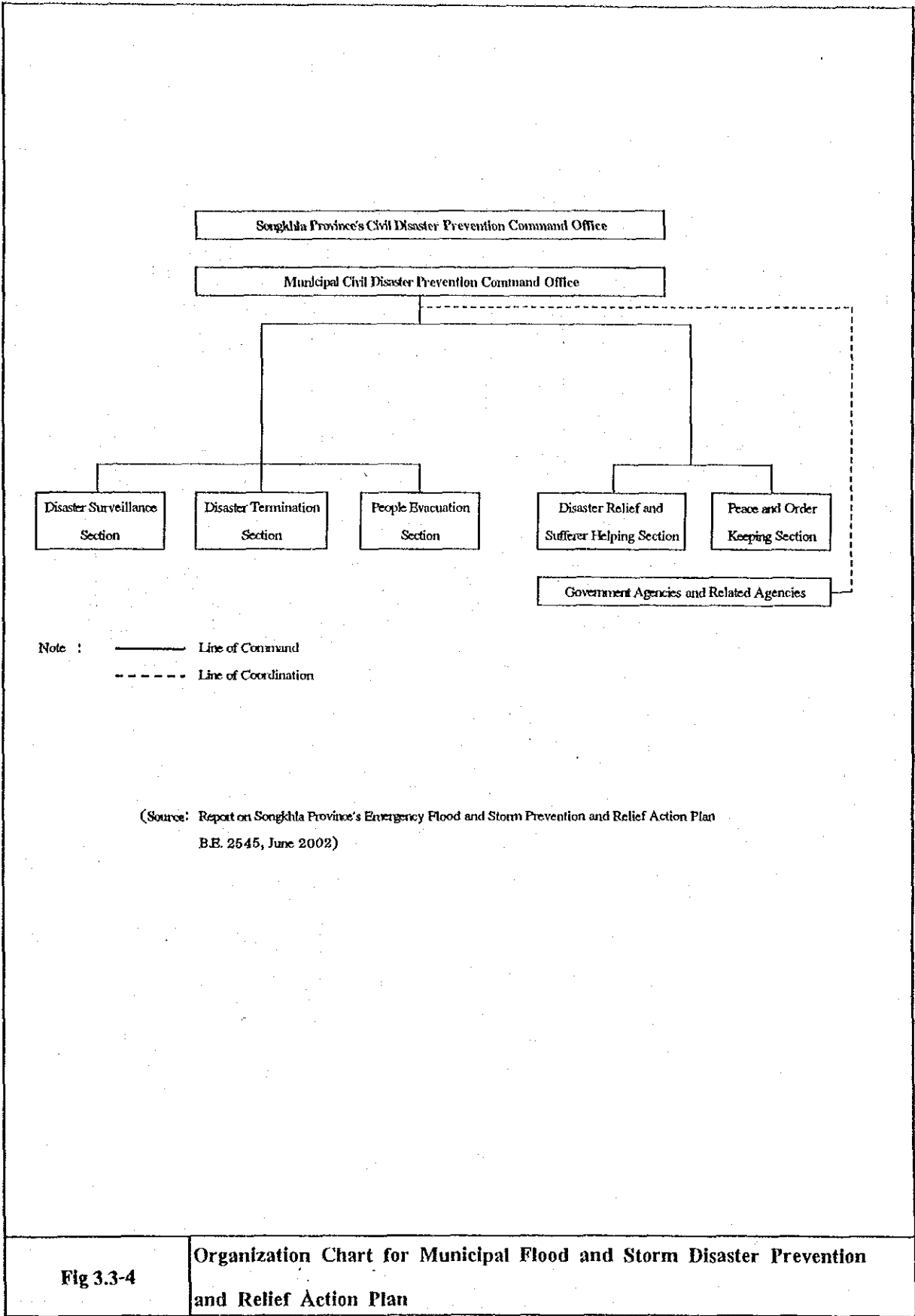
Note: — Line of Command

(Source: Report on Songkhla Province's Emergency Flood and Storm Prevention and Relief Action Plan  
B.E. 2545, June 2002)

Fig 3.3-3

Organization Chart for District Flood and Storm Disaster Prevention and Relief Action Plan





**Fig 3.3-4**

**Organization Chart for Municipal Flood and Storm Disaster Prevention and Relief Action Plan**

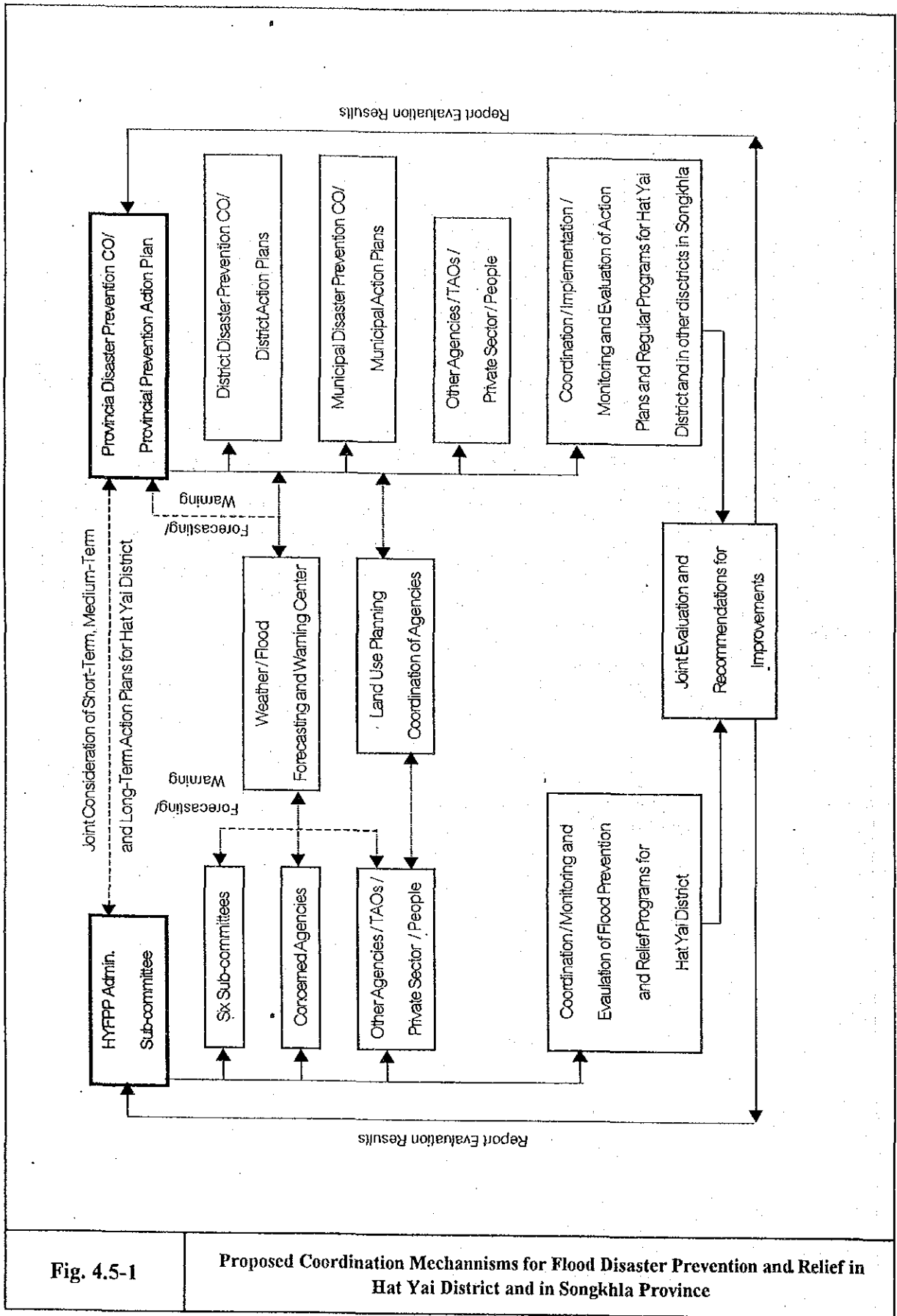


Fig. 4.5-1

Proposed Coordination Mechanisms for Flood Disaster Prevention and Relief in Hat Yai District and in Songkhla Province