

THE KINGDOM OF THAILAND
MINISTRY OF INTERIOR
DEPARTMENT OF TOWN AND COUNTRY PLANNING

THE STUDY ON
APPLIED TECHNOLOGY FOR
MAKING CITY PLAN

FINAL REPORT

JANUARY 1989

JAPAN INTERNATIONAL COOPERATION AGENCY

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PREFACE

In response to a request from the Government of Thailand, the Government of Japan decided to conduct a study on Applied Technology for Making City Plan and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Thailand a study team headed by Mr. Takeo KATO, comprising experts from Yachiyo Engineers Co., Ltd. five times from November 1987 to November 1988.

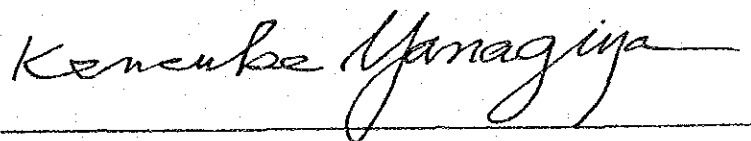
The team held discussions with concerned officials of the Government of Thailand.

After the team returned to Japan, further studies were made and the present report was prepared.

I hope that this report will contribute to the development of the project and to the promotion of friendly relations between our two countries.

I wish to express my sincerest appreciation to concerned officials of the Government of Thailand for their close cooperation extended to the team.

January 1989

A handwritten signature in dark ink, reading "Kensuke Yanagiya", is written over a horizontal line.

Kensuke Yanagiya

President

Japan International Cooperation Agency

SUMMARY AND RECOMMENDATIONS

SUMMARY AND RECOMMENDATIONS

GENERAL COMMENTS

- 1) The Department of Town and Country Planning (DTCP) has been the central agency responsible for preparation of city plans and for coordination with other governmental agencies, and it is recognized that it will continue to be the lead agency in an improved system of city planning and urban development in Thailand. DTCP's leadership role is merited by the technical expertise developed by its staff over the years.
- 2) It is recognized that Thailand is reaching a point where a more integrated approach should be adopted to respond to new developments in Thai city planning. This approach will include:
 - advancement of city planning techniques in response to the increasing seriousness and complexity of urban problems in Thailand;
 - expansion of the geographic areas covered by city planning in response to the acceleration of rural area development; and
 - promotion of implementation-oriented city planning to increase the effectiveness of city planning in support of national economic and social development.
- 3) In response to these new approaches, both technical improvements and planning systems improvements were proposed, with the former aimed at the improvement of planning techniques and implementation techniques, and the latter at organizational and functional improvements in DTCP.
- 4) The proposed technical improvements were tested through Case Studies (I and II), so that the methods and techniques recommended could be transferred to DTCP staff members and documented in a series of planning manuals.
- 5) With DTCP's administrative structure and role reshaped to promote integrated city planning, an Action Plan including a series of planning systems improvements was proposed including both organizational improvements (e.g., organizational reform, personnel training, and database management) and functional improvements (e.g., improving the quality of general plans and implementation of urban improvement projects and research).
- 6) Considering the scale of DTCP's planned improvement program, an Action Center was proposed to serve as the technical innovation core of DTCP. The center would provide training, database management, and technical services in order to improve city planning and urban development in Thailand.
- 7) Several planning manuals were prepared in this study and they will aid in the development of the center. They will provide teaching material for the training courses, technical specifications for the database management system, and general

guidance for improving city planning and urban development in Thailand.

- 8) Immediately, DTCP should act to increase the efficiency and quality of plan making by utilizing the techniques and methods documented in the planning manuals prepared during this study. In addition, DTCP must begin work immediately to establish the proposed Action Center. Also, work should be begun to implement a pilot project to test the feasibility of a land readjustment system in Thailand, to establish an initial database management system (DBMS), and to hold a regular series of planning seminars.

STUDIES OF TECHNICAL IMPROVEMENTS (FIGURE 1)

Planning Techniques and Manuals

- 9) The city planning process was improved by integrating and streamlining DTCP's current planning activities, and by establishing standardized procedures and techniques in a series of planning manuals.

Integrated City Planning

A manual for integrated city planning was prepared. It explicitly stated standards governing the substance and procedure of an integrated physical plan, including goals and objectives and the output from each planning sector.

Mapping

A mapping manual was developed. It presented basic concepts, a procedure for map production, and a method of measurement of ground position lengths. Also, an appendix included materials on a method of transformation between map and ground coordinates, and on a method of net adjustment for traverses and leveling. The methods were all examined in terms of accuracy, practicability, and efficiency through case studies.

Socioeconomic Analysis

A socioeconomic analysis manual was prepared. Emphasis was placed on the inclusion of new data items such as daytime population and monthly income into the existing scope of study for the preparation of general plans. Also, standardized and computerized methods of basic tabulation (including statistical analysis) were introduced and examined in terms of effectiveness and usefulness through case studies.

Land Use Planning

A manual for land use planning was developed, with special attention paid to new approaches to land use forecasting, and to a computer-aided method for evaluation of development potential called potential surface analysis (PSA), the advantages and limitations of which were examined through case studies.

Transport Planning

A transport planning manual was also prepared, and it highlighted techniques for quantitative analysis that in the case studies proved to be practical, at least when the relevant data had been adequately collected and managed. The method also could contribute substantially to the rational planning of transport systems in Thailand, especially in cities where rapid urbanization is taking place and transport problems are becoming a growing concern to municipalities. For smaller cities, however, it was recommended that alternative approaches, such as those based on trend analysis and trip rate methods, would be more appropriate.

Urban Facilities Planning

The urban facilities planning manual aimed at standardizing the planning procedure for various kinds of facilities to be included in general plans. Special emphasis was placed on drainage/sewerage and parks/recreation, which were the subjects of case studies. In addition, special methodologies such as computer-aided design methods for drainage/sewerage systems and potential surface analysis were considered. These techniques proved useful for increasing the quality and efficiency of urban facilities planning.

Implementation Techniques

- 10) There are two categories of measures for implementing general plans: the enforcement of statutory plans and the execution of project plans. Accordingly, effective city planning requires the application of both the control measures of the former and the project implementation measures (e.g., capital investment measures) of the latter.

Land Readjustment

The land readjustment method was selected as a possible project implementation measure. Special attention was paid to its unique features, such as self-financing for land acquisition and infrastructure improvement, and cost- and benefit-sharing among landowners. This aspect of the study primarily focused on the transfer of practical knowledge and techniques of the Japanese land readjustment system. Through a series of exercises, DTCP acquired the technical expertise necessary to proceed with the implementation of land readjustment, from the formulation of an action plan to replotting design.

Moreover, based on an exploratory survey, some examples of situations where this system could work effectively in Thailand were examined. Also, approaches for the application of land readjustment in the Thai city planning system were suggested. DTCP is now ready to establish an organizational framework in the government to institutionalize a land readjustment system.

District Planning

District planning involves effective and socially acceptable measures to control the use of land. This aspect of the study assisted DTCP in acquiring knowledge of district planning techniques and provided a technical basis for improving the specific planning process. Based on a series of application exercises, it was suggested that there is a rather high possibility that district planning could be used to complement general planning, to implement national policy in specific areas, and to promote self-help projects to improve living environments.

STUDIES OF PLANNING SYSTEMS IMPROVEMENTS

- 11) The proposed technical improvements in city planning necessitate a new administrative structure. Accordingly, it was recommended that DTCP as a central planning agency shift its role and function from the production of plans to supervising, guiding, and assisting local agencies.
- 12) It was stressed that DTCP must strengthen its organizational, technical, and functional capabilities if it is to effectively perform its new role.

Organizational Reform

It was recommended that DTCP establish local offices to supervise, guide, and assist local governments in plan preparation. Also, it was recommended that DTCP restructure its central office to establish new divisions in the areas of city planning, urban policies, and urban development.

Personnel Improvements

The technical training of provincial and municipal officials is particularly important, considering that DTCP has been overworked in preparing general plans that local governments have lacked the skills to prepare themselves.

Database Management System

A nationwide information network must be established to facilitate the sharing of duties by local and central agencies. Thus, development of a database management system has been recommended, with its implementation programmed into three stages--initial, intermediate, and "full-scale."

Improvement of the Quality and Efficiency of City Planning

By applying the technical manuals prepared during this study, DTCP will be able to substantially improve the quality of the general planning process.

Implementation of Urban Improvement Projects

DTCP should launch a pilot or pioneer land readjustment project based on the technical and practical knowledge acquired during this study.

Research

Urban improvement policies, technical guidance, standards, instructions, regulations, and implementing measures must be prepared on the basis of technically-defensible research studies, specifically focused on such subjects as: 1) official government technical guidance on city planning and development; 2) policies and guidelines to respond to urban problems; 3) the proposed database management system; and 4) measures for managing urban development.

- 13) An Action Center was proposed to organize and spearhead DTCP's various improvement programs. The major functions of the center would be technical training, database management, and technical development.

Technical Training

Seven training courses should be provided, including one executive course and six specialist courses (Land Use Planning, Urban Development Projects, Transport Planning, Urban Facilities Planning, Mapping, and Database Management). The first phase of the training program will involve training the instructors (20 persons, 2-year training period). The second phase will be for these instructors to train central and local government officials (2,820 persons, 5-year training period). The planning manuals prepared in this study, along with general and specific plans, research reports, and statute books, will be used as teaching materials.

Database Management

Major services to be provided by the Action Center will include a database service, a data processing service, an information service, and a word processing service. The center's database management division will include one supervisor, four systems managers, three systems engineers, four programmers, and three operators. The central control unit will be a minicomputer, and a remote batch system will be employed.

Technical Development (Research)

Research will be an ongoing activity to continuously pursue innovation in city planning and urban development in Thailand. At the outset, DTCP should conduct research on land use intensity and building control, urban facilities, and urban development projects (e.g., land readjustment).

The Action Center will be composed of two buildings, a seminar house and a dormitory. The seminar house will include seminar rooms, a computer center, administrative offices, study rooms, and rooms for instructors.

Fig. 1 STAGES IN PLANNING SYSTEMS IMPROVEMENT

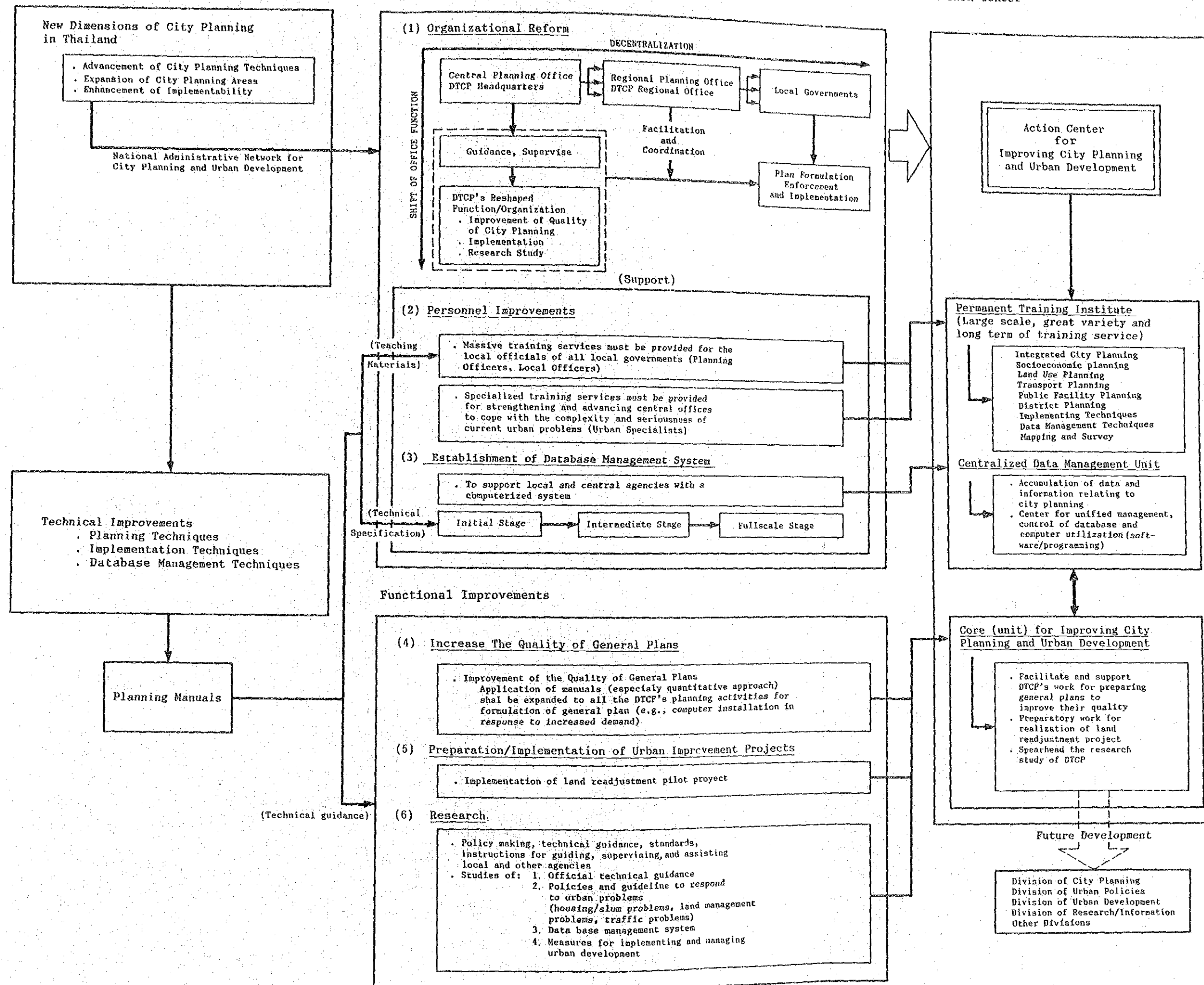


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PART I

INTRODUCTION AND INITIAL ASSESSMENT

1

INTRODUCTION

1 INTRODUCTION

1.1 Study Background

In response to a request by the Government of the Kingdom of Thailand, the Government of Japan decided to conduct the "Study on Applied Technology for Making City Plan" (hereinafter referred to as "the Study") within the general framework of technical cooperation between Japan and Thailand. Accordingly, the Japan International Cooperation Agency (hereinafter referred to as JICA), the official agency responsible for the implementation of the technical cooperation programs of the Government of Japan, was assigned to undertake the study in close cooperation with the authorities of the Kingdom of Thailand's Department of Town and Country Planning (hereinafter referred to as DTCP), which is under the Thai Ministry of Interior. DTCP was assigned to act as counterpart agency to the Japanese study team and also as a coordinator with other relevant organizations.

The scope of work of this study was set forth in an agreement signed by the representatives of DTCP and JICA on August 28, 1987. The actual study commenced in December 1987 and was completed in February 1989.

In the course of the study, an Inception Report, two Interim Reports (I and II), a Progress Report, and a Draft Final Report were submitted to DTCP. A set of planning manuals consisting of nine volumes was also presented as an end product of the study as follows:

- Volume 1: Integrated City Planning
- Volume 2: Mapping
- Volume 3: Socioeconomic Analysis
- Volume 4: Land Use Planning
- Volume 5: Transport Planning
- Volume 6: Urban Facilities Planning
- Volume 7: Database Management
- Volume 8: Land Readjustment
- Volume 9: District Planning

The manuals summarize the techniques and knowledge acquired through a series of case studies and exercises.

1.2 Study Objectives

The objectives of the study defined in the Scope of Work agreed upon between DTCP and JICA were to:

- propose city planning techniques applicable to the Thai planning system;
- prepare planning manuals describing standard methods; and
- recommend effective measures of plan formulation and implementation.

This study has been a cooperative effort between DTCP and the JICA Study Team, with the DTCP participants guided by the JICA Study Team.

It is important to stress that both the experience accumulated by DTCP prior to the study, and the case studies and exercises conducted by DTCP during the study, made an invaluable contribution to the development of applicable planning techniques. In this sense, the study placed great emphasis on DTCP's reorganizing their own experiences and their learning practical techniques and knowledge.

The case studies and exercises considered several subjects in response to the crucial problems in each sector in which DTCP operates. This implied that the suggestions for technical improvements were to be principally sector-specific, while the suggestions for the city planning system as a whole were to be a somewhat secondary concern in this study.

The major activities of the study were the following and are illustrated and summarized in Figure 1-1:

- cooperation, with the JICA Study Team responsible for the transfer of techniques and knowledge, and their DTCP counterparts for the execution of case studies and exercises; and
- acquisition of knowledge and techniques through the cooperative efforts and the documentation of these techniques in a series of planning manuals.

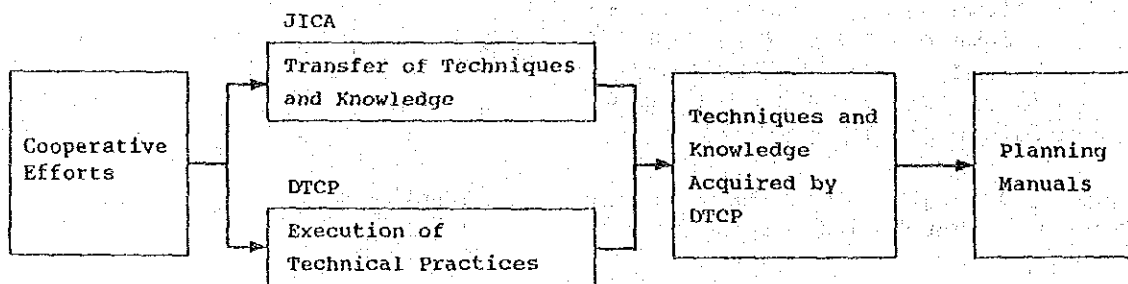


Fig. 1-1 MAJOR ACTIVITIES IN THE STUDY

1.3 Study Method

Study Phases

The study was roughly divided into the following three phases:

Phase One

- Identification of problems through a review of current city planning.
- Development of technical improvements in response to the problems identified.
- Documentation of the proposed improvements in a series of planning manuals.

Phase Two:

- Analysis of various sectors in Case Studies (I and II) in order to examine the viability and practicality of the planning manuals.

Phase Three:

- Revision of the planning manuals.
- Proposal of action plans and programs to promote the further technical improvement of DTCP through an integrated city planning and urban development system.

To enhance DTCP's acquisition of techniques, a unique study method combining three components was adopted: preparation of planning manuals, case studies, and seminars:

- Collaborative work for preparing planning manuals. The JICA Study Team proposed methods and techniques with which to solve the identified problems, and their DTCP counterparts worked to consolidate them into manuals that took the Thai city planning context and existing conditions into consideration.
- DTCP's technical practice in Case Studies (I and II). The proposed manuals were utilized and examined through these case studies.
- Seminars (I, II, and III) held jointly by DTCP and the JICA Study Team. Seminars were designed to be an integral part of the technical transfer.

First Seminar: The first seminar was targeted at disseminating advanced planning techniques throughout DTCP, with agency staff providing feedback to improve the practicality and broad applicability of the manuals. The seminars were presented mainly by the DTCP team members, with some participation by the JICA Study Team. Accordingly, the seminars were indispensable for the successful execution of the case studies conducted by DTCP.

Second Seminar: The second seminar was held shortly after the completion of the case studies, presenting their results to DTCP to stimulate discussion on the revision of the planning manuals. It proved useful as a means of attracting the attention of the DTCP staff (planners, engineers, and analysts) that did not work directly on this project.

Third Seminar: The third seminar, which presented an overview of the whole study, was attended not only by planners and engineers from DTCP, but by professionals from other agencies at all levels of government and by academic experts. Although this seminar was intended to disseminate the major findings of the study, it also was intended to foster understanding and cooperation among agencies concerned as well as to promote DTCP's initiative to lead and coordinate Thai city planning and urban development. It is hoped that this kind of seminar could be held periodically in the future and it will develop into one of the most significant city planning seminars in Thailand.

1.4 Study Organization

The study was carried out by the study team under the supervision of an Advisory Committee organized by JICA, which included several Japanese government officials and was directed by Mr. Iwai. The study team, headed by Mr. Katoh, consisted of ten experts and worked closely with the so-called Counterpart Team organized by DTCP.

The members of the DTCP Steering Committee, the Counterpart Team, the JICA Advisory Committee, and the JICA Study Team are listed below.

DTCP Steering Committee

Mr. Channarn POTCHANA Director-General	Chairman
Mrs. Charatsri TEEPIRACH Town and Country Planning Expert Planning Division	Vice-Chairman
Mr. Sarat SRIVIROJ Director of Mapping Division	Member
Mr. Pallop ONG-CHAREON Director of Engineering Division	Member
Mr. Chirasak SRESHTAPUTRA Director of Research and Analysis Division	Member
Mr. Thira PUNGSUNTHORN Director of Specific Planning Division	Member

Mr. Tasana SINGHASILARAK
Director of Programming
and Evaluation Division

Member

Mr. Prakarn MEKSUPA
Director of Public Relations
and Training Division

Member and Secretary

Mrs. Banasopit MEKVICHAI
Regional Planning Division

Member and Assistant
Secretary

DICP Counterpart Team

Mrs. Charatsri TEEPIRACH
Director of Comprehensive
Planning Division

Chairman

Mr. Thira PUNGSUNTHORN
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Planning Division

Deputy Chairman

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Planner 7 (Comprehensive
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Mr. Bancha NOOCHSATHIT
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Planning Division)

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Engineer 6 (Engineering Division)

Counterpart

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Photogrammetrist 6 (Mapping Division)

Counterpart

Mr. Preecha RONNARONG Planner 6 (Programming and Evaluation Division)	Counterpart
Mr. Kongphap SUKIJBUMRUNG Planner 4 (Programming and Evaluation Division)	Counterpart
Mr. Suthichai SAENGNAK Engineer 5 (Engineering Division)	Counterpart
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Mr. Keathisak AMORNPRASEARTSUK Engineer 4 (Engineering Division)	Counterpart
Mr. Suthep RATIYAPORN Analyst 5 (Research and Analysis Division)	Counterpart
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Miss Pimolporn ONJAMRAS Planner 5 (Specific Planning Division)	Counterpart
Mr. Worawan KLINKAEW Analyst 5 (Research and Analysis Division)	Counterpart
Mr. Prakarn MEKSUPA Planner 6 (Comprehensive Planning Division)	Counterpart and Secretary
Miss Kobkaew POLCHAROEN Planner 4 (Comprehensive Planning Division)	Counterpart and Assistant Secretary

JICA Advisory Committee

Chairman	Hikoji IWAI	Ministry of Construction (MOC)
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Hideo MATSUDA

JICA (Thailand Office):

Assistant Resident Representative

Takashi YOSHIDA

JICA Experts (DTCP Office):

Masami YAMASHITA

Takao YAMANE

Yuji HINO

1.5 Structure of This Report

This report consists of four parts and eight chapters.

PART I presents an introduction and an initial assessment of DTCP's existing planning activities and the Thai city planning system.

Chapter Two. Describes basic features of the city planning system in Thailand, planning activities undertaken by DTCP, and its internal organization and functional responsibility to produce statutory comprehensive plans (hereinafter called "general plans").

Chapter Three. Assesses these activities, principally analyzing them from a technical perspective and discussing problems that have made it difficult to improve the quality of general plans.

PART II discusses the technical improvements proposed to aid in the improvement of plan formulation and plan implementation. A database management system is also proposed to increase the rationality of planning.

Chapter Four. Proposes technical improvements for each sectoral activity, and summarizes the case studies that were conducted in part to test the practicality of some of the proposed improvements. Major findings from the case studies are presented. The sectors considered in this chapter are mapping, socioeconomic analysis, land use planning, transport planning,

and urban facilities planning.

Chapter Five. Introduces new implementation techniques to improve the effectiveness of city planning and to promote urban development to achieve the goals envisioned in general plans. Two principal topics are introduced in this chapter: land readjustment and district planning techniques. The proposed techniques are described and the results from application exercises are presented. A preliminary assessment of the applicability of the methods to city planning in Thailand is offered.

Chapter Six. Proposes an integrated database management system (DBMS) to promote the rationality of the process of plan formulation in DTCP. The possibility of this system acting as a major center of city planning information in Thailand is discussed, and the steps necessary to implement such a system are set forth.

PART III addresses the improvement of planning systems in Thailand and suggests possible actions to strengthen the organizational and functional capacities of DTCP. Also, PART III proposes an Action Center for improving city planning techniques and urban development administration systems in Thailand.

Chapter Seven. Suggests measures to strengthen DTCP in the context of Thailand's changing planning environment. The chapter defines the new roles to be played by DTCP and presents programs recommending organizational reforms and functional improvements.

Chapter Eight. Proposes an "Action Center" to improve city planning and urban development techniques and systems in Thailand. The center would include training and research facilities, and the necessary staff would be hired and trained.

PART IV, consisting of Chapter Nine, provides some concluding remarks.

A set of appendices is included to substantiate the findings presented in the main part of the report.

2

**DESCRIPTION
OF THE EXISTING SYSTEM**

2 DESCRIPTION OF THE EXISTING SYSTEM

2.1 Basic Features of the City Planning System in Thailand

2.1.1 Historical Background

The first Town and Country Planning Act was enacted in 1936 based on the principles of British Town and Country Planning Act of 1932. The 1936 Act was superseded by a 1952 law and later by the Town Planning Act of 1975.

Until 1936, town planning was administered by the Division of Town Planning in the Department of Public Works under the Minister of Interior. In 1962, the Department of Town and Country Planning (DTCP) was established pursuant to the Town Planning Act and various Royal Decrees such as the "Decree to Reorganize the Ministries and Departments" and the "Decree to Transfer the Administrative Functions of the Ministry of Interior."

Thai city planning in the period from 1962 to the end of the this century could be classified into three stages of development.

Stage 1: Before the 1975 Town Planning Act (1962-1975)

The Greater Bangkok Plan 2533, which was introduced by Lichfield, was the first attempt at comprehensive city planning in Thailand. The necessity of institutionalizing planning as a continuing process was stressed and resulted in the establishment of the Department of Town and Country Planning in 1962.

Stage 2: After the 1974 Town Planning Act (1975-1988)

Another important change came with the enactment of the Thai Planning Act in 1975. Since then, the Thai government and DTCP have engaged in various city planning activities and are about to enforce general plans for 124 targeted cities and towns.

Stage 3: 1988-2000

New approaches for the improvement of the city planning system have been suggested, based on the experience and knowledge gained through city planning activities previously executed. The new approaches will be responsive to the increasing importance and complexity of urban problems in Thailand.

2.1.2 National City Planning Policies

The First National and Economic Development Plan Covering 1961-1966 proposed a series of public development projects related to overall economic development objectives, which did not include city planning.

With the increased availability of data and the wider acceptance of planning as a development tool, The Second Plan Covering 1967-1971 was

broadened to include private sector and manpower aspects.

The Third Plan 1972-1976 incorporated both macro-planning aspects and sectoral programs and projects, with two regional planning projects (in the northeastern and northern regions) initiated to promote economic growth within each region and slow down out-migration from the regions.

The Fourth Plan 1977-1981 expressed a government policy to promote the growth of secondary cities and reduce Bangkok's growth and economic dominance. The development policy in regional cities addressed urban land use, basic infrastructure, and services, while the Bangkok growth control policy involved the limitation of industrial investment within Bangkok, the development of growth poles in suburban areas, the limitation of basic services, the decentralization of government offices, and the control of migration.

The Fifth Plan 1982-1986 pursued the development of alternative urban growth centers in two ways. The first involved a continuation of the regional cities program initiated in the fourth plan, with an additional ten secondary cities to be developed. The second was a strategy to promote urban growth outside the primate city of Bangkok through the development of an urban growth corridor along Thailand's eastern seaboard provinces and in other areas.

The Sixth Plan 1987-1991 emphasizes improving the efficiency and quality of the country's economic activities, with three development goals proposed. These goals were established to address the problems that developed during the periods of the two previous plans. The goals are to:

- Increase the country's efficiency in development.
- Improve the country's production and marketing systems and raise the quality level of its basic economic inputs.
- Distribute income and prosperity to regional and rural areas.

In line with these development strategies, ten programs were formulated, including the "Urban and Specific Zones Development Program."

The Sixth Plan recognizes that urbanization is a result of the changing economic structure of Thailand, which is becoming a newly industrializing country with an economic base that relies increasingly on the industrial and service sectors. While the Bangkok Metropolitan Region will clearly continue as the nation's largest economic center, the Sixth Plan set forth various spatial development strategies to diffuse growth and decentralize economic activities to the regions. These strategies are listed below.

- Develop the Bangkok metropolis as a single metropolitan region with a self-contained polycentric pattern and with more efficient and orderly linkages.
- Develop regional urban growth centers to serve as the economic and social development base of each region. The centers will be planned to absorb economic activities

decentralized from Bangkok, accommodate rural migrants, and serve as centers of public administration.

- Develop the Eastern Seaboard sub-region and prepare to develop other areas (e.g., the Upper South sub-region and the Songkhla Lake Basin) into new economic zones. This will provide alternatives for future industrial locations and help strengthen Thailand's international competitiveness.

The specific objectives of the urban and specific area development program of the Sixth Plan are to:

- Implement the government's decentralization policy by diffusing growth to the regions.
- Strengthen the economic base and employment of urban areas to encourage a more systematic transition to a national economic structure based on an industrialized and service-oriented economy.
- Strengthen and improve the efficiency of infrastructure services in urban areas and new economic zones in order to enhance their international competitiveness.
- Reduce the government's role in investment in line with budgetary constraints. Integrated efforts to mobilize capital investments are to be encouraged. The burden of urban infrastructure provision is to be based on more appropriate cost-sharing among local authorities, state enterprises, and the private sector.

2.1.3 Laws and Regulations

Table 2-1 presents Thailand's planning and development laws and regulations. The Town Planning Act of 1975 provides the legal basis for city planning in the country. However, Thailand's planning laws and regulations have not been streamlined to enable integrated urban planning and development.

Our evaluation of the legal system found that:

- Most land policy decisions are currently left to the separate governmental departments legally involved with land use. Often the goals of one department come into conflict with the goals of another.
- These laws and regulations were enacted to pursue different goals, and there are numerous scattered laws relating to urban land. These laws often have conflicting objectives, and it is extremely difficult to determine which objective should override.
- Based on the Town Planning Act, statutory city planning refers to the preparation, making, and implementation of comprehensive specific plans in an area of a city and related areas, or in the countryside, in order to build or develop a new town or a part thereof or to replace a "damaged" town or a part thereof. City planning is for the purpose of improving "sanitation, community and convenience"; for enhancing aesthetic values, public safety, social security, economic and social values, and the environment; for

Table 2-1 THE LEGAL ENVIRONMENT FOR PLANNING AND DEVELOPMENT IN THAILAND

LAWS ON URBAN LAND	GOVERNMENT ORGANIZATIONS INVOLVED	AREAS OF GOVERNMENT INVOLVEMENT
Act Promulgating the Land Code B.E. 2497 (1954) A.R.P. No. 49 A.R.P. No. 96 A.R.P. No. 334 Land Code Amendment Act B.E. 2520 (1977) A.R.P. No. 16 Land Code Amendment Act (No. 2) B.E. 2521 (1978) Commonly-Owned Housing Act B.E. 2522 (1979) Expropriation of Immovable Properties Act B.E. 2497 (1954)	Department of Land (various government organizations; eg., NHA)	Land ownership and tenure Property taxation
House and Land Tax Act B.E. 2475 (1932) House and Land Tax Amendment Act B.E. 2475 (1932) House and Land Tax Act (No. 3) B.E. 2485 (1942) Royal Decree B.E. 2487 (1944) Royal Decree B.E. 2498 (1956) A.R.P. No. 209 Royal Decree B.E. 2516 (1973) Local Development Tax Act B.E. 2508 (1965) A.R.P. No. 156 Local Development Tax Act (No. 2) B.E. 2516 (1973)	Department of Local Administration Department of Local Administration	Property taxation
Sanitary District Act B.E. 2495 (1952) Sanitary District Act (No. 2) B.E. 2511 (1968) Municipality Act B.E. 2496 (1953) Municipality Act (No. 4) B.E. 2505 (1962) Municipality Act (No. 7) B.E. 2517 (1974) Bangkok Metropolitan Civil Service Act B.E. 2516 (1973) Bangkok Administrative Act B.E. 2518 (1975) A.R.P. No. 295 (Highways)	Department of Local Administration Bangkok Metropolitan Authority Department of Highways Department of Town and Country Planning Department of Land Department of Local Administration Bangkok Metropolitan Authority Public Welfare Department	Provision of infrastructure Regulation of land
Town Planning Act B.E. 2518 (1975) A.R.P. No. 286 (Land Allocation) Building Control Act B.E. 2522 (1979) House and Land Rent Control Act B.E. 2504 (1961) House and Land Rent Control Act (No. 2) B.E. 2509 (1966) House and Land Rent Control Act (No. 3) B.E. 2511 (1968)	Department of Town and Country Planning Department of Land Department of Local Administration Bangkok Metropolitan Authority Public Welfare Department	Regulation of land
A.R.P. No. 315 (National Housing Authority) Industrial Estate of Thailand Act B.E. 2522 (1978) Housing Scheme Banking Act B.E. 2496 (1953) State Property Act B.E. 2518 (1975)	National Housing Authority Industrial Estate Authority Government Housing Bank of Thailand Treasury Department	Participation in development Property finance Government land use

preserving places and objects of interest or value in the field of art, architecture, history or antiquity; and for preserving natural resources and beautiful landscapes.

The act also defines the administrative and legislative procedures for the preparation, formulation, and enforcement of general and specific plans. DTCP is entrusted to implement the city planning activities at the request of the local governments concerned. As of this writing, general plans had been completed for all 124 municipalities in Thailand.

2.2 Planning Activities in DTCP

2.2.1 Organizational Structure

Functions and Responsibilities of DTCP

The Department of Town and Country Planning (DTCP) under the Ministry of Interior was established on October 1, 1962 and reorganized in 1975 with the responsibility to:

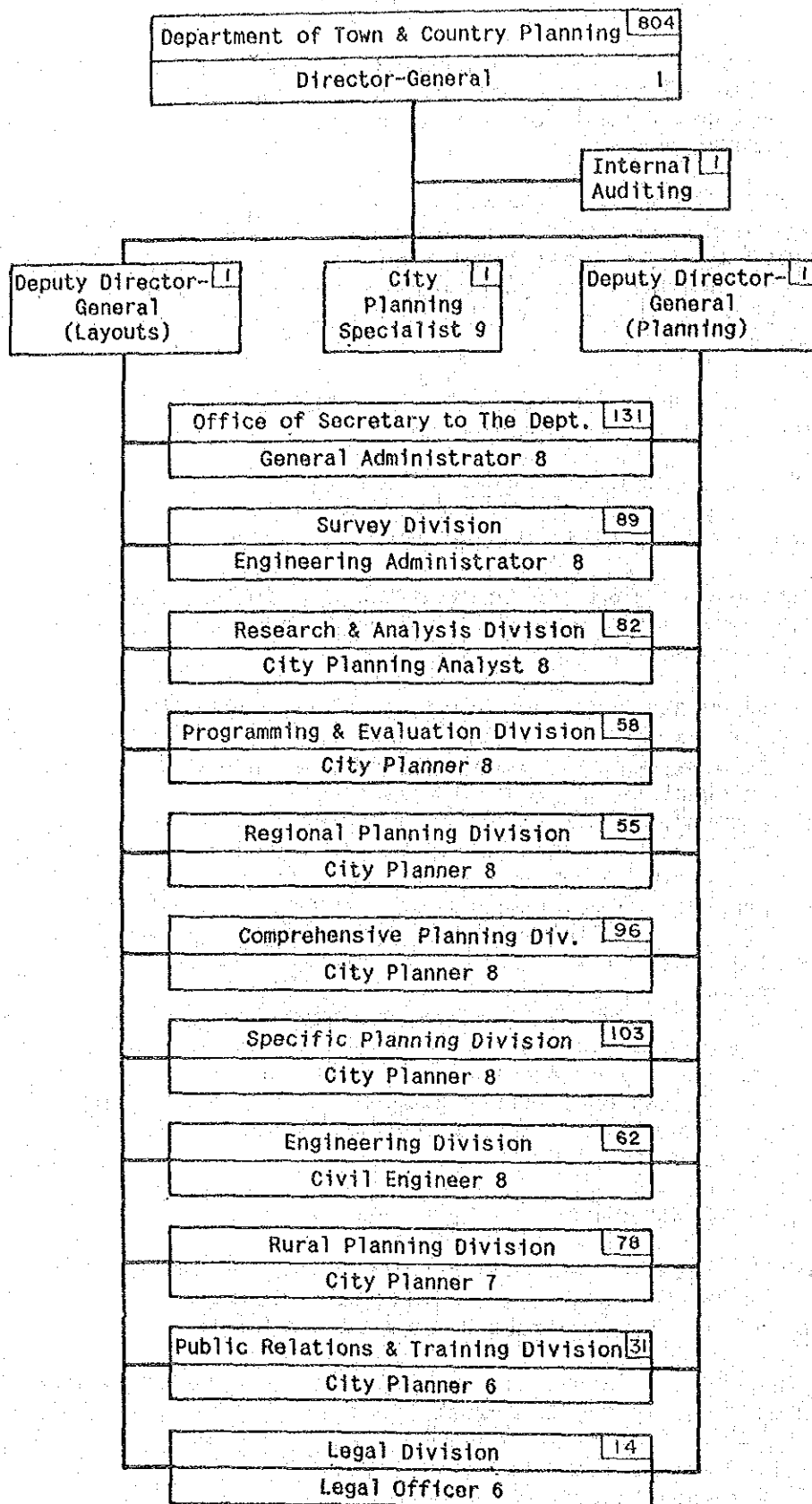
- formulate regional plans, the provincial development plans for the whole Kingdom;
- prepare, or help local authorities to prepare, general plans pursuant to the Town Planning Act;
- prepare, or help local authorities to prepare, specific plans based on the requirements of the Town Planning Act;
- formulate community development plans;
- prepare special project plans for such purposes as government centers, public parks, and historical preservation;
- formulate rural development plans (e.g., tambon and village plans);
- analyze urban growth and prepare maps and descriptions of administrative boundaries of new as well as of expanded municipalities and sanitary districts; and
- revise regional plans, general plans, specific plans, special project plans, community development plans, and rural development plans.

Organizational Structure

To fulfill the functions and responsibilities stated above, eight formal divisions and three internal divisions of DTCP were created as shown in Figure 2-1 and listed below.

Formal Divisions (divisions marked with an asterisk have major responsibilities in the technical aspects of general plan preparation)

1. Office of the Secretary
- * 2. Mapping Division
- * 3. Research and Analysis Division
- * 4. Engineering Division
5. Programming and Evaluation Division



Note : Prepared in October 1987

Fig. 2-1 DTCP ORGANIZATIONAL CHART

6. Regional Planning Division
- * 7. Comprehensive Planning Division
8. Specific Planning Division

Internal Divisions

1. Legal Division
2. Public Relations and Training Division
3. Rural Development Division

Functions of the Divisions Concerned with the Technical Aspects of General Plan Preparation

The organization and functions of the divisions concerned with the technical aspects of general plan preparation are outlined below. A detailed description of each division's responsibilities, organizational structure, and the technical staff assigned to the divisions are provided in Appendix A.

Mapping Division

The Mapping Division has two main sections plus a clerical work section. The main sections are the Photogrammetric Survey Section and the Ground Survey Section.

The major responsibilities of the Mapping Division are to:

- design maps;
- produce maps of various scales using photogrammetry; and
- produce maps for various purposes using ground surveys.

Research and Analysis Division

Within the Research and Analysis Division, there are two subdivisions and each one consists of four sections carrying out similar tasks. There are also secretaries, typists, and temporary workers performing clerical work.

The functions of the division are to:

- survey and collect socioeconomic and other data for urban and regional planning;
- prepare basic studies on population and socioeconomic variables relating to general and specific plans; and
- define the administrative boundaries of municipalities and sanitary districts throughout the county.

Engineering Division

Transport-related planning is performed in the Engineering Division. This division also deals with planning for urban facilities such as drainage and sewerage systems.

There are two subdivisions for engineering, and each subdivision consists of three sections. Each section houses two to three

engineers (university graduates) and technical staff such as draftsman. There are also secretaries, typists, and temporary workers who perform miscellaneous tasks (e.g., painting colors on presentation maps). This division is presently staffed with 73 permanent and temporary engineers, technicians, draftsmen, typists, and secretaries.

The two subdivisions carry out similar tasks but at the section level; engineers perform tasks relating to their own professional disciplines, such as transport engineering, sanitary engineering, and survey engineering. The sections do not specialize in either general planning or specific planning. Assignments are made based on the schedule of each section and the schedule of planning tasks. The planning tasks are often delineated by cities or regions.

The functional responsibilities of the division include various tasks, but they may be classified into the following four categories:

- statutory planning of transport systems in the preparation of general plans;
- statutory planning of transport and urban facilities for specific plans;
- preparation of ad hoc plans requested by local governments (e.g., for drainage systems or intersection design); and
- non-statutory planning of transport and other urban facilities in the preparation of local plans requested by local authorities.

This Division works closely with the Comprehensive Planning Division and the Specific Planning Division in the preparation of general and specific plans. It provides engineering assistance such as the collection of engineering data, analysis, and planning.

Comprehensive Planning Division

The Comprehensive Planning Division is the central agency for preparing general plans. They are responsible for coordinating the activities of DTCP's various divisions and coordinating with other governmental agencies.

The duties and responsibilities of the Comprehensive Planning Division are set forth in the City Planning Act as follows:

- to prepare general plans governing land use, communications and transportation systems, including the location of public utilities and public services;
- to provide city planning technical assistance to other governmental agencies and state enterprises;
- to prepare general plan documents;
- to proceed with the legal enforcement of general plans; and
- to revise general plans every five years.

2.2.2 Preparation and Enforcement of General Plans

(1) Administrative Procedure and Documentation

The Town Planning Act, B.E. 2518, prescribes in detail the Administrative Procedure of City Planning, which is roughly divided into four steps:

- the issuance of a Royal Decree delineating the area for the survey;
- the preparation or making of a general plan;
- decision on the general plan (approval by the Board of Town Planning and the posting of a notice); and
- enforcement of the general plan through ministerial regulation.

The major activities involved in the procedure are described below.

Initial Survey

The first step in the preparation of the general plan is the issuance of a Royal Decree delineating the area to be surveyed. The Royal Decree will specify the purpose of the survey, the planning officer, the locality to be surveyed, and other relevant information. After the Royal Decree is issued, the planning officer begins data collection work for the preparation of the general plan.

Preparation of the General Plan

1) Public Hearing

The planning officer advertises the preparation of the plan in order to inform the public. At least two meetings are held to solicit public opinion.

2) General Planning Advisory Board

In any changwat (province) where a general plan is being prepared, the changwat governor shall appoint a "general planning advisory board" to solicit advice and opinions. It is composed of a representative of the local administrative authority, a representative of the office of town planning, from ten to fifteen representatives of other governmental units, and other persons as deemed appropriate.

3) Coordination between DTCP and the Local Administrative Authority

In the process of preparing a general plan, there should be coordination between DTCP and the local administrative authority. Whenever there are difficulties in coordination, the Board of Town Planning is to resolve the differences and any Board decision shall be final.

4) Approval by the Board of Town Planning

After a general plan has been prepared, it is submitted by the Office of Town Planning to the Board of Town Planning in order to obtain approval.

5) Posting

Upon approval by the Board of Town Planning, the general plan is to be posted up at a conspicuous place (e.g., the local administrative authority office) for not less than ninety days. If any interested person makes a request within sixty days to modify or cancel any prescription on the use of property in the general plan, the planning officer shall submit the request together with his own opinion to the Board of Town Planning. If the request is approved, the Board of Town Planning may order the planning officer to modify or cancel the prescription. If the request is disapproved, the Board of Town Planning shall disallow the request.

6) Decision on the General Plan

If, within ninety days, any interested person has not made a request for modification or cancellation, or if such a request has been made but disallowed, or if a modification or cancellation has been ordered, and the planning officer has completed his task as ordered, the general plan shall be approved and submitted to the Minister of Interior.

Enforcement of the General Plan

The general plan shall be enforced through Ministerial Regulations. No person shall be permitted to use land in a way different from that prescribed in the general plan.

Documentation

The contents of general and specific plans are set forth in the Town and Country Planning Act and are set forth below.

Contents of General Plans

- The purpose of preparing the general plan
- A map showing the boundary of the planning area
- A plan with regulations governing at least some of the following:
 - . Classifications of property use
 - . Open space
 - . Communications and transport projects
 - . Public utility projects
- Details accompanying the plans
- Policies, measures, and methods for implementing the general plan

Contents of Specific Plans

- The purpose of preparing the specific plan
- A map showing the boundary of the planning area
- A plan containing at least some of the following:
 - . Classifications of land use
 - . Communications and transport projects
 - . Public utility projects
 - . Regulations governing the level of land
 - . Places or objects of art, architecture, history, or antiquity to be preserved, maintained, or renovated
 - . Natural resources and landscapes to be conserved
- Details and explanations accompanying the above items, including categorization of the kinds of construction projects that may or may not be permitted
- Regulations governing at least some of the following:
 - . limit and size of accessory spaces (privately owned lands to be used as open space or for other public uses such as sidewalks and footpaths)
 - . construction projects that may (or may not) be permitted
 - . building demolition projects to be ordered
 - . dimensions of land on which building is to be permitted
 - . other matters, as may be deemed necessary, in accordance with the objectives of the specific plan
- Details specifying the land or other immovable property to be expropriated by governmental authorities

(2) Technical Procedures

The plans defined above are to be prepared through the cooperative efforts of officers in the divisions concerned. The technical procedure of plan preparation that DTCP follows is summarized below and in Figure 2-2:

- 1) The Mapping Division provides the maps listed in the figure as the first step in plan formulation.
- 2) The Research and Analysis Division reviews secondary sources and conducts a field survey to gather required data.
- 3) The Engineering Division conducts traffic surveys, processes the data, and then reports the results to the Comprehensive Planning Division. (The Transportation Plan is formulated in cooperation with the Comprehensive Planning Division, which prepares the land use plan.)
- 4) The Comprehensive Planning Division analyses the data collected by the other divisions, specifies objectives, develops planning concepts, and then formulates the general plan.

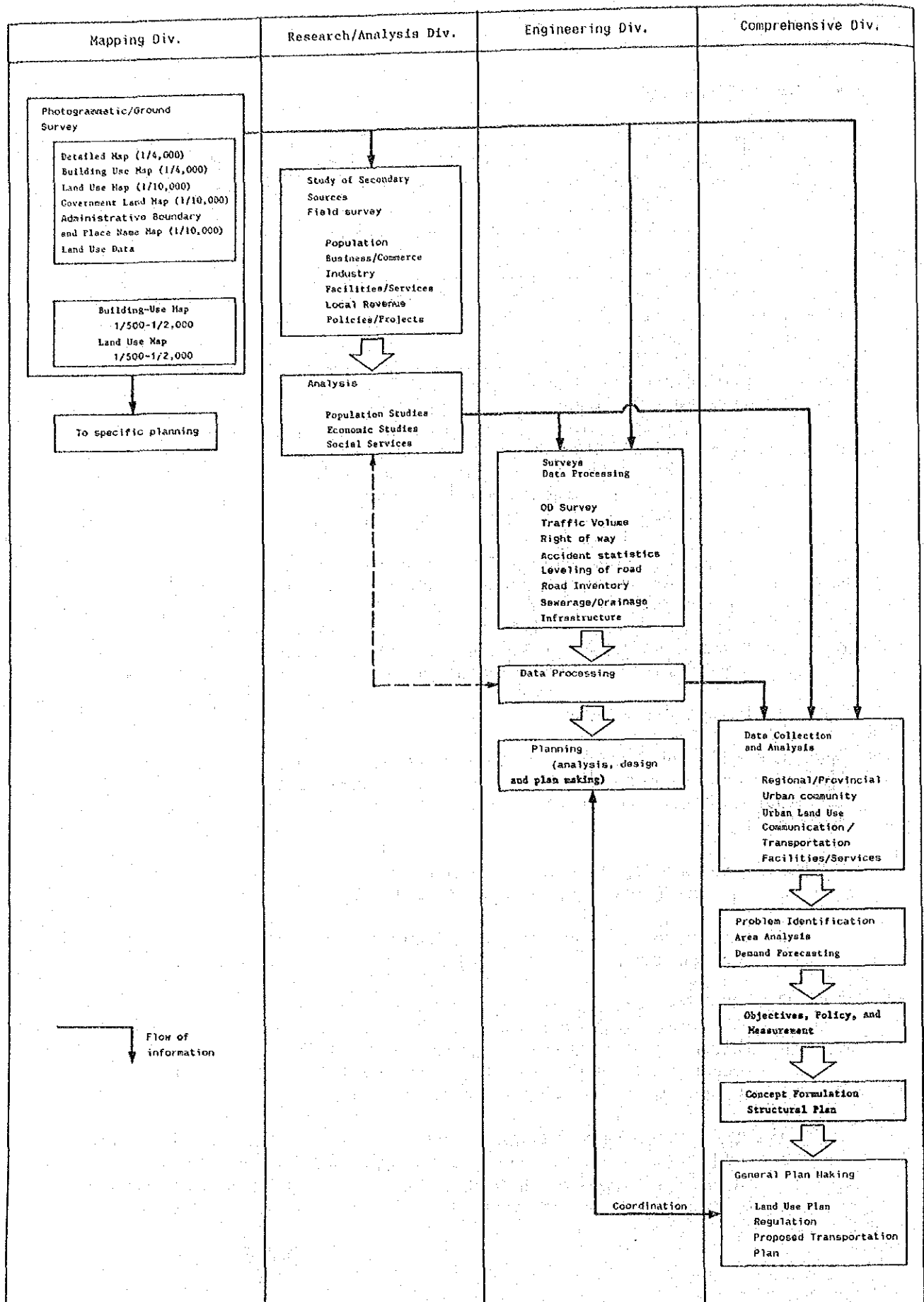


Fig. 2-2 TECHNICAL PROCEDURE OF PLAN FORMULATION AND INFORMATION NETWORK

2.3 Planning Activities of Major Divisions

The planning activities of the divisions that perform technical procedures involved in the preparation of general plans are described in this section.

2.3.1 Mapping Division

The activities of the Mapping Division are devoted to the production of base maps (1/4,000, 1/500-2,000) and information maps such as building use maps, land use maps, and maps showing government land. Also they provide information from their various databases (e.g., their land use database).

Current Mapping procedures are illustrated in Figure 2-3. Either a photogrammetric survey or a ground survey is conducted to produce maps. The "graphical collection method" and simple planimeter method are employed for measuring land use areas. The instruments now in use at the Mapping Division are listed in the Table 2-2.

Table 2-2 LIST OF EQUIPMENT EMPLOYED BY MAPPING DIVISION

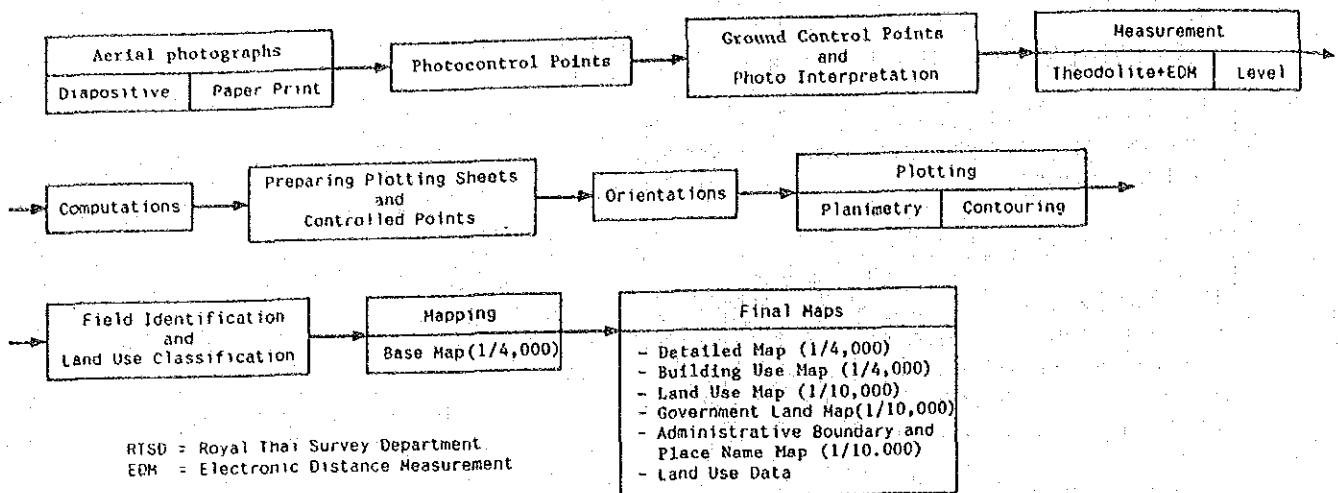
Name of Equipment (Make)	Total Pieces
1 Geodetic and Control Survey	3
- EDM (Sokkisha)	
- Theodolite (Sokkisha and Zesiss)	15
- Auto Level (Sokkisha)	14
- Scientific Calculator (Casio)	9
- Lettering Set (English)	6
- Lettering Set (Thai)	14
- Planimeter	6
- Pantograph	6
2 Photogrammetry	
- Analogue Stereoplotter (WILD A8)	2

2.3.2 Research and Analysis Division

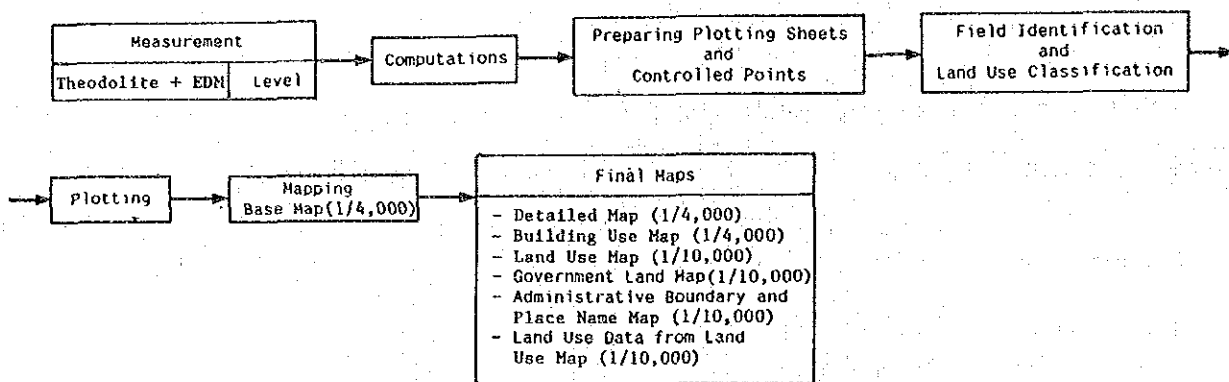
The activities of the Research and Analysis Division include the collection of basic data: the planning and implementation of field surveys and analysis. The flow of work in this division is illustrated in Figure 2-4.

Collection of Basic Data

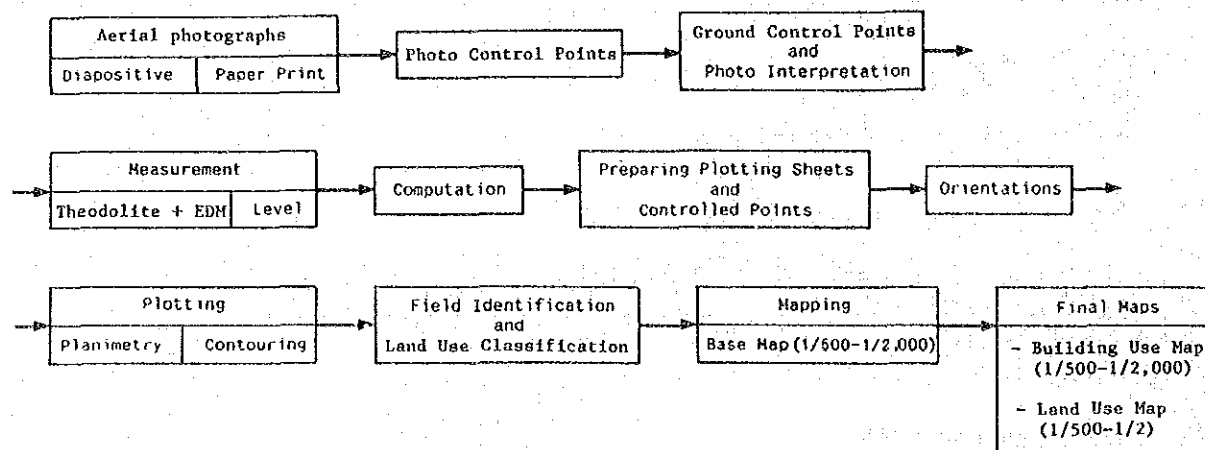
The Research and Analysis Division studies both graphic and non-graphic data from authorities concerned. Graphic data includes the base maps produced by the Mapping Division and the general plan boundary map prepared by the Comprehensive Planning Division. Non-



(1) Mapping Procedure for General Plans (Photogrammetric Subdivision)



(2) Procedure of Mapping for General Plans (Ground Survey Section)



(3) Procedure of Mapping for Specific Plans (Ground Survey Sub-division)

Fig. 2-3 CURRENT MAPPING PROCEDURES

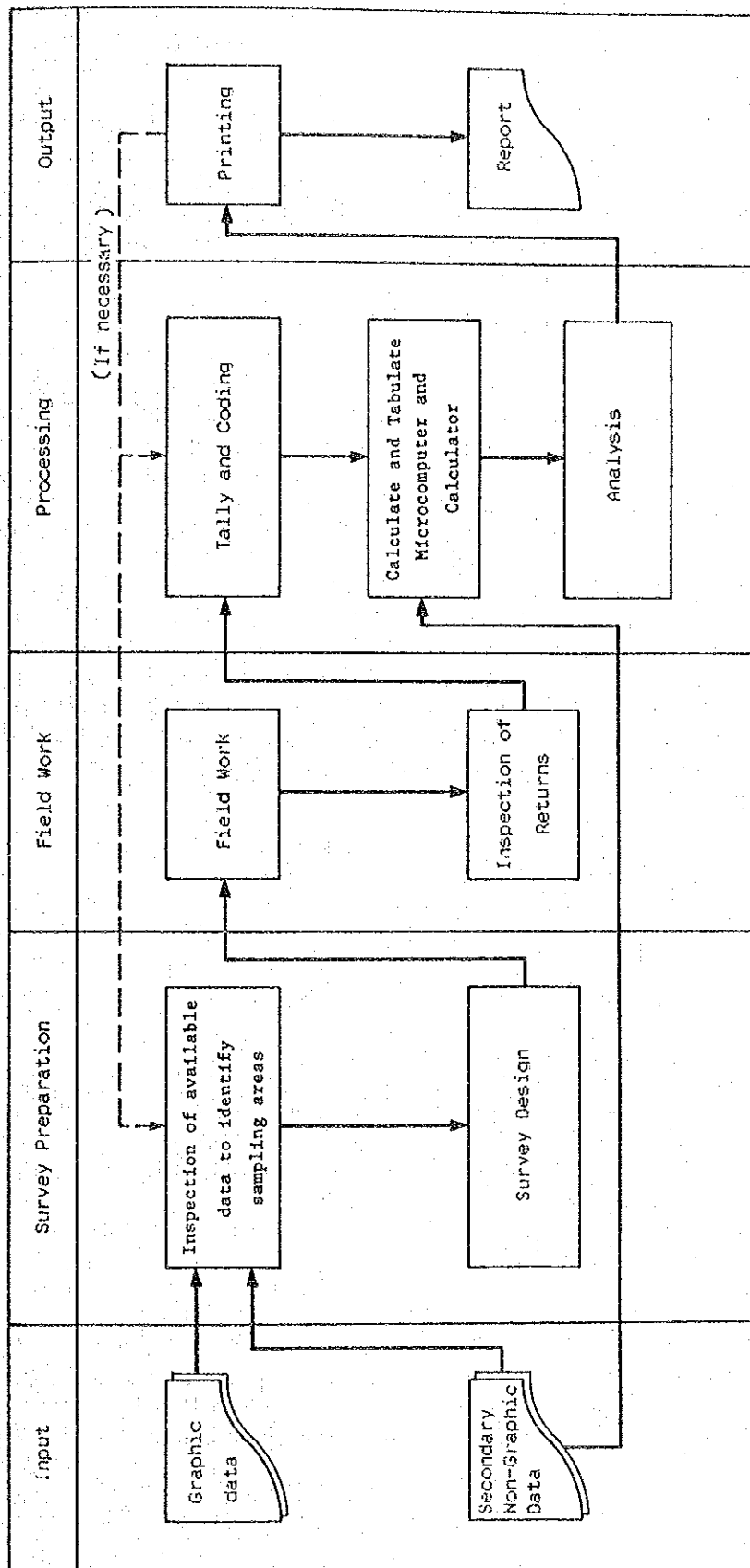


Fig. 2-4 WORK FLOW IN RESEARCH AND ANALYSIS DIVISION

graphic data includes data on population (municipal, district and changwat levels) as well as additional data from secondary sources.

Survey Preparation

Survey designs are formulated by dividing the general plan boundary map into sub-areas to provide sampling areas. A random survey is to be conducted of approximately 10% of all households and 100% of all businesses in the sampling areas. All public facilities and services are also included in the count.

Field Survey

The random survey is conducted by interview using a questionnaire. The interviewers include members of the statistical and mapping staff of the Research Division, with local students hired to assist. The questionnaire is designed to cover the domestic, commercial, industrial, and public facility sectors.

Analysis

After the completion of the field work, the data collected is evaluated by planning analysts. The statistical staff of the Research and Analysis Division is responsible for data processing and tabulation. Every step of the processing is conducted with calculators. In some big cities, such as Bangkok, Chiang Mai, and Khon Kaen, microcomputers are used for population cohort and regression analyses.

Major data items used in the analysis include:

- 1) Population Data
 - Past growth rates
 - "Natural change"
 - Migration flows
 - Population characteristics
 - Age structure
 - Population projections
- 2) Economic Data
 - Commercial activities
 - Industrial activities
 - Employment
 - Local revenues and expenditures
- 3) Social Data
 - Existing facilities and services
 - Comparisons of existing facilities to accepted standards to determine adequacy
 - Estimates of the need for expansion of existing facilities

2.3.3 Engineering Division

Transport Planning

The transport planning activities of the Engineering Division are divided into three phases: field work, analyses of transport system design, and engagement in the statutory planning process in cooperation with other divisions.

Field Work

One of the basic tasks of statutory planning is the determination of the boundary of the planning area. The staff of the Engineering Division visit the planning area together with officers from the Comprehensive Planning, Mapping, and Research and Analysis Divisions in order to establish a suitable planning area boundary. This process usually takes five to ten days.

Once a planning area boundary is established, the Engineering Division begins the major task of collecting data. The various transport surveys, listed below, are directly organized by field officers of the division.

Traffic Volume. A manual count of traffic is conducted by assigning one or two persons to each selected spot to tabulate traffic volume by nine vehicle types. The data is collected at specific intervals, from 7 to 10 am and from 3 to 6 pm. A hand counter is the principal instrument used in making the manual counts. In addition, an automatic count is conducted (with a pneumatic traffic counter) on a 24-hour basis over a period of one week. The result of the automatic count is used for reference when evaluating the manual counts regarding the variation of traffic during a day. The location of the pneumatic traffic counter is selected to cover busy intersections and roadways in business or residential zones. Turning movements at major intersections are recorded by assigning four to eight persons to each intersection.

Origin-Destination (O-D) Survey. An O-D survey is conducted through direct home interviews in order to ascertain the number of person trips per day. A random sampling method is employed for five to ten days with a zoning system that corresponds to the system employed by the Research and Analysis Division. A group of eight to ten persons are assigned to conduct the interviews in each zone.

Cordon Survey. Roadside interviews of car drivers are conducted in both directions at entry and exit points around the planning boundary with the aid of the traffic police in the stopping of traffic. About four to five persons are employed at each checkpoint. Seeking to minimize disturbances to motorists, the interviewers take an arbitrary sample.

Travel Time Survey (Moving Observer). The moving observer (moving car) method is used to determine travel speeds on major links.

License Plate Survey. A license plate survey is conducted to determine external-external and external-internal traffic movements at strategic points on the roads leading to and leaving the area (i.e., in both directions). Three field workers are assigned at each point to record the license plate numbers of passing cars. No special equipment is required for the survey. Additional data of this nature are obtained from local authorities or other planning agencies.

Road Inventory. A field survey of most of the streets in the planning area is made to determine the width of the right-of-way, carriage way, and sidewalks, the type of road surface, and other information. In addition, other government agencies such as DOH, Provincial Administration Organizations, and amphoe (district) authorities are contacted to obtain their road data.

Accident Statistics. The police stations located within the planning area are contacted to obtain traffic accident data.

Car Ownership. Car ownership data are obtained from provincial police stations and the land transport office.

Bus/Coach Terminals. The provincial land transport office or municipalities are contacted to obtain data on bus/coach terminals.

Parking. A survey is conducted in the planning area with approximately three field workers counting the number of cars parked on and off the roads in the business zones and other congested areas.

The Engineering Division also collects urban facility data, which will be described in a subsequent section. The whole data collection process takes 30 to 50 days for smaller cities and 80 to 120 days for the larger ones. The length of the survey period is determined by the Programming and Evaluation Division, and this decision affects the scale and ambitiousness of the data collection plan. O-D surveys are time-consuming and are usually conducted in major cities only.

Compilation, Analysis, and Plan Formulation

The compilation, analysis, and plan formulation phase of work is primarily performed at the DTCP office. The results are summarized in "Engineering Reports" and distributed to relevant divisions and authorities.

The major compilations and analyses involve the following tasks:

Compilation of Traffic Volume Data (Automatic Counts). Automatic traffic counters print out traffic volumes, but do not provide classification by vehicle type. These data are compiled manually, or a computer is used for tabulations and drawing graphs depicting the change in levels of traffic volume within a week, day, or other time period.

Compilation of Manual Counts. Nine classifications of peak hour traffic composition are made. The results are tabulated and shown with graphs.

O-D Survey Data Analysis. Home interview surveys have been conducted in several cities but the collected data have not been effectively analyzed to provide present travel demand patterns. The necessary computer programs and related methodology remain to be worked out.

Road Inventory. Road data are usually tabulated to show section number, type of pavement, section width, and other information. Thematic maps are also produced to show the configuration of the entire road network. Cross sectional data are shown diagrammatically in engineering drawing formats.

Average Travel Speeds. Moving observer data are processed to estimate the average travel speed of road sections.

Forecasting and Plan Formulation

Forecasting and plan formulation have not yet been conducted with a quantitative modeling approach. The process of plan design is, therefore, not standardized in the Engineering Division. Each engineer is relatively free to use his own professional judgment, but certain common principles (listed below) are employed:

- The forecasts are based on the standardized growth rate forecast by DOH and on analyses of the road system within the planning area.
- The forecasts are based on data released from studies performed by other government agencies, including the development studies of major provincial cities, and a recent study of the tourism industry conducted by the Tourism Authority of Thailand. These data provide the framework for forecasting demand in various sectors (e.g., transport, utilities, and public facilities).
- The forecasts take into consideration development projects planned by the local government or other organizations.

The process of plan formulation is based on the following information:

- . Topographic maps
- . Forecasts of future land use
- . Existing land use
- . Traffic volumes
- . Rights of way
- . Future proposals for improving the transport system
- . Accident statistics
- . Socioeconomic data
- . Data from other planning levels

The above data are considered in light of the following:

The Functions of Roads. Roads to be designed (specified) are classified into four categories depending on traffic and accessibility requirements. It is recommended that only the three categories of roads with the highest capacities be included in plan formulation. The

details of the fourth category (access roads) should be left to local authorities.

Relationship Between Roads and Land Use. Consideration must be given to the relationship between the highway network and land use in order to provide for balanced development consistent with a high quality of life. In this context, consideration should be given to safety by avoiding through traffic in residential areas.

Availability of Land for Road Construction. In statutory planning, roads are divided into three types in terms of the need for land acquisition: existing roads with no expansion requirements, existing roads to be widened, and proposed extensions. Plan feasibility must be considered in designing the latter two types of roads. For example, it is necessary to consider land ownership and the buildings to be demolished to make way for road construction.

Other Types of Work

The Engineering Division devotes most of its resources to the preparation of plans for statutory enforcement (mostly general plans). The Engineering Division cooperates with other divisions, and officers of the Engineering Division attend advisory committee meetings. Also, with the officers of other divisions, they make presentations at public hearings.

Urban Facilities Planning

Organizationally, urban facilities planning occurs throughout DTCP.

- In the Research and Analysis Division, data concerning urban facilities such as schools, hospitals, waterworks, and power stations are collected through questionnaires sent to local governments.
- The Engineering Division conducts studies of urban utilities. The data are collected through questionnaire and field surveys. The studies are focused on present conditions and problems as well as on making suggestions for the solution of problems and for future projects. In addition, the Engineering Division is responsible for designing drainage/sewerage facilities requested by local governments. Such requests impose a great work volume on the Engineering Division.
- The Comprehensive Planning Division evaluates the present conditions of urban facilities for functions such as education, public health, religion, and parks/recreation. Also, the Comprehensive Planning Division compiles the urban facility planning studies prepared by the Engineering Division. Coordination between land use planners and urban utilities is facilitated by meetings held with relevant authorities and departments.

For special "sanitary districts," development plans are formulated by the Specific Planning Section. In light of the limited study time and available data, some items for urban facilities are not considered. The development plans for sanitary districts are more informal than general plans. Sometimes these development plans are not implemented due to budgetary or manpower constraints at the local government level.

2.3.4 Comprehensive Planning Division

As stated above, the Comprehensive Planning Division develops general plans by coordinating and integrating all interdivisional planning efforts, which include the formulation of land use and urban facilities plans.

Process of Formulating General Plans

Planning methods vary depending on the groups in the Comprehensive Planning Division that happen to be in charge. Some groups follow the standard planning process, as shown in Figure 2-5, but others do not or skip some steps of the process.

The standard planning process involves accumulation of a database, delineating the boundary of the planning area, problem identification, setting of goals and objectives, formulating a structure plan, developing a land use plan and associated regulations, and finally compiling the general plan. More details are provided below.

(1) Setting of Planning Area Boundary

A planning area boundary is set by meetings at three levels: the DTCP Subcommittee Board, the Provincial General Planning Advisory Board, and public hearings. Topics to be presented include the following:

- existing land use, including present conditions and problems;
- physical constraints and urban growth trends; and
- planning boundary to prevent future problems and to support the expansion of urban growth in the target year.

Materials to be presented include an administrative (tambon) boundary map, a map of existing land use, an urban expansion plan, and a planning area boundary map.

(2) Analysis of Data

Data analysis is emphasized in the following activities:

- determination of the final schedule for the work plan for each year (the annual schedule from the Programming and Evaluation Division);
- setting of goals and objectives (conducted by the Regional Planning Division);
- identification of community problems (based on existing land use activities and general conditions identified by the

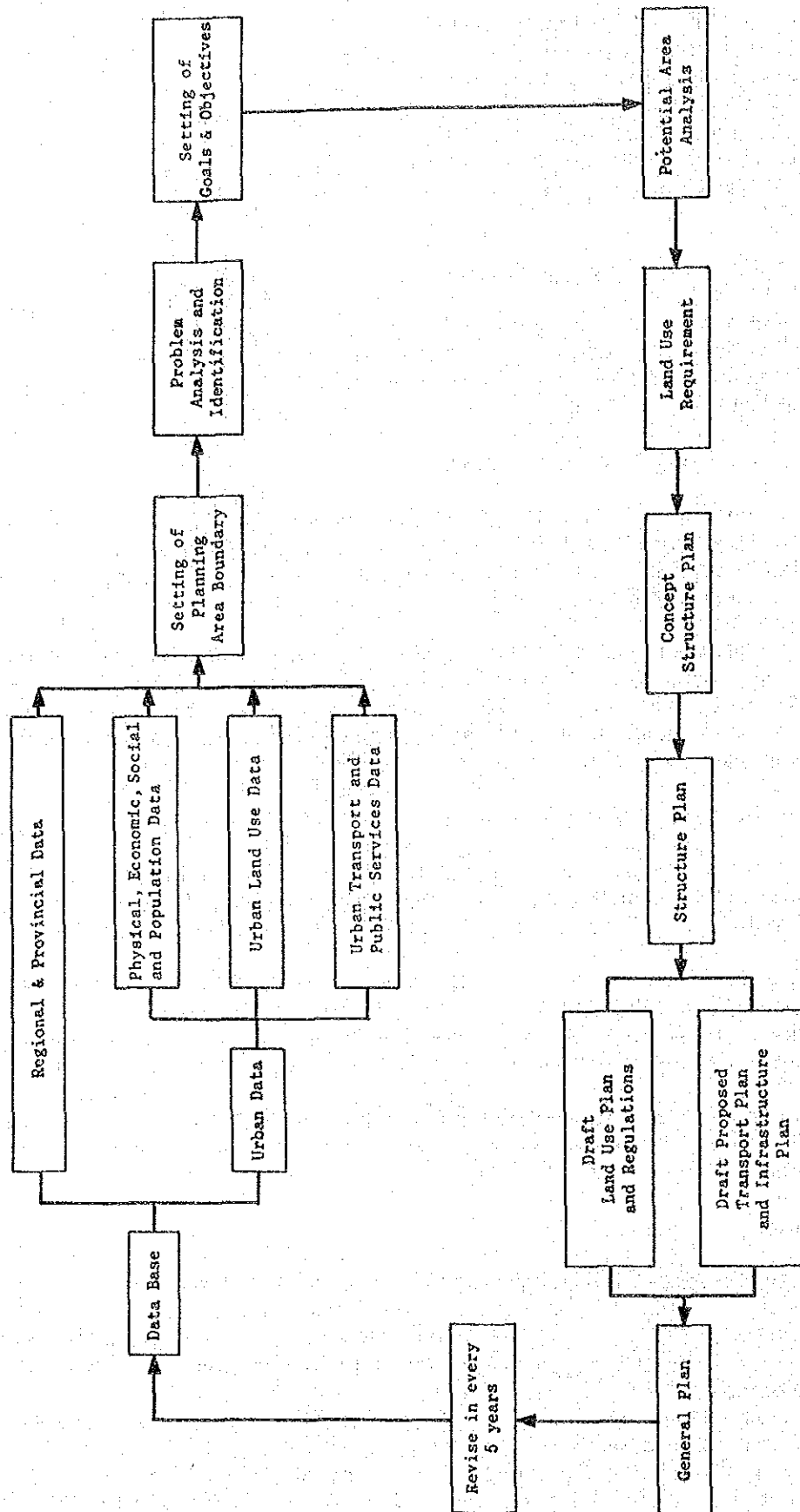


Fig. 2-5 PROCESS FOR GENERAL PLAN FORMULATION

Research and Analysis Division;

- projection of urban growth trends (based on existing land use patterns, land limitations, and plan development projects, as compiled by the Research and Analysis Division, the Mapping Division, and the Engineering Division); and
- formulation of an urban structure concept and land use plan (based on studies of land requirements and development potential).

(3) Land Use Forecasting

Land use forecasts help a community cope with expansion and population growth. They are often made through a "requirements analysis," which is based on an evaluation of the requirements of different categories of land use. Typically, such an approach considers land use from the past to the present, and involves forecasting the change in the proportion of each land use category.

Land use forecasting is a vital step in the preparation of a land use plan. A list of land use categories and information considered is listed below.

- Residential: Proportion of total land use, problems, standards, and connections with other activities.
- Commercial: Proportion, role, service area, and rate of business expansion.
- Industrial: Proportion, employment, employment density, and standards.
- Rural and Agricultural: Proportion, land potential, environment, future community expansion, and connections with other kinds of land use.
- Open Space and Recreational: Proportion, service area, standards, future projects, requirements, community environment, density of population, and other categories of land use that may be used as a substitute (e.g., religious uses, rivers, and canals.)
- Educational: Proportion, community roles, future number of school children and educational standards (from the National Housing Authority and Ministry of Education), and private and public sector projects.
- Religious: Proportion and "service area."
- Governmental: Proportion, community roles, service area, and future projects.
- Public Utility or Public Facility: Proportion, role, service area, environmental requirements, standards, and future projects.

(4) Setting of Goals

To establish the goals of a land use plan, it is necessary to consider the main problems that a community faces. In addition, the various levels of development plans must be considered, including the National Economic and Social Development Plan, the Regional Development Plan, the Changwat Structure Plan, and the Municipality Development Plan or Sanitary District Development Plan. By evaluating area conditions,

an effort is made to solve local problems and prepare for future expansion by focusing on physical development.

However, the general characteristics and natural resources of the larger region and province must also be considered. A plan for a local community cannot be made without reference to the surrounding area.

(5) Urban Structure Concept

A "land use structure or concept plan" is used as a guideline in forecasting land use in the preparation of a general plan. It considers the following factors:

- community or urban roles;
- land use for various activities;
- future land use requirements for each activity;
- suggested guidelines for land use activities; and
- the ability of the area to cope with urban expansion.

After an evaluation of various alternatives, the structural plan that is most suitable for the local community is selected.

(6) Population Distribution Policy

Population distribution policy depends on current development trends, the current population density, and population projections. National forecasts of population distribution by community or urban area are considered and judgments are made as to whether they should be adopted or adjusted. The average population density of different categories of land use is taken into consideration.

(7) Employment Distribution Policy

Employment distribution policy depends on the following factors:

- population projections;
- urban development and land use patterns; and
- total employment and employment by sector.

The future employment distribution for each community or urban area is considered, based on existing employment and land use patterns for major activities (including agriculture, manufacturing, trade, financial services, recreation, and personal services). Moreover, the potential of the area and existing land use regulations are taken into account in estimating the distribution of future employment.

(8) Land Use Plan

After the urban structure concept is determined, preparation of a draft land use plan is the next step. The following factors are considered:

- function, role, and significance of the urban community;
- existing conditions and problems;

- urban expansion trends and the area's development potential;
- the responsibility to alleviate the community's present problems and to prevent future ones;
- preparing the area for supporting urban expansion; and
- goals and objectives of land development.

A draft land use plan has to be coordinated and integrated with the transportation and infrastructure plans prepared by the Engineering division. It must cover the following:

- objectives;
- physical features of the community;
- principles and models or patterns of future land use; and
- land use regulations.

A draft land use plan thus formulated has to be presented to the DTCP Committee Board, the Planning Coordination Committee, the Provincial General Planning Advisory Board II, the public (Public Hearing II), and to the Board of Town Planning for approval.

(9) General Plan

Pursuant to Ministerial Regulations, the general plan has to be presented to the Local Officer and Operations Officer. Topics to be covered include the following:

- the purpose of the general plan;
- the boundary of the area for the general plan;
- a plan (including details) prescribing the use of property as classified;
- the policies, measures, and methods to be used to implement of the general plan.

Presentation maps, plans, and figures include a general planning area map, a property use plan, a communications and transport plan, and a figure showing the use of land and buildings in ways that vary from those prescribed by Ministerial Regulation.

3

**ASSESSMENT
OF THE PLANNING ACTIVITIES
OF DTCP**

3 ASSESSMENT OF THE PLANNING ACTIVITIES OF DTCP

3.1 Assessment Method

The first step in assessing DTCP's planning activities was to conduct a review of technical reports produced by different divisions as supporting materials for past general plans. This review was conducted to learn more about the current level of city planning techniques in DTCP, the extent to which quantitative analysis is used, and the degree of consistency in the planning process.

The next step in the assessment was a review of actual planning activities in the different divisions of DTCP, in which these technical reports were produced. The planning system and activities were reviewed in terms of the following "production" criteria:

- 1) "Production Process" - Plan formulation process.
- 2) "Production Techniques" - Techniques for data collection/processing, analysis, preparation of plans, and preparation of technical reports.
- 3) "Production Equipment" - Machines and equipment for surveying, data collection, drawing, and other activities.
- 4) "Production System" - Organization, number, and qualifications of technical staff.

Sectoral activities were first examined, followed by an overall assessment. The following sections show the results of these evaluations.

3.2 Assessment of Sectoral Activities

Planning activities in DTCP were assessed through close observation of the general-plan related subdivisions. The assessment was based on the following:

- A questionnaire inquiring about functions and work processes was sent to each division. The returned questionnaires provided a general understanding of DTCP's sectoral activities.
- Each division was asked to make a presentation regarding its general responsibilities.
- The key personnel in each division were interviewed.
- The study team members visited each division to observe day-to-day plan making activities.

The results of a "self diagnosis" and improvement measures implemented by each division (Table 3-1) were also used as a point of departure for the sectoral assessments. The following sections describe the results of assessments.

Table 3-1 PROBLEMS AND MEASURES IDENTIFIED BY DTCP

	Problems	Measures to be Taken
Mapping	<p>The Mapping Division presently has been experiencing great difficulty in conducting mapping effectively and efficiently due to a lack of modern technology and machinery.</p> <p>Many of the cartographic instruments, measuring instruments, and surveying equipment are out of date, thus resulting in inaccurate maps.</p>	<p>New technology and equipment are most needed.</p>
Research/ Analysis	<ol style="list-style-type: none"> 1. <u>Scarce Data</u> <ul style="list-style-type: none"> • Incomplete or unreliable data • Data collected by different boundaries 2. <u>Defects in Field Surveys</u> <ul style="list-style-type: none"> • Unavailability of good sampling frames • Sampling frames depend on the maps produced by the Mapping Division 3. <u>Unsuitable analytical models</u> 4. <u>Limited equipment for data processing/analysis</u> 	<ol style="list-style-type: none"> 1. <u>Database management for urban planning</u> <p>Objective: To instill systematic data processing, storing, accessing, and retrieving by using modernized equipment such as microcomputer.</p> 2. <u>Survey methodology and urban analytical models</u> <p>Objectives: 1) To formulate survey methodologies suitable for the database management system. 2) To formulate suitable analytical models for urban planning using available data and information.</p>
Transport (Engineering)	<p>Due to time and manpower constraints, smooth and efficient execution of the work in the division could hardly be expected, especially regarding survey, analysis, and planning tasks. The problems in each of the areas are shown below</p> <ol style="list-style-type: none"> 1. <u>Survey</u> <ul style="list-style-type: none"> 1) <u>O-D Survey</u> <ul style="list-style-type: none"> - Lack of proper data collection techniques (e.g., sampling) 2) <u>Traffic Volume</u> <ul style="list-style-type: none"> - Insufficiency of equipment; lack of proper data processing techniques 3) <u>Road Inventory</u> <ul style="list-style-type: none"> - Lack of proper data management 4) <u>Public Transport Inventory</u> <ul style="list-style-type: none"> - Applicable techniques are unavailable 	<ol style="list-style-type: none"> 1. Adopt appropriate technologies for transport planning, especially a quantitative approach. 2. Obtain modern instruments and equipment for transport planning. 3. Receive training in transport planning in order to obtain capability of using new equipment efficiently. 4. Obtain planning manuals.

Table 3-1 PROBLEMS AND MEASURES IDENTIFIED BY DTCP (CONT.)

	<p>2. Analysis</p> <p>1) Processing Survey - Lack of proper data management - Insufficient equipment</p> <p>2) Model Formulation - Insufficient theory and techniques</p> <p>3) Model Calibration - Inadequate theory and techniques - Insufficient input data</p> <p>4) Model Simulation - Lack of operational techniques</p> <p>3. Planning</p> <p>1) Network Planning - Lack of experience in pattern design</p> <p>2) Traffic Assignment - Lack of applicable techniques</p> <p>3) Evaluation of Alternatives - Difficulty in identifying the various kinds of factors concerned and determining the best alternative</p>	<p>It is essential to study the techniques and models necessary for making a General Plan. All these techniques must be appropriately modified and applied to suit local conditions in Thailand.</p>
Land Use (Comprehensive Planning)	<p>1. Land use classifications involved in land use planning as well as social and economic resources have not been standardized.</p> <p>2. A system of land use registration for controlling development and updating information (i.e., existing use, vacant land and built up area) has to be established.</p> <p>3. Appropriate controls to regulate density in residential, commercial, and industrial areas must be devised.</p> <p>4. New techniques for land use and transportation models must be introduced.</p> <p>5. A Database Management System for Formulation of a General plan by computer has to be devised.</p>	
Urban Facilities (Comprehensive Planning)	<p>The major obstacle in public facilities planning is that there is a lack of research analysis regarding urban planning standards in infrastructure.</p>	<p>The Comprehensive Planning Division needs to modify its criteria and strategies to develop standards appropriate for Thailand.</p>

Table 3-1 PROBLEMS AND MEASURES IDENTIFIED BY DTCP (CONT.)

<p>Programming and Evaluation</p>	<p>The Department of Town and Country Planning is given authority to enforce the General Plans, which perform the role of the so-called Master Plan in all urban areas throughout the country under the Town Planning Act (1975); except for the implementing procedures, there is a great need for improving and upgrading techniques for local authorities and DTCP in the execution of the plan.</p>	<ol style="list-style-type: none"> 1. Build models to identify the priority of programming work plans. 2. Incorporate new methodologies in work procedures. 3. Work out effective implementation procedures. 4. Prepare manuals for implementation. 5. Conduct training of Thai personnel in up-to-date planning methodologies, both in DTCP and through overseas training.
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Mapping Division

Mapping

The most serious problem in the Mapping Division is the shortage of modern technology and equipment. A sizable proportion of cartographic instruments, measuring instruments, and surveying equipment is outdated, and consequently it is extremely difficult to produce accurate maps. The equipment and methodology problems may be summarized as follows:

Equipment Problems

- Insufficiency of photogrammetric instruments
- Insufficiency of modern field instruments
- Insufficiency of modern calculators
- Lack of cartographic instruments
- Lack of accurate map modification instruments

Methodology Problems

- Lack of uniformity in map quality and the mapping process
- Lack of uniformity in the use of symbols
- Lack of a validation system
- An insufficient number of specialists with advanced cartographic skills.

Research and Analysis Division

Socioeconomic Analysis

The Research and Analysis Division obtains some of its data from other governmental organizations and a statistical data book compiled for the preparation of the general plan. A field survey is conducted to supplement the existing data. Analysis of the collected data has been made mostly through manual calculation.

The problems in this division exist within the working processes of data collection and analysis, as explained below:

- collected data have been manually tabulated, making mistakes inevitable;
- some of the original and intermediate data have been lost due to inadequate data management; and
- economic data such as industrial output and retail sales are not collected.

Comprehensive Planning Division

Land Use Planning

The problems in land use planning are of three kinds:

- the lack of standardized land use classifications;

- the lack of a quantitative approach in land use analysis and design; and
- the lack of appropriate land use planning measures to control density.

Land use classification is not standardized. Different types of land use classifications are used in the data collection and analysis/planning stages. Therefore, some of the data are difficult to interpret and the plan making process is made less efficient.

Further, there is very little in-depth quantitative analysis. A massive amount of data has been collected by the divisions, but most of the data are summarized and utilized in a very qualitative manner. The successive land use analysis and land use design tasks are conducted without a common baseline. With the public increasingly concerned about the rationale of land use plans, it is necessary to introduce more rigor into the process. In particular, quantification is required in the analysis of present land use patterns and development potential, and in land use forecasting.

The third kind of problem relates to measures for plan implementation. The present land use prescriptions are somewhat inadequate in terms of density control.

Engineering Division

Transport Planning

The transport planning methods employed by the Engineering Division are generally not quantitative. Judging from the amount of data collected, however, much of the analysis and plan making process could have been conducted using quantitative methods if appropriate techniques were available. Another problem is in the data collection process, especially regarding the design of inventory formats. In one case, the lack of an automatic data collection system has greatly reduced the efficiency of data collection. Appropriate theories and methods need to be introduced in the analysis and forecasting stages. A simplified approach, for example, could be applied to the estimation of O-D (origin-destination) patterns and future travel demand.

Below, these problems are described in detail by stage of planning activity.

Data Collection. The equipment for counting traffic volumes is insufficient. There are only two automatic traffic detectors (pneumatic cable type), and they are not adequate for counting traffic because they cannot distinguish among different types of vehicles. Manual counters (combined type) are also in short supply, further reducing the efficiency of traffic data collection.

Home interview surveys have been conducted on several occasions but the collected data have not been fully utilized due to time constraints. The data from such surveys are useful, for example, for analyzing travel behavior and forecasting future travel demand.

A road inventory is usually prepared by local authorities but the data cannot be utilized immediately because additional information such as pavement conditions and cross-sectional patterns are required in the planning process. These supplementary data can only be collected with a time-consuming field survey. Clearly, standardizing road inventory data and asking local authorities to cooperate with DTCP in the data collection process would improve the efficiency of the planning process. These supplementary data can only be collected with a time-consuming field survey. Clearly, standardizing road inventory data and asking local authorities to cooperate with DTCP in data collection would improve the efficiency of the planning process.

The moving observer method is used for collecting travel speed data during peak hours. This method is very useful, but has not been standardized. There is a need for standardized manuals that can be applied in all stages of the data collection process.

Compilation and Analysis of the Transport System and Traffic Data. A common problem in data compilation and analysis is the low level of computer utilization due to time constraints resulting from the heavy work load in the Engineering Division. But since transport-related data are often in numerical form, the use of computers actually makes their processing much faster and more accurate. Significantly more useful information could be obtained by computer analyses.

Computer software to perform transport analyses should be made available. The functions listed below could be computerized:

- traffic data compilation and analysis;
- O-D compilation from home-interview data;
- O-D compilation from car O-D surveys;
- desire line drawing by plotter;
- license plate data matching;
- moving observer data analysis;
- road inventory database; and
- automatic drawing of cross-sectional diagrams.

Travel Demand Forecasting. This planning phase has not been conducted quantitatively with transport demand models. There are at least four reasons this has not been done:

- lack of trained staff with practical experience in travel demand forecasting;
- shortage of manpower to carry out demand forecasting;
- lack of quantitative land use data and socioeconomic forecasts consistent with traffic zoning; and
- lack of computer software and experience.

Travel demand forecasting also requires an accumulated database on travel behavior. The trip generation rates of different land uses need to be tabulated, and origin/destination patterns among those activities must be analyzed. Route choice behavior and the relationship between traffic volume and travel speed under local

traffic conditions should also be investigated.

Transport Network Design. The details of transport networks are considered in the preparation of general plans but there is no satisfactory method to check the adequacy of the system for a proposed land use plan. The pattern of network development also should be redefined and documented to improve rationality and to assure the consistency of planning in different cities by different planners.

Urban Facilities Planning

DTCP now appears to be pursuing a realistic approach to urban facilities planning, though, occasionally, ad hoc or arbitrary decisions are made. The formulation of improvement plans for urban facilities is often dependent upon requests from local governments. Also, the end products of planning activities rely considerably on the preparedness of the agencies responsible for the implementation of urban utility projects.

Usually, land use plans are proposed so that the area covered by the plan can be provided with urban utility services. In general, urban planning is understood as the physical planning of urban facilities. However, such planning should carefully evaluate the demand (or the "need") for such facilities in light of financial constraints.

It would also be helpful to simplify or streamline the voluminous documentation required for the formulation of urban facilities plans. Urban facilities planning has not been a main focus of DTCP, and there are several problems in the current system of urban facilities planning, as detailed below.

- There is no institutional framework as there is for land use planning or transport planning.
- Planning functions including data collection are divided into separate divisions, including the Research and Analysis Division, the Comprehensive Planning Division, and the Engineering Division, thus leading to unsystematic and inefficient planning of urban facilities.
- The database for urban facilities planning includes unreliable information made available by local governments.
- There is a shortage of experienced urban facilities planners.

3.3 Overall Assessment

The results of the sectoral investigations reported above reveal the necessity for all divisions to adopt standardized procedures and a quantitative approach. The assessment of planning activities as a whole also gave rise to the following concerns.

Problems Identified in the Review of Technical Reports

The review of technical reports that were prepared as background materials for general plans was carried out for selected cities that were seen as representative of a variety of different types of cities in Thailand. The review identified the following problem areas.

- Strategic urban development policies specific to the characteristics of each city are not clearly presented.
- The analysis of existing conditions covers many items including natural conditions and industries but these analyses are not clearly related to the final recommendations of the general plans.
- Quantitative land use and travel demand forecasts are not made to the extent desirable.
- The levels of accuracy in data handling vary greatly in the different phases of planning activities.

Implications of Subdivided Planning Tasks

DTCP is divided into subdivisions based on technical function, such as mapping, research and analysis, engineering, and planning. This system is believed to contribute to the efficient production of general plans. However, problems exist in communications between the subdivisions. For example, the data and the results of the analysis performed by the Research and Analysis Division are not always fully utilized in the divisions responsible for planning, i.e., the Comprehensive Planning Division and the Engineering Division. Also, the information provided by the Research and Analysis Division is sometimes insufficient for comprehensive city planning. For example, only total employment was furnished to the land use planning group, while employment by industry is also required.

Since analysis and plan formulation activities are closely connected, coordination between those engaged in these activities is of crucial importance. In Japan, analysis and planning are usually carried out by a single city planner/analyst, thereby enabling him to internalize the entire planning process, including data collection, analysis, and plan formulation. Of course, the planner is sometimes assisted by a systems engineer for computerized data processing. However, it is clear that an analyst should not only be a data provider; rather, he must work together with the planner. To achieve such close coordination, personnel exchange between divisions may be useful.

Resource Constraints

DTCP prepares more than 20 general plans every year. These voluminous documents must be completed within severe time, manpower, and equipment constraints. In this environment, sufficient coordination among divisions is hard to realize and misunderstandings as well as duplication of planning efforts are likely to occur.

Taking the above conditions into consideration, it can be concluded that the present technical level of DTCP is not necessarily a reflection of a lack of human resources. Rather, it reflects shortages of non-human resources and a lack of practical knowledge of advanced planning techniques.

Lack of Practical Knowledge of Planning Techniques

It is obvious that DTCP staff are aware of comparatively advanced city planning techniques. However, they are hindered by time constraints as mentioned above. Indeed, the application of these techniques is time-consuming at the orientation stage. To address this problem, technical transfer through case studies and the development of standardized methods (possibly by simplifying time-consuming advanced techniques) was recommended.