

2. タイ工業用水技術研究所フェーズ2 PDM (案)

タイ工業用水技術研究所フェーズ2 プロジェクト デザイン マトリックス (案)

プロジェクトの要約	指標	指標データ入手手段	外部条件
(上位目標) タイ産業界がより効率的な用水利用及び効率的な排水処理・再利用を行える。	1. 工場内での水再利用率が向上する。 2. 工業用排水処理状況が改善される。	1. 技術指導の記録 2. 工場へのインタビュー	a. タイ政府が工業用排水に関する政策を継続する。 b. 経済状況に著しい変化が起こらない。
(プロジェクト目標) IWTI がタイ産業界に継続的に工業用水供給、水使用合理化、排水処理・再利用に関する技術指導を行える。	1. IWTI による技術指導のユーザーが増加する。 2. 技術指導提供を受けた人の満足度が向上する。	1. 技術指導の記録 2. サービス利用者へのインタビュー	a. タイ政府が工業用排水に関する政策を継続する。 b. タイ産業界が必要な設備・機器に投資する。
(成果)			
0. IWTI の組織が強化され、効率的に運営される。	0-1. 十分な数のスタッフが配置される。 0-2. 十分な予算が確保される 0-3. 計画能力が向上する。	0-1. スタッフリスト 0-2. 会計記録 0-3. 活動計画及び中長期計画の見直し	a. タイ産業が IWTI の役割を認め、支持する。 b. C/PがIWTI継続的に勤務し、経験を蓄積する。
1. タイ産業界への技術指導のための機材が備えられ、適切に使用される。	1-1. 十分な機材が調達される。 1-2. 機材が適切な状態に保たれる。 1-3. 機材が効果的に使用される。	1-1. 機材リスト 1-2. メンテナンス記録 1-3. 使用記録	c. DIWがIWTIの活動をサポートする。
2. IWTI により、工業用排水技術に関する研修サービスがタイ産業界に対して提供される。	2-1. C/Pの技術レベルが向上する。 2-2. 十分な教材が準備される。 2-3. 研修受講者数が増加する。 2-4. 研修受講者の満足度が向上する。 2-5. C/Pが独力で研修を取りしきれる。	2-1. 評価シート 2-2. 教材リスト 2-3. 研修受講者数 2-4. 研修受講者への質問 3-1. 評価シート	
3. IWTI により、工業用排水技術に関するコンサルティングサービスがタイ産業界に対して提供される。	3-1. C/Pの技術レベルが向上する。 3-2. 十分な教材が準備される。 3-3. コンサルティングの件数が増加する。 3-4. 対象となった工場の満足度が向上する。 3-5. C/Pが独力でコンサルティングを実施できる。	3-2. 教材リスト 3-3. C/P及び専門家による活動・評価記録 3-4. 工場への質問・インタビュー 4-1. 評価シート	
4. 工業用水、工業排水技術に関する情報提供が IWTI によってタイ産業になされる	4-1. C/Pの技術レベルが向上する。 4-2. 十分な教材が準備される。 4-3. IWTI の保有する情報の数・種類が増加する。 4-4. ユーザーの満足度が向上する。 4-5. C/Pが独力で情報サービスを実施できる。	4-2. 教材リスト 4-3. ユーザーの数 4-4. ユーザーへの質問 4-5. C/P及び専門家による活動・評価記録	

プロジェクトの要約	投 入	外部条件	外部条件
(活動)	タイ側	日本側	
0-1. 計画どおり人員を配置する。 0-2. プロジェクトのオペレーションプランを作成する。 0-3. 予算計画を策定し、適切に執行する。 0-4. 合同調整委員会を運営する。	IWTI の運営に必要な予算措置 プロジェクトマネージャー及び 10 名のフルタイムカウンターパートの配置	長期専門家 (名× 月) ・チーフアドバイザー ・調整員	a. C/PがIWTIに継続的に勤務する。 b. 機材の到着に関し、運送・通関による大幅な遅延が生じない。
1-1. 機材を調達する。 1-2. 使用・維持管理計画を策定する。 1-3. 機材を常時使用し、適切に維持管理する。	事務職員の配置	短期専門家 基礎的計測、分析機器	(前提条件)
2-1. 産業界および他関係機関から、研修サービスに必要な情報を収集する。 2-2. 技術提供のターゲットとするセクター、工場規模を選定する。 2-3. 研修部門のオペレーションプランを作成する。 2-4. 研修部門スタッフへの技術移転計画を作成する。 2-5. 研修部門スタッフへの技術移転カリキュラムを作成する。 2-6. 研修部門スタッフへの技術移転のための参考資料を作成する。 2-7. 講義により研修部門スタッフへの技術移転を行う。 2-8. 工場エンジニア、公害防止管理者・運転者、DIW 検査官用のガイドブック・参考図書を作成する。 2-9. 工場エンジニア、公害防止管理者・運転者、DIW 検査官を対象とするセミナー及び研修コースを実施する。 2-10. 研修部門スタッフの技術レベルを把握する。	建物・施設 機器・材料	C/P研修 (名/年) プロジェクト運営費のサポート	a. 少なくとも 8 名のフェーズ 1 C/P が引き続き IWTI に勤務する。 b. 建物、施設、備品が使用可能である。 c. DIW にある関係データ、情報が使用可能である。
3-1. 産業界および他関係機関から、コンサルティングサービスに必要な情報を収集する。 3-2. 技術提供のターゲットとするセクター、工場規模を選定する。 3-3. コンサルティング部門のオペレーションプランを作成する。 3-4. コンサルティング部門スタッフへの技術移転計画を作成する。 3-5. コンサルティング部門スタッフへの技術移転カリキュラムを作成する。 3-6. コンサルティング部門スタッフへの技術移転のための参考資料を作成する。 3-7. 講義によりコンサルティング部門スタッフへの技術移転を行う。 3-8. 工場調査を行う。 3-9. 用排水処理実験のマニュアルを準備する。 3-10. ラボ・ベンチスケール実験機によるオペレーション・エンジニアリング用データの収集およびベンチスケール実験機による処理システムのデモンストラーションのための用排水処理実験を行う。 3-11. 概念設計及び改善提案を作成する。 3-12. 実験・工場調査の結果、及び運転状況・設備の改善提案を以て工場への技術指導を行う。 3-13. コンサルティング部門スタッフの技術レベルを把握する。			
4-1. 産業界および他関係機関から、情報サービスに必要な情報を収集する。 4-2. 対象とする情報を選定する。 4-3. 情報部門のオペレーションプランを作成する。 4-4. 情報部門スタッフへの技術移転計画を作成する。 4-5. 情報部門スタッフへの技術移転カリキュラムを作成する。 4-6. 情報部門スタッフへの技術移転のための三興資料を作成する。 4-7. 講義により情報部門スタッフへの技術移転を行う。 4-8. 情報管理のためのマニュアルを作成する。 4-9. ファイル及びデータベースにより情報を管理する。 4-10. IWTI の年報を発行する。 4-11. ホームページを作成する。			

3. タイ工業用水技術研究所フェーズ2 中長期計画

The Middle and Long Term Plan for IWTI

1. Background

From the Government's policy to industrialize the country, Thailand, in recent years, has been gradually facing the problem of water crisis, both quantitatively and qualitatively. The problem becomes major concern of the country each and every year.

As an agricultural country in nature, most water resources are basically and primarily consumed by agricultures, plantation, as well as domestic or households activities. As a result, water for industrial activities has been mostly limited to depend on water from underground. In consequent social problems such as land subsidence by pumping up of groundwater, together with water pollution caused by industrial effluent discharges are regarded as serious issues, especially in Bangkok and its surroundings, as well as industrial areas throughout the country region.

The Royal Government of Thailand has coped with these difficulties by raising the charges of groundwater pumping-up, tightening industrial and domestic effluent standards and executing other possible countermeasures. However, the solution to the environmental problems caused by industrial activities, where water utilization is ineffective and treating of wastewater is insufficient, remains to be much more improved.

In order to utilize water resources effectively and enhance industrialization of the country in harmony with environment, the Royal Government of Thailand, by the Department of Industrial Works, Ministry of Industry requires an implementing agency to accomplish the task. Eventually, the Industrial Water Technology Institute (IWTI) has been established under the technical cooperation with the Government of Japan, for the purpose that the water crisis will be solved and alleviated effectively and systematically.

2. Overall Goal

IWTI is an organization specialized in industrial water technology whose purpose is to assist industries to solve the industrial water problems, in order to achieve sustainable development of Thai industries.

3. Activities

To achieve the goal, the institute provides the industry with three services. They are (1) Training, (2) Consulting and (3) Information.

4. Functions

4.1 Training Service

Transfer appropriate technology to Thai industries and inspectors, and conduct the qualification certification courses for pollution control supervisors and operators.

- a. Provide factory engineers and inspectors with basic and practical technology of industrial water supply, effective use of water, wastewater treatment and reuse by holding seminars or training courses.
- b. Hold training courses for the qualification certification of water pollution control supervisors and operators.

4.2 Consulting Service

Make proposals and presentations for factories by carrying out experiments and process designs.

- a. Implement factory investigations and data analyses.
- b. Carry out researches and experiments to obtain engineering data for improvement or planning of factory water and wastewater systems.
- c. Make proposals and presentations on the improvement of the existing water and wastewater systems or planning of new ones.

4.3 Information Service

Manage the relevant information .

- a. Collect outside and in-house information.
- b. Make files and database through computers.
- c. Provide information to in-house and outside.
- d. Do think tank business.

5. Relationship with other organizations

IWTI will be in close relationship and cooperation with other several environmental organizations such as

- 5.1 Federation of Thai Industries (FTI)
- 5.2 Thailand Environmental Institute (TEI)
- 5.3 Industrial Estate Authority of Thailand (IEAT)
- 5.4 Thailand Institute of Scientific and Technological Research (TISTR)
- 5.5 Environmental Engineers Association of Thailand (EEAT)
- 5.6 Academic Institutes
- 5.7 Private consulting firms.

The relationship would be mutual cooperation between IWTI and the mentioned organization such as

- Co-conducting of seminar and / or training courses.
- Exchange of speakers.
- Exchange of views and informations in related fields.
- The organizations from 5.1 – 5.5 are requested by DIW to join IWTI's Joint Cordinating Committee (of which one of the major role is to exchange some valuable views suitable for the direction and operation of IWTI)

6. Operation and Management Plan

6.1 General

The middle and long terms are defined herein 5 years and 10 years from 2000, respectively.

2000 – 2004 : Put into actual activities to acquire the relevant technology to strengthen each function through the Phase 2 Project in order to establish technical and managerial self-sustainability in 2005 – 2009.

2005 – 2009 : Manage by the institute itself.

6.2 Operation Plan

6.2.1 Training Section

2000 – 2004 : (1) First step : Planning

- a. Investigation of demand.
- b. Contents of textbooks and guides
- c. Collection of reference books
- d. Detailed plan of activities

(2) Second step : Preparation of training materials

- a. Compilation of textbooks for factory engineers
- b. Compilation of guides
- c. Compilation of reference books and textbooks for pollution control supervisors and operators
- d. Compilation of textbooks for inspectors

(3) Third step : Courses and seminars

- a. Planning courses and seminars
- b. Holding training courses and seminars for factory engineers, pollution control supervisors, operators and inspectors
- c. Holding seminars to introduce relevant technology to industry

(4) Fourth step : Management

- a. Analysis of problems and counter-measures

2005 – 2009

- (1) Holding training courses for factory engineers and inspectors to acquire practical technology periodically.
- (2) Holding training courses for water pollution control supervisors and operators periodically.
- (3) Holding seminars to introduce relevant technology to industry.
- (4) Revision of text books, guides and reference books if necessary.

6.2.2 Consulting Section

2000 – 2004 : (1) First step : Planning

- a. Selection of target factories (sector, size, number, etc.)
- b. Design of testing equipment
- c. Selection of collaborate consulting firms
- d. Detailed plan of activities

(2) Second step : Factory investigation

- a. Procurement of equipment
- b. Investigation of factories
- c. Investigation reports

(3) Third step : Experiment and design

- a. Experiment
- b. Experiment report
- c. Conceptual design

(4) Fourth step : Proposal

- a. Collection of quotation
- b. Proposal and presentation

(5) Fifth step : Management

- a. Preparation of self sustainability
- b. Managing of technical data.

2005 – 2009 : (1) Consultation on the relevant technology for factories by themselves.

(2) Managing technical data.

6.2.3 Information Service

2000 – 2004 : (1) First step : Planning

- a. Investigation of relevant information
- b. Detailed plan of activities

- (2) Second step : Equipment
 - a. Selection of equipment
 - b. Procurement of equipment
- (3) Third step : Information management
 - a. Collection of information
 - b. Processing of information
 - c. Preparation of homepage
- (4) Fourth step : Provision of information
 - a. PR activities to outside
 - b. Provision of information to in-house
 - c. Think tank business
- (5) Fifth step : Management
 - a. Preparation of self-sustainability

2005 – 2009 : (1) Managing and providing information

4. タイ工業用水技術研究所フェーズ2 詳細計画

Detailed Plan of IWTI's Phase II

Background

After Phase I Project (June 1, 1998 – May 31, 2000) which will terminate in mid 2000, it would be realized that to strengthen the ability of IWTI, Phase II Project must be continued immediately. Since the overall goal of Phase I is only to foster engineers with basic technology relating to industrial water, thus, the overall goal of Phase II, which is designated for 5 years duration, start from June 1, 2000 to May 31, 2005, is to put into actual activities to acquire the relevant technology to strengthen each function of IWTI and achieve the sustainable development of the institute.

DIW's Policy

According to DIW's policy, one of the most important is to enhance the competitiveness of Thai industries, as well as to keep the environment in harmony. Water resources and water pollution is the most critical problems concerned for industrial activities, hence, IWTI was established under DIW's administration and is expected to be an implement agency with sufficient capability to back up DIW's policy and mission.

IWTI's Phase II Activities

Regarding to the aforementioned policy, Phase II targets are designated as :

1. To put the institute into actual activities to acquire the relevant technology.
2. To strengthen each function of IWTI and achieve the objective that the institute would be developed sustainably.

To achieve these targets, the Phase II Activities (which are correspondent to the middle – term plan of IWTI) are planned as the followings :

Projects	Targets	Responsible Function	Supporting Function	Outputs
1. Development for appropriate techniques of resin regeneration in water softener	Factories equipped with water softeners	Consulting Service	Information Service	Reduce amount of water and salt usage in regeneration process. (At least 1000 Tons/Day Is expected)
2. Study of water usage and trouble shooting of wastewater treatment system for rubber industries	Rubber industries	Consulting Service	Information Service	Report and guidebook of effective use of water and upgrading of wastewater treatment system for rubber industries.
3. Water Saving Manuals for some specific industries	- Textile - Food - Pulp and Paper	Consulting Service	Information Service	Manual for saving of water consumption for some major industries.
4. Water Saving Practice for individual factory	Factories facing problem of prohibition of groundwater pumping	Consulting Service	Information Service	Practical solution to reduce water usage for factories in specific area where land subsidence is severe and pumping up of groundwater is prohibited.
5. Training course for quality control of boiler water	Factories equipped with boilers	Training Service	- Information Service - Consulting Service	Factory engineers will be well educated and trained in quality control and treatment of boiler water.

Projects	Targets	Responsible Function	Supporting Function	Outputs
6. Operation Manual for wastewater treatment system	Factories with WWT system	- Information Service	Consulting Service	Practical Manual for factory engineers, pollution control supervisors and operators.
7. Guidebook / Training Course for WWT system inspectors	DIW's inspectors	- Information Service - Training Service	Consulting Service	- Reference and guidebook for DIW's inspectors - Training for DIW's inspectors
8. Proposal and presentation on the improvement of existing wastewater treatment system	Factories facing problem of discharging over - standard effluent	Consulting Service	Information Service	Assistance and services from government provided to private sector to solve problems properly.

Role of JICA's assistance

Due to economical crisis the country has been facing in recent years , as well as the total annual budget for government activities is unreasonably increasing , the country can no longer bear such expenses , Thailand's policy now is to freeze any tendency to expand or create new agencies unless whose missions and operations proved to be beneficial to the country. IWTI , as a new agency to implement the industrial water problem , has to receive supports from other financial and technical resources. As a result , JICA's assistance is strongly requested to accomplish the 5 – years Phase II activities plan. After the termination of the Phase II in the year 2005 , the institute should be firmly developed and proved to be beneficial to industrial sector , which will onwards be direct customers of the institute.

JICA 's cooperation would be comprised of technical assistance , as well as procurement of equipments and financial assistance , described in table below.

Project No.	Technical Assistance	Financial Assistance	Equipment	Remark
1 ***	one short-term experts in softener / demin. system	- procurement of sesin and chemicals - samples analysis	- one lab+scale. plant - one pilot scale plant	5 @ 250,000 B/yr.
2 ***	one short-term expert in WWT (for rubber industries)	- daily allowance for factory practice in remote areas - samples analysis	To be determined when necessity arises	5 @ 500,000 B/yr.
3 and 4 **	one long-term expert in water saving practice.	- daily allowance for factory practice is remote areas - sample analysis		5@ 300,000 B/yr.

Project No.	Technical Assistance	Financial Assistance	Equipment	Remark
5 ***	one long-term expert in boiler water treatment and quality control	Expenses for holding seminars and training courses	-	5 @ 250,000 B/yr.
6 *		-	-	
7 ***	one long-term expert in WWT	Expenses for holding seminars and training courses		5 @ 300,000 B/yr.
8 **		- daily allowance for factory practice in remote areas - samples analysis		5 @ 300,000 B/yr.

Note : *** = Project with 1 st. priority
** = Project with 2 nd. priority
* = Project with 3 rd. priority

Apart from the aforementioned assistances to be requested , corresponding to each project's activities , the following additions are strongly recommended.

Item	Amount	Purpose
1. Long-term expert (1 yrs.)	1	Technical assistance in Data Base Management System
2. Short-term expert (1-2 months)	1	Technical assistance in chiller system
3. Server System with networking	1	For information service utility and back-up system
4. Personal Computer (Notebook)	10	For each counterpart's activities
5. Color printer (A3 size)	2	For color printings
6. Laser printer (A 3 size)	2	For high quality printings
7. Scanner (A3 size)	2	Scan and store relevant information and materials.
8. Procurement of reference books , subscription fee for international relevant organizations , softwares , internet , homepage , PC upgrade , equipment spareparts ,etc.	Annual budget	Strengthen functions of the institute
9. Digital video camera	1	compact and high quality for recording and presentation
10. Light van	1	Vehicle for institute's routine operation and travelling
11. Chemicals and reagents	Annual budget	For laboratory operation (most of them are special for potable equipments and not available from DIW's central laboratory)

Item	Amount	Purpose
12. Technicians	2	Local employees : - one for field practice - one for laboratory operation and maintenance
13. Project secretary (with fluently English speaking and writing)	1	Local employee for project secretariat
14. Bench scale membrane filter	2	Laboratory experiment
15. BOD meter	1	Sample analysis
16. Attending of international or domestic training / conference / seminar in a country except Japan	To be determined when necessity arises or some events considered to be beneficial to IWTT's activities	acquire relevant technology from worldwide countries
17. Long-term expert (1 yr.)	1	Technical assistance in certification system of pollution control supervisors
18. Others	To be determined when necessity arises	To support and enhance the performances of institute

Counterparts training in Japan

At least 2 counterparts / year are required for training in Japan , approximate 3 weeks duration. The contents and fields of training will be determined year by year.

Measures to be taken by Thai side

1. Allocation of 10 counterparts and 4 administrative staffs .
2. Provision of office space (include private working area for Japanese long-term and short-term experts).
3. Vehicle (upon daily request).
4. Laboratory analysis (upon individual request to DIW's central laboratory).
5. Office supplies and expenses.
6. Maintenance and operating cost for equipments donated to DIW.
7. Travelling budget for factory practice (upon request).

Note : Planning of specific amount of budget is not practically available. It would normally be approved based on actual circumstances according to the above list.