「タイ、メイサイ流域の水資源・農業開発計画」

プロジェクト・ファインディング調査報告書

平成 17 年 3 月

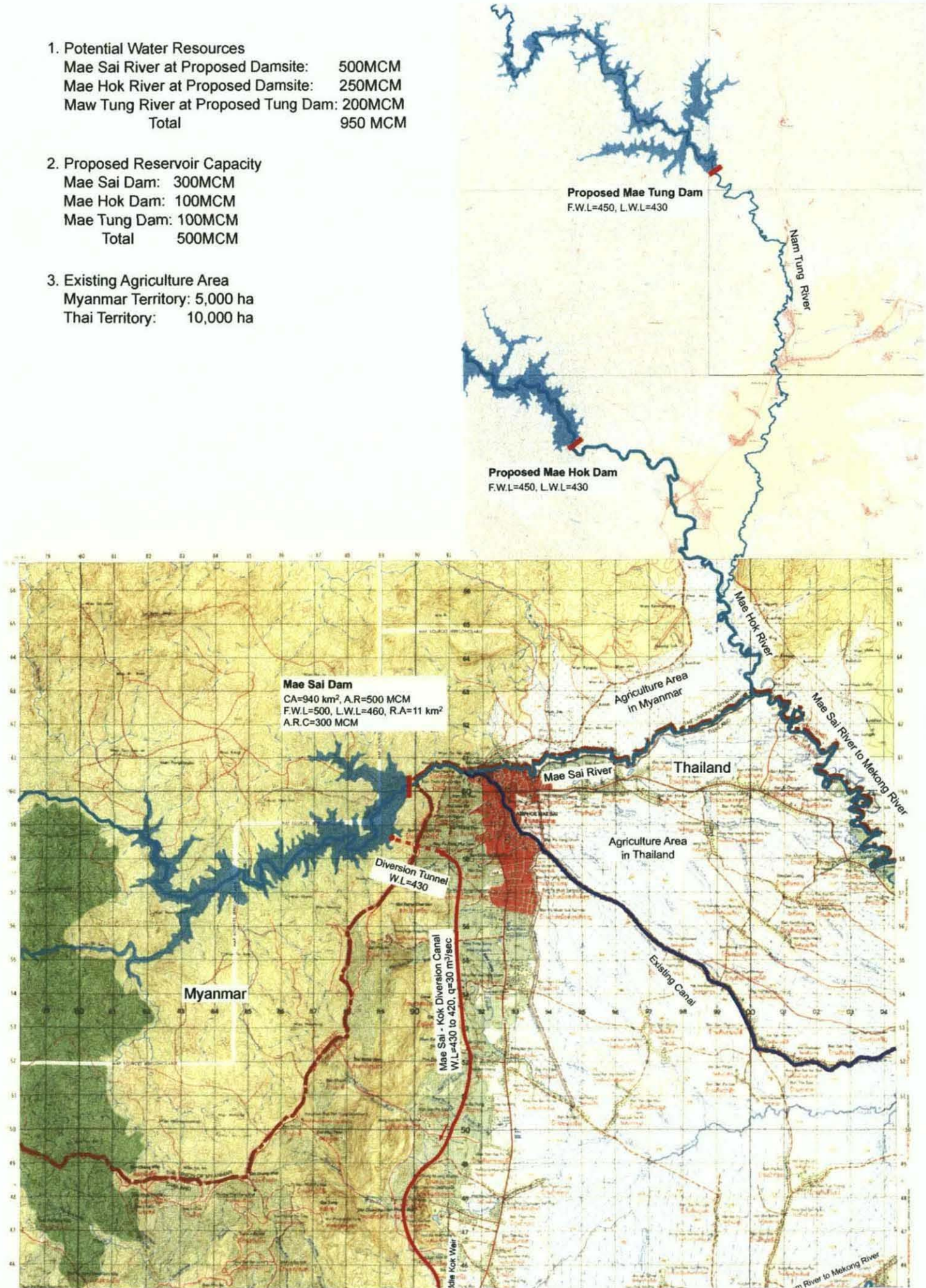
社団法人　海外農業開発コンサルタンツ協会（ADCA）

General Plan of Mae Sai Water Resources Development Project

1. Potential Water Resources
   - Mae Sai River at Proposed Damsite: 500MCM
   - Mae Hok River at Proposed Damsite: 250MCM
   - Maw Tung River at Proposed Tung Dam: 200MCM
   - Total 950 MCM

2. Proposed Reservoir Capacity
   - Mae Sai Dam: 300MCM
   - Mae Hok Dam: 100MCM
   - Mae Tung Dam: 100MCM
   - Total 500MCM

3. Existing Agriculture Area
   - Myanmar Territory: 5,000 ha
   - Thai Territory: 10,000 ha



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1. 調査の背景

(1) タイ、ミャンマー国境地域の水資源農業開発に関する両国の協議

タイ、ミャンマー両国は、国境地域の水資源、農業開発に関する MOU (Memorandum of Understanding) を 2004 年 1 月に締結した。この MOU に基づき、2005 年 3 月初旬、タイ国の天然資源環境省 (Ministry of Natural Resources and Environment, MONRE) とミャンマー国の農業環境省(Ministry of Agriculture and Irrigation, MOAI)及び水資源、農業に関する他の省の代表は具体的な事業推進のための協議をミャンマーの首都 Yangon で行った。協議の結果は以下のとおりである。

- ミャンマー側の事業の対象地域はコク川流域 (Mae Kok) とメイサイ川流域 (Mae Sai) である。
- 調査はまず 2 流域の水資源開発・管理のマスタープランを策定し、優先度の高い事業を発掘すると共にその F/S 調査を実施することである。
- 調査の工期はマスタープランを 2005 年 6 月から 2006 年 1 月 (但し、優先 F/S プロジェクトの選定は 2005 年 9 月末)、また、その F/S 調査は 2006 年 12 月より約 18 ヶ月となっている。
- 上記のマスタープランは、タイがコンサルタントを雇用して実施する予定であるが、ミャンマー MOAI の協力を必要とする。
- タイ側においては、ミャンマーで開発された水資源を利用するコク、イン流域及びチャオプラヤ流域の将来の水需要量及び水不足量を概定し、水配分計画をマスタープランレベルで策定する。また、優先流域を選定し、コク、メイサイ流域よりの導水事業計画を策定する。
- 両国により締結された "Term of Reference Formulation of Master Plan for Water Diversion from Kok Dam under the cooperation on Water Resources between Thailand and Myanmar" は添付のとおり。

(2) ミャンマー側よりメイサイ流域の開発調査についての強い要請

タイ側政府は、今年度の調査予算が限られていることによりミャンマー流域の水資源開発・管理調査はコク流域に限定して行うことをミャンマー政府側に説明したが、ミャンマー政府側の以下の理由による強い要請で、メイサイ流域の調査も実施することを承認した。

- ミャンマーのコク川上流域には山岳少数民族が点在するのみで、コク川の水資源開発によるメリットは殆どない。すなわち、コク川上流に建設する貯水ダムはコク川下流のタイ国の利益のみである。
- 一方、隣接するメイサイ流域の中流にはタチリック市 (Tachileik) が存在し、そこには国境警備隊の司令部やタイとの交易のための大きな市場もあり、この地域はミャンマーの重要な国境都市地域を形成している。また、メイサイ川の下流はメイサイ川の水を利用する農業地帯が展開している。
- メイサイ川は雨期に大きな洪水をもたらすが、乾期の水は少なく、河川沿いの町、農村、農地は洪水と旱魃の被害を受け、住民は貧困より脱却出来ない。しかし、メイサイ川の中、下流河

川はミャンマーとタイの国境を形成しており、ミャンマー単独でこの河川の水資源開発は出来ず、今回のマスタープラン対象地域としてメイサイ流域を絶対に追加する必要がある。

(3) タイ国水資源局よりの要請

タイとミャンマーの会議で決定した調査対象地域はコクとメイサイ流域、そのマスタープランに続くF/S の調査工程は別添 T.O.R の表-1 で示すとおりである。すなわち、調査はタイの資金でコンサルタントを選定し（外国人をアドバイザーとして雇用可能）2006 年 6 月より 2006 年 1 月の工程でマスタープランを作成する一方、コクダムのように優先プロジェクトは 2005 年 11 月より F/S を行うことになっている。F/S 工期は約 1.5 年である。

タイ国水資源局はメイサイ流域の調査内容を全く検討していなかったこと、また調査予算を準備していなかったことより、弊社にメイサイ地域の概要、調査内容と方法、そして予算等について弊社に協力を要請してきた。この要請に応じて、今回 ADCA による調査をタイ国側のメイサイ地域に実施した。また、メイサイ流域の開発による導水の受益地として、北部タイのヨム流域が対象となることより、ヨム流域についても調査を行った。

2. メイサイ流域の水資源・農業開発概要

2.1 水資源開発概要

(1) 河川水系

メイサイ川はタイ、ミャンマーの国境を形成しながら流下し、メコン河に注ぐ河川で、河川中流にはマエホック(Mae Hok)及びマエタング(Mae Tung)の大きな支流が合流している。全流域面積は約 2,500km^2 で上流ポントン(Phontan Site)には貯水ダムが計画されており、その流域面積は約 950km^2 である。

(2) 河川流出量

メイサイ川のポントンダムサイトには流量観測点があり、観測点における平均流量は下表のとおりである。

表 2-1 ポントン観測点の河川流量

CA=950km^2

月 / 流量	1	2	3	4	5	6	7	8	9	10	11	12	計
m^3/sec	8.7	6.9	6.8	6.4	8.7	11.7	18.8	28.8	30.7	22.5	15.4	10.5	14.7
MCM	23.3	16.7	18.2	16.6	23.3	30.3	50.4	77.1	79.6	60.3	39.9	28.1	464

(3) 流出特性

- 雨期、乾期の平均流出量はそれぞれ 3.4 億 m^3 (73%)、1.3 億 m^3 (27%) で、北部タイの河川に比べて乾期の流出量が全流出量の 27%とかなり多い。その理由は流域は殆どが山岳部で占められ、降雨地や河川流量を使用する水田農地が極めて少ないからである。
- メイサイ川の最大洪水量は 150～200m^3/sec で、河川両岸に横たわる農地はこの洪水により洪水被害を受けている。一方、最低渇水量は 2～3m^3/sec と少なく、乾期の灌漑農業面積は極めて少ない。

(4) マエホック、マエタング支流

メイサイ川に合流するマエホック、マエタング支流の流量観測は行われていないが、その流域面積、河川流出量は両流域で約 1,000km^2、4.5 億 m^3 と推定される。

(5) 貯水ダムによる乾期利用可能量の増加

メイサイ川及びマエホック、マエタン支流に貯水ダム計画があり、それぞれの概要は以下のとおりである。（ミャンマー側の Desk Plan）に基づく。

項目	単位	マエサイ (Mae Sai)	マエホック (Mae Hok)	マエタング (Mae Tung)	計
流域面積	km^2	1,000	600	400	2,000
平均流量	MCM	500	250	200	950
満水位	m	490	450	450	-
低水位	m	430	430	430	-
河床標高	m	415	415	420	
有効貯水量	MCM	300	100	100	500
堤高	m	90	40	35	-

(6) メイサイ流域よりのコク川への導水可能量

上記のダムにより開発、利用される水量は以下のように推定されている。

- 総平均流量 9.5 億 m^3 のうち、雨期、乾期の流量はそれぞれ 7.0 億 m^3、2.5 億 m^3 である。
- 総有効貯水量は 5.0 億 m^3 で、この貯水池により開発される雨期、乾期の利用可能量はそれぞれ 4.0 億 m^3、5.0 億 m^3 となる。（雨期流量、特に 8～9 月の洪水量がダムによりコントロールされ、雨期流量は減少し、乾期の利用可能水量が増大する。）
- 乾期の利用可能量のうち、メイサイ流域の灌漑農業に利用される水量は雨期、乾期それぞれ 1.5 億 m^3、計 3.0 億 m^3 で、雨期 2.5 億 m^3、乾期 3.5 億 m^3、計 6 億 m^3 が余剰水となる。この余剰水をコク川の中流に設けられる中流コク大堰へ向けて導水する計画である。

2.2 コク-ピン及びメイサイ-コク-イン-ヨム導水計画

(1) コク-ピン導水計画

- ミャンマーのコク上流に有効貯水量 10 億 m^3 の大型ダムが計画され、現在の雨期流量 16 億 m^3、乾期流量 4 億 m^3、計 20 億 m^3 がコントロールされ、雨期、乾期の利用可能量はそれぞれ 10 億 m^3 に変化する。
- コクダムの下流タイ側では、コクダムの放流量とコクの支流ファン川の流量を調節するための上流コク大型堰が設けられる。ファン川の流入量は雨期 6 億 m^3、乾期 2 億 m^3、計 8 億 m^3 で、上流コク大型堰における全流入量は雨期 16 億 m^3、乾期 12 億 m^3、計 28 億 m^3 となる。

- チェンマイ県を抱える上流ピン川流域は農業開発の発展に伴い、乾期用水が著しく不足し、上記大堰よりの導水を必要としている。またピン川の中流域に建設されたプミポンダムは、有効貯水量 90 億 m^3 をもつ大きなダムであるが、上流ピンの開発による水需要の増加で、貯水流入量は年々減少し、現在は 50 億 m^3/年で、貯水池は常時満水しない。従ってコク川より雨期も導水してプミポンダムの貯水回復を計画している。この目的のために雨期 13 億 m^3、乾期 7 億 m^3、計 20 億 m^3 の水をコクよりピンへ流域変更で導水する計画となっている。

(2) メイサイ-コク導水計画

- 上流コク大堰サイトの流量のうちピン流域へ導水された残りの流量(雨期 3 億 m^3、乾期 5 億 m^3、計 8 億 m^3 は大堰よりコク川下流へ放流され、チェンライ市の上流に設けられる中流コク大堰へ送られる。なお、上流大堰と中流大堰の間の中流コク川からは雨期 4 億 m^3、乾期 1 億 m^3、計 5 億 m^3 の河川流量が、また前述したメイサイ流域や、タイ側のマエカン、マエチャン支流では、貯水ダムで流量がコントロールされ、雨期 6 億 m^3、乾期 5 億 m^3、計 11 億 m^3 が中流コク大堰へ導水される。すなわち、中流コク大堰では雨期 13 億 m^3、乾期 11 億 m^3、計 24 億 m^3 の水が利用可能となる。
- メイサイ、マエカン、マエチャンよりの水を導水するために約 70km の開水路がメイサイダムより中流コク大堰へ向けて計画されている。

(3) コク-イン導水計画

- 上記中流コク大堰の利用可能量 24 億 m^3 は大堰より出発するコク-イン開水路で運ばれ、コク-イン流域の農業地域約 10 万 ha の灌漑に利用される。
- また、灌漑後の余剰水及びイン流域の余剰流量約 15 億 m^3 はイン川の中流大堰によりヨム流域へ導水することになっている。その導水量は雨期 10 億、乾期 5 億 m^3、計 15 億 m^3 と推定されている。

2.3 メイサイ流域の農業開発計画

- メイサイ川はタイ-ミャンマーの国境を形成する河川で、川の左岸ミャンマー側には約 5 千 ha、右岸タイ側には約 1 万 ha の水田農地が展開し、メイサイ川の水を利用して雨期稲作が行われている。しかし、乾期は河川流量が少なく、作物栽培は僅かな灌漑地域で行われているだけである。
- 一方、雨期はメイサイ川の洪水により農地は湛水被害を受けており、地域住民よりは洪水調節を目的としたダム建設の要望が高い。
- ミャンマーの山麓丘陵地では、オレンジを中心とした果樹の栽培も行われているが、一部では未だケシの栽培が行われており、ミャンマー政府はその撲滅に力を注いでいる。そしてこの目

的のため、タイ政府のメイサイ流域の農業開発に対する技術、資金援助を大いに期待している。

2.4 ヨム流域の農業開発計画

メイサイ流域よりの雨期、乾期導水量が増加するため、コク、イン流域の農業受益地では用水が余ることになり、その余剰水はヨム流域へ導水され、ヨムの農業開発に利用される。約 10 万 ha の大規模灌漑農業が可能となろう。

① 調査団構成

樋口　昭一郎	:（株）三祐コンサルタンツ	海外事業本部　相談役（水資源計画）
後藤　道雄	:（株）三祐コンサルタンツ	海外事業本部　取締役（灌漑農業）
Arnan Suwannasihdh	: 同上	バンコク事務所（水資源管理）
Paitoon Palayasoot	: 同上	バンコク事務所（灌漑農業）

② 調査日程

月日	宿泊地	団員	行程
3/14 (月)	ﾊﾞﾝｺｯｸ	樋口	・ 成田→バンコク
3/15 (火)	ﾊﾞﾝｺｯｸ	後藤	・ 成田→バンコク
		樋口、アナン	・ 8:00 助手雇用、資料収集、翻訳業務依頼 ・ 9:00 水資源局新 Deputy DG Mr. C.Samai、水資源部長 Mr. Niwachai と協議。 ・ 10:30 天然資源省、Inspector General Mr. Surachai と協議。 ・ ローカルコンサルタントと協議。 ・ 14:00 NESDB, Director of Water Resources Planning, Mr. Potchana と協議。 ・ 19:30 ミャンマー農業灌漑省、DG Agriculture Planning, Mr. U Thin との協議。
3/16 (水)	ﾊﾞﾝｺｯｸ	樋口・後藤・アナン	・ 8:00 水資源局新 DG Mr. C. Sanong と協議。 ・ 10:00 RID, Mr. Suwit と協議。 ・ 12:00 SEATEC, Vice President Mr. Salin と協議。 ・ 13:30 資料収集、翻訳結果のチェック ・ 18:30 SEATEC コンサルタントと会食、打合せ。
3/17 (木)	ﾊﾞﾝｺｯｸ	樋口・後藤・アナン	・ 9:00 水資源局、RID にて資料収集。 ・ 13:00 北部タイ水資源管理レポート（三祐作成）の内容チェック、30 部印刷発注（水資源局の要請）。 ・ 18:00 Team Consultant Executive Director Mr. Chawalit と会食、打合せ。
3/18 (金)	パレ	樋口・後藤・アナン	・ 6:00 バンコク空港→ランパン空港 ・ 8:00 ランパン空港→パレ県RID,O/M事務所→ヨム川流域調査→パレ市
3/19 (土)	ﾊﾞﾝｺｯｸ	樋口・後藤・アナン	・ 7:00 ヨム流域、スコタイ農業地域調査。 ・ 14:00 ピサノロック空港よりバンコクへ。 ・ 水資源局と協議。依頼資料の入手。
3/20 (日)	ﾊﾞﾝｺｯｸ	樋口・後藤・アナン	・ 休日、収集資料の整理。 ・ 18:00 水資源委員会会長 Dr. Apichart と会食打合せ（樋口のみ）
3/21 (月)	ﾊﾞﾝｺｯｸ	樋口・後藤・アナン	・ 8:00 資料収集、翻訳雇用（3/21～25）打合せ。 ・ 9:30 JBIC 訪問、斎藤氏に現況説明。 ・ 11:00 天然資源省、次官補 Dr. Siripong と協議。 ・ 12:30 RID 国際部長、Mr. Chatchai と協議。 ・ 14:00 資料収集、整理。
	日本	後藤	・ 22:00 バンコク→日本
3/22 (火)	ﾊﾞﾝｺｯｸ	樋口・アナン	・ 8:30 資料収集、翻訳資料のチェック。 ・ 11 :00 水資源局、Chief Eng. Mr. Thanade と協議。 ・ 19 :00 Dr. Siripong との会食、協議。

3/23 (水)	ﾊﾞﾝｺｯｸ	樋口・パイトゥーン	・ アナン氏病気のため、パイトゥーン氏と交代。 ・ パイトゥーン氏と調査内容協議。 ・ 水資源局 DG Mr. Samai, NESDB Mr. Potchana と会食、打合せ。
3/24 (木)	ﾊﾞﾝｺｯｸ	樋口・パイトゥーン	・ メイサイ流域の資料分析。 ・ 三祐タイ、スタッフとの会食、打合せ。 ・ チェンマイ、チェンライ出張準備、助手に追加資料の要請。
3/25 (金)	ﾁｪﾝﾏｲ	樋口・パイトゥーン	・ RID, Region I office 幹部と協議。 ・ Mae Kuang Dam, Mae Faek Weir 等の水管理現況調査。 ・ Region I 関係者と会食、打合せ。
3/26 (土)	ﾁｪﾝﾗｲ	樋口・パイトゥーン	・ ﾁｪﾝﾏｲ→ファング流域調査→コク川調査（ボートにて湾岸侵食調査）→ﾁｪﾝﾏｲ ・ ﾁｪﾝﾗｲ県 RID 職員と会食、打合せ。
3/27 (日)	ﾁｪﾝﾗｲ	樋口・パイトゥーン	・ メイサイ流域調査。 ・ メコン河調査（チェンセン流量観測点）
3/28 (月)	ﾊﾞﾝｺｯｸ	樋口・パイトゥーン	・ 7 :00 コク中流頭首工計画サイト調査。 ・ 10 :30 チェンライ→バンコク。 ・ 14 :00 天然資源省、Dr. Siripong と協議。 ・ 18 :00 水資源局、新 Deputy DG Mr. Virat と会食、打合せ。
3/29 (火)	ﾊﾞﾝｺｯｸ	樋口・パイトゥーン	・ 収集資料のチェック、整理。 ・ RID、Mr. Chachai 他との会食、打合せ。
3/30 (水)	ﾊﾞﾝｺｯｸ	樋口・パイトゥーン	・ 収集資料のチェック、整理。 ・ ケンバー社（地質）カシット社長との会食、打合せ。 ・ 水資源局、RID へ帰国の挨拶。
3/31 (木)	日本	樋口	・ BKK より日本へ帰国。

③ 収集資料

番号	項目	内容	購入/コピー
1	地形図	ヨム川流域、Upper Yom Damsite	コピー
2	〃	ヨム川流域、Yom-Sirikit 導水ルート	〃
3	〃	ヨム川流域、Lower Yom Damsite	〃
4		1/10,000　メイサイ川流域、ミャンマー側メイサイ	〃
5	〃	1/50,000　メイサイ川流域、タイ側メイサイ	〃
6	〃	1/10,000　メイサイ川流域、Mae Hok	〃
7	レポート	北部タイ水資源管理計画レポート	〃
8	統計資料	ﾁｪﾝﾗｲ、ﾁｪﾝﾏｲ、ﾊﾟﾔｵ 3 県の資料	デジタル
9	〃	メイサイ流域の農業、社会経済資料	コピー
10	観測資料	メイサイ川の水文資料	〃
11	〃	Mae Kuang ダム、Mae Faek 堰等の水管理	〃
12	県の分析資料	ヨム川流域の小・中規模ダム群の分析	デジタル
13	〃	ピン川流域の水文、水収支解析	コピー
14	〃	コク川の水文、水収支解析	〃
15	〃	コク、ラオ、イン川の灌漑農業面積	〃
16	〃	上記の水利用現況	〃

④ 面談者リスト

Thailand

• National Economic & Social Development Board (NESDB)

Director of Natural Resources Planning;	Ms. Potchana

• National Water Resources Committee

Chairman (Managing Director of A&R Consultant);	Dr. Apichart

• Department of Water Resources (DWR)

Director General;	Mr. Sanong
Deputy Director General;	Mr. Samai
(New) Deputy Director General;	Mr. Virat
Chief Engineer;	Mr. Thanade
Director;	Mr. Niwatchai

• Ministry of Natural Resources and Environment (MONRE)

Deputy Permanent Secretary;	Mr. Siripong
Inspector General;	Mr. Surachai

• Royal Irrigation Department (RID)

Acting Director of Foreign Finance Project Administration Div.;	Mr. Chatchai
Professional Engineer for planning;	Mr. Suwit

• RID Region I (Chaing Mai)

Director;	Mr. Saengratana
Chief of O&M;	Mr. Larm
Chief of Northern Hydropower Center;	Mr. Tada

• RID Office in Chiang Mai

Chief;	Mr. Prapon

• RID Office in Chiang Rai

Chief;	Mr. Supon
O&M Section (In charge of Mae Sai);	Mr. Chomyouth
O&M Section;	Mr. Ronachai

• Kenbar Geotechnic Co. Ltd.

Managing Director;	Mr. Kasit

• SEATEC

Vice President;	Mr. Salin Pinkayan

• TEAM Consultant

Executive Director;	Mr. Chawalit Chantararat

• Chiang Mai University
Institute for Science & Technology Research & Development

Assistant Director;	Dr. Thanaporn

• JBIC
Mr. Saito

Myanmar

• Ministry of Agriculture and Irrigation (MOAI)

Director General (Department of Agricultural Planning);	Mr. U Thin

天然資源環境省　水資源局長
Mr. Sanong Chantaintorn
と打合せ

2005 年 3 月 16 日

王室灌漑局　水資源・灌漑計画
専門官　Mr. Suwit
Thanopanuwat　と打合せ
2005 年 3 月 16 日

天然資源環境省次官
Dr. Siripong Hungspreug
と打合せ
2005 年 3 月 21 日

Phre Provincial RID 事務所

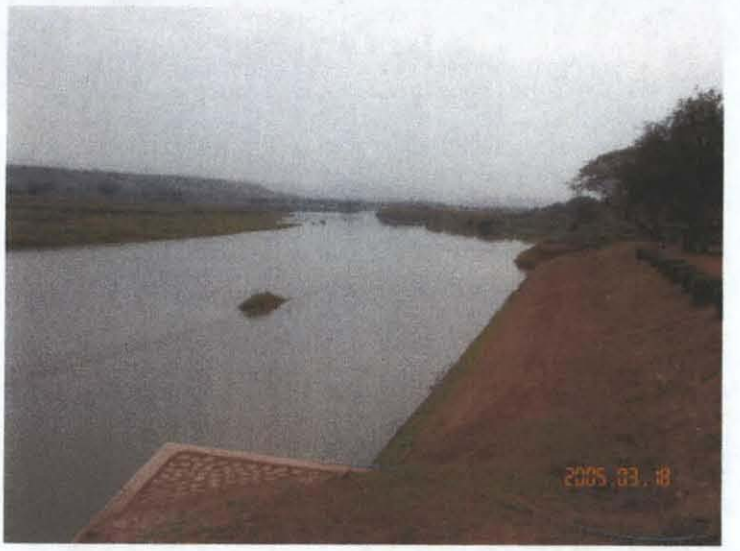
Yom 流域の水資源開発事業をまとめている RID のプランナーと協議。

Yom 流域で計画される小・中規模ダム群。

Phre Provincial RID 事務所での聞き取り調査

当県管轄の灌漑面積は　雨季：24,000Rai、乾季：2,400Rai で乾季の灌漑面積は雨季の 10％に過ぎない。洪水、干ばつが最大の問題　　2005 年 3 月 18 日

ヨム川に建設されたラバーダム。　乾季、干ばつにより上流には水は少ない。



同上
堰より上流を望む。

Sirikit Dam への導水トンネル建設計画における取水口候補予定地付近の現況

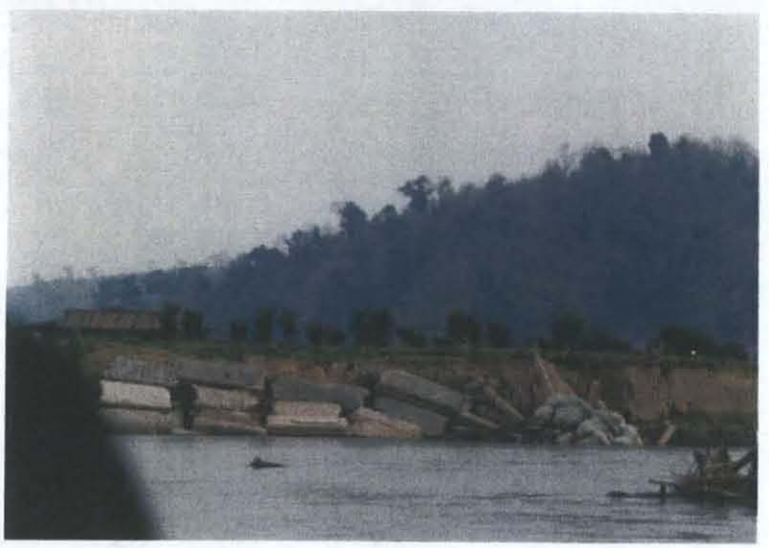
Soya Been が作付け中

2005 年 3 月 18 日

ヨム川の流況
Amphoe
Yom Wang Chi

同上下流を望む
堰建設計画予定地
Amphoe
Yom Wang Chi

同上、上流を望む。最近設置
された量水計
2005 年 3 月 19 日



洪水により破壊されたコク川中流左岸
(メイサイ川よりの導水路はコク中流大堰に連結するのでコク中流左岸は洪水防御のための護岸工事を1.0～1.5kmにわたってする必要があろう)

コク川中流域の護岸工事
(Temporary)

コク川中流域の果樹園

メイサイ流域灌漑農業地域

メイサイ流域灌漑農業地域

メイサイ流域灌漑水路

メイサイ川の雨期洪水状況
左岸がタイ、右岸がミャンマー
（チェンライ県RID Officeより提供）
この上流5kmの地点(ミャンマー領域)に
ダムの計画中。

2005年3月初旬にタイとミャンマーで締結した
コク川、メイサイ川の水資源開発マスタープランに関する
Term of Reference

Terms of Reference

for

Biennial Technical Cooperation

(April 2005 – March 2007)

March 2005

The Ministry of Agriculture and Irrigation
The Union of Myanmar
and
The Ministry of Natural Resources and Environment
The Kingdom of Thailand

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1. Background

The ministry of Agriculture and Irrigation of the Union of Myanmar and the Ministry of Natural Resources and Environment of the Kingdom of Thailand, hereinafter, it is referred to as "the Parties", have signed Memorandum of Understanding in Chiang Rai on the first day of November 2004 by His Excellencies, Major General Htay Oo, the Minister of Agriculture and Irrigation of the Union of Myanmar and Mr. Suwit Khunkitti, the Minister of Natural Resources and Environment of the Kingdom of Thailand.

The said Memorandum of Understanding was the result of mutual discussion between the Parties and it aimed to deal with technical cooperation, technical exchange and technical assistance between the two Parties on the basis of friendship and good neighborliness. Prior to the said event of signing of Memorandum of Understanding, the both Parties also carried out preparatory and supporting discussion by Senior Official Meeting in Chiang Rai on the 31st day of October 2004, in order to establish a mechanism for driving the mutually agreed guide-line into action as soon as possible and also to promote stronger cooperation.

After following the said series of event of Senior Official Meeting and signing Memorandum of Understanding, both Parties have mutually contacted each other to exchange their views through the facsimile and e-mail dialogues. Finally, the both Parties have established Joint Steering Committee for cooperation of the water resources development and management together with two task force groups, one is Joint Technical Working Committee on Technical Cooperation, and the other is Joint Technical Working Committee on Human Resources Development.

Both Joint Steering Committees have agreed their principle work-plan and activities during coming couple of years and summarized them as Terms of Reference herein in order to boost and accelerate mutual cooperation between both Parties especially in the field of water resource development and management.

2. Definition

In interpreting or construing the Terms of Reference, the following expressions shall have the meanings hereby assigned to them except where the context otherwise requires.

2.1 Memorandum of Understanding (MOU)

In all activities, which will be executed and performed by the both Parties, the priority shall be given to Memorandum of Understanding, hereinafter it is abbreviated to "MOU". If any discrepancy is found among signed documents and/or unsigned document by both Parties, priority shall be given in the following order of precedence.

A. MOU
B. Minutes of Discussion
C. Terms of Reference
D. Minutes of Meeting

2.2 Minutes of Discussion (MOD)

Minutes of Discussion, hereinafter it is abbreviated to "MOD", was aimed and prepared as a supporting official document of the said MOU, and that MOD was agreed by Senior Official Meeting by both Parties prior to MOU signing, and signed by U Ohn Myint, His Excellency

Deputy Minister of Agriculture and Irrigation of the Union of Myanmar, and Mr. Siripong Hungspreug, Deputy Permanent Secretary of Ministry of Natural Resources and Environment of the Kingdom of Thailand on the 31st day of October 2004.

2.3 Terms of Reference (TOR)

Terms of Reference, hereinafter it is abbreviated to "TOR", means this document herein and it is prepared for biennial workplan on technical cooperation for both Parties in order to indicate and guide their activities during two years in the period from April 2005 to March 2007. The TOR shall come into force after JSC meeting, and if it is necessary, be able to be amended and modified by Joint Steering Committee.

2.4 Minutes of Meeting (MOM)

Minutes of Meeting, hereinafter it is abbreviated to "MOM", shall be prepared and described outcomes of Joint Steering Committee meeting and be signed by authorized representatives of both Joint Steering Committees from the both Parties. All names of attendance of Joint Steering Committee meeting, Joint Technical Working Committee on Technical Cooperation meeting, and Joint Technical Working Committee on Human Resources Development meeting shall be recorded and attached to the said MOM.

2.5 Joint Steering Committee (JSC)

Joint Steering Committee, hereinafter it is abbreviated to "JSC", is the highest level organization of the Parties under the MOU, and its tasks, roles and responsibilities are mentioned as follows;

A. to convene JSC meeting at least twice a year
B. to approve the TOR for required activities following through MOU and MOD, and amend and/or modify TOR if it is necessary
C. to exchange required data and information between the Parties through Contact Persons
D. to identify study(s), study area(s), project(s) according to recommendation by Joint Technical Working Committee on Technical Cooperation
E. to approve all possible Studies including Master Plan, Feasibility and Final Design Studies
F. to formulate study tour and trainings according to recommendation of Joint Technical Working Committee on Technical Cooperation and Human Resources Development
G. to put up required information and recommendation to each Government from time to time

In order to aim to be smooth performance of JSC, co-chair system shall be adopted and JSC shall be chaired by the Director General of the Irrigation Department of the Ministry of Agriculture and Irrigation of Union of Myanmar and the Deputy Permanent Secretary of the Ministry of Natural Resources and Environment of the Kingdom of Thailand. JSC shall follow MOU and MOD in compliance with existing laws and regulations of the Union of Myanmar and the Kingdom of Thailand as well.

Member list of JSC is attached to the TOR in Appendix I for Myanmar side and Appendix II for Thai side, those members are approved by cabinet of respective Government.

2.6 Contact Persons

Respective Parties shall have each Contact Person; the Director General of the Irrigation Department of the Ministry of Agriculture and Irrigation is the Contact Parson of Myanmar side, and the Director General of the Department of Water Resources of the Ministry of Natural Resources and Environment is the Contact Person of Thai side. The duties and responsibilities of respective Contact Persons are mentioned as follows;

A. the only persons, who can send and receive necessary and/or required information and data between Parties officially
B. to deliver data and information to the members of each committee
C. to appoint an appropriate person, who will send official information and data to other Party during his absence and/or journey subject to inform other Party in advance

2.7 Joint Technical Working Committee on Technical Cooperation (JTWCTC)

Joint Technical Working Committee on Technical Cooperation, hereinafter it is abbreviated to "JTWCTC", is a task force under JSC in the field of irrigation, drainage, water resources and basin development and management. The duties and responsibilities of JTWCTC are described as follows;

A. to collect necessary data and information, and to update them
B. to inform necessary and required technical data and information to JSC under mutual understanding of both Parties
C. to supervise the consultants to be contracted to conduct the studies.
D. to examine all possible studies including Master Plan, Feasibility and Final Design Studies
E. to receive necessary guidance from JSC and follow it
F. to put up technical recommendation to JSC
G. to coordinate and to implement the technical cooperation works according to the discussions and decision of the JSC
H. to establish a working group, assigned with 2-3 staffs from each side chosen from JTWC, which is to solve the problem of field work and study work and to put up to JSC if required.

JTWCTC shall adopt co-chair system, the chairman of Myanmar side is the Deputy Director General of the Irrigation Department of the Ministry of Agriculture and Irrigation, and the chairman of Thai side is the Deputy Director General of the Department of Water Resources. The member list of JTWCTC is attached the TOR in Appendix III for Myanmar side, Appendix IV for Thai side.

2.8 Joint Technical Working Committee on Human Resources Development (JTWCHRD)

Joint Technical Working Committee on Human Resources Development, hereinafter it is abbreviated to "JTWCHRD", is also a task force under JSC in the field of institutional development, capacity building, and knowledge development and enhancement. The duties and responsibilities of JTWCHRD are described as follows;

A. to pick up all possible activities on human resources development field for sustainable and mutual cooperation between the Parties.
B. to inform necessary and required data and information to JSC on human resources development field

C. to plan and arrange all appropriate activities such as trainings, seminars, study tours and scholarships on human resources, water resources and irrigated agriculture.
D. to receive necessary guidance from JSC and follow them
E. to put up recommended activities of human resources development field to JSC

JTWCHRD shall adopt co-chair system, the chairman of Myanmar side is the Deputy Director General of the Department of Agriculture Planning of the Ministry of Agriculture and Irrigation, and the chairman of Thai side is the Deputy Director General of Department of Water Resources. The member list of JTWCHRD is attached the TOR in Appendix V for Myanmar side, Appendix VI for Thai side.

3. Scope of Activity

The both Parties have agreed their activities to be carried out and executed during the period from April 2005 to March 2007 under the TOR shall consist of the following components;

3.1 Technical Exchange

Both Parties shall exchange each other such as experts, researchers and study teams, and also exchange technical information and data, which are in the field of irrigation, drainage, water resources management and development, and basin development as well. Exchanging can be done at levels of JSC and JTWCs.

3.2 Study visits and trainings

Study visits and trainings from Myanmar to Thailand in the following areas :
(1) Training courses for Myanmar staff in irrigation and drainage works especially land reclamations at Chao Phraya Delta area and pump irrigation and water management system at northern Thailand.
(2) Study programme for familiarization in operating and maintenance of farm equipments and irrigation facilities.
(3) Training in establishment of medium and small scale hydro-power station combined with irrigation system.

Study visits and training from Thailand to Myanmar for the purpose of:
(1) Symposiums, Exhibitions and Seminar / Workshop on irrigation facilities.
(2) Study teams to exchange experience in irrigation. and river basins.

3.3 Mutually Beneficial Cooperation Programme for Sustainable Water Resources Projects
Both Parties have agreed to perform master plan and feasibility study on:
(1) Available water resources in target areas in Nam Kok river basin and Mae Sai river basin of both countries specified in Appendix VII including hydropower generation, and identification of water resources development project(s).
(2) Site visit to the identified project(s)' sites.
(3) Investigation works in the field of Hydrology, Geology, Topographic survey and environmental and social adverse effects which could result with project implementation.
(4) Formulation of water resources development project(s) and preparation for implementation works.
(5) Formulation of contract farming and seed farm development.

3.4 Study Report Preparation and Approval

The Party of Thai side may initiate to carry out several kinds of studies and their reports in order to materialize the technical cooperation between two Parties, and the Party of Myanmar side shall collaborate to the said Thai side activity in terms of communication and data collection, some necessary facilities, arrangement for security at border crossing and inside Myanmar, provision of counterparts and other official procedures.

JSC shall examine and approve the said reports during JSC meeting, which is pre-examined and recommended by JTWCTC and/or JTWCHRD as the occasion may demand. Appendix VII of this Terms of Reference shows overall workplan including study period, and Appendix VIII of this TOR shows the list of the studies.

4. Exchange of Delegation

(1) The sending Party will bear the cost of international airfare and the receiving party will provide local hospitality for persons deputed under the TOR. Activities pursuant to this TOR are subject to the availability of resources and to the respective laws and regulations of the two countries.
(2) For accomplishing exchange of visit the sending Party shall inform the receiving party at least 60 days in advance of the proposed visit. The receiving Party shall inform the sending party not later than 30 days, after receipt of the notice of the visit, its decision on the acceptance of the nominee.

5. Venue of Meeting and Overall Workplan

The venue of 1st meeting of JSC, JTWCTC, and JTWCHRD shall be held in Yangon, Union of Myanmar, and the venue of 2nd meeting of each committee shall be held in some appropriate place in the Kingdom of Thailand. Thereafter, the both Parties shall select host country by alternative basis.

The schedule of the said meetings shall be discussed and approved by both Parties with mutual consent, and overall workplan including the said meeting is attached in Appendix VII in this TOR.

6. Amendment and Modification

Both parties may by mutual consent add to, amend, modify and/or delete any provision of this TOR by a written document signed by the both Parties.

7. Language and Measurement System

All correspondence between the two parties including notices, information and data shall be written in English. All specifications, drawings and reports and other documents shall also be prepared in English. All documents made under this TOR shall adopt the gravitational system of unit, and days shall be Gregorian calendar days.

8. Notice

All notices pertaining to this TOR shall be sent in written form of airmail, facsimile, e-mail and/or be handed to the addresses of Contact Person so stated herein. Such notices shall take effect from the date of receipt by the other Party. In case either Party hereto changes the

address, phone number and/or others stated herein, the Party concerned shall give such notice to the other Party beforehand.

Contact Person of Myanmar side

Name	: The Director General Irrigation Department, Ministry of Agriculture and Irrigation
Address	: Thitsar Road, Yankin Township, Yangon, Myanmar
Telephone	: (+95) – 1 – 578105
Facsimile	: (+95) – 1 – 578785
E-mail	: dg-irr@myanmar.com.mm

Contact Person of Thai side

Name	: The Director General Department of Water Resource, Ministry of Natural Resources and Environment
Address	: 49 Rama VI Road Soi 30, Phayathai, Bangkok 10400
Telephone	: (+66)-2-2985667
Facsimile	: (+66)-2-2985667
E-mail	: sukontha_a@monre.go.th

Appendices

Appendix I; Member List of JSC (Myanmar Side) 1
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Appendices

Appendix I
Member List of JSC (Myanmar Side)

(1) Director General, Irrigation Department Ministry of Agriculture and Irrigation	Chairman
(2) Deputy Director General, Water Resources Utilization Department Ministry of Agriculture and Irrigation	Member
(3) Deputy Director General, Foreign Economic Relation Department Ministry of National Planning and Economic Development	Member
(4) Deputy Director General, Energy Planning Department Ministry of Energy	Member
(5) Deputy Director General, Office of the Attorney General	Member
(6) Deputy Director General International Organization and Economic Department Ministry of Foreign Affairs	Member
(7) Deputy Director General, Forest Department Ministry of Forestry	Member
(8) Deputy Director General, Department of Electrical Power Ministry of Electrical Power	Member
(9) Deputy Director General, Survey Department Ministry of Agriculture and Irrigation	Member
(10) Deputy Director General, Irrigation Department Ministry of Agriculture and Irrigation	Member
(11) Deputy Director General, Department of Agricultural Planning Ministry of Agriculture and Irrigation	Member
(12) Representative, National Commission on Environmental Affairs	Member
(13) Advisor for Irrigation Sector Ministry of Agriculture and Irrigation	Member
(14) Director. Hydrology Branch, Irrigation Department Ministry of Agriculture and Irrigation	Member
(15) Director . Planning and Works Branch, Irrigation Department Ministry of Agriculture and Irrigation	Secretary

Appendix II
Member List of JSC (Thai Side)

(1)	Deputy Permanent Secretary of the Ministry of Natural Resources and Environment	Chairman
(2)	Director General of Department of Water Resources	Vice Chairman
(3)	Representative from the National Economic, Social and Development Board	Committee
(4)	Representative from the Ministry of Interior	Committee
(5)	Representative from the Ministry of Energy	Committee
(6)	Director General of the Royal Irrigation Department or representative	Committee
(7)	Director General of the Department of Treaties and Legal Affairs Or representative	Committee
(8)	Director General of the East Asian Affairs or representative	Committee
(9)	Director General of the Department of Groundwater Resources or representative	Committee
(10)	Director General of the National Park, Wildlife and Plant conservation Department or representative	Committee
(11)	Secretary General of the Office of Natural Resources and Environmental Policy and Planning or representative	Committee
(12)	Governor of the electricity Generating Authority of Thailand or representative	Committee
(13)	Director General of Agricultural Extension Department or representative	
(14)	Director of Water Resources Development Bureau	Committee
(15)	Director of Water Resources Policy and Planning Bureau	Committee
(16)	Director of International Cooperation Bureau	Committee
(17)	Representative from the International Cooperation Bureau	Committee and Secretary
(18)	Representative from the Office of International Cooperation on Natural Resources and Environment	Committee and Assistant Secretary

1. Appendix III

Member List of JTWCTC (Myanmar Side)

(1)	Deputy Director General, Irrigation Department Ministry of Agriculture and Irrigation	Chairman
(2)	Advisor for Irrigation Sector Ministry of Agriculture and Irrigation	Member
(3)	Director, Design Branch, Irrigation Department Ministry of Agriculture and Irrigation	Member
(4)	Director, Geology Branch, Irrigation Department Ministry of Agriculture and Irrigation	Member
(5)	Director, Investigation Branch, Irrigation Department Ministry of Agriculture and Irrigation	Member
(6)	General Manager, Myanmar Agriculture Service Ministry of Agriculture and Irrigation	Member
(7)	Director, Survey Department Ministry of Agriculture and Irrigation	Member
(8)	Director, Water Resources Utilization Department Ministry of Agriculture and Irrigation	Member
(9)	Director, Settlement and Land Record Department Ministry of Agriculture and Irrigation	Member
(10)	Director , Department of Agriculture Planning Ministry of Agriculture and Irrigation	Member
(11)	Representative, National Commission on Environmental Affairs	Member
(12)	Representative , Ministry of Forestry	Member
(13)	Representative , Department of Hydroelectric Power Ministry of Electrical Power	Member
(14)	Representative , Department of Meteorology and Hydrology Ministry of Transport	Member
(15)	Representative Ministry of Progress of Border Area and Development of National Races	Member
(16)	Representative Directorate of Water Resources and Improvement of River System, Ministry of Transport	Member
(17)	Director, Hydrology Branch, Irrigation Department Ministry of Agriculture and Irrigation	Member
(18)	Deputy Director, Design Branch, Irrigation Department Ministry of Agriculture and Irrigation	Secretary

Appendix IV
Member List of JTWCTC (Thai Side)

(1)	Deputy Director General of the Department of Water Resources	Chairman
(2)	Director of Mineral Resources Conservation and Management Division, Department of Mineral Resources	Committee
(3)	Senior Engineer, Disaster Prevention Measure Bureau, Department of Disaster Prevention and Mitigation	Committee
(4)	Senior Hydrological Meteorologist, Meteorology Development Bureau, Department of Meteorology	Committee
(5)	Senior Engineer, Project Management Bureau, Royal Irrigation Department	Committee
(6)	Director of Groundwater Resources Conservation and Rehabilitation Bureau, Department of Groundwater Resources	Committee
(7)	Chief of Water Resources Management, Electricity Generating Authority of Thailand	Committee
(8)	Ministry of Energy	Committee
(9)	Director of Specific Agricultural Areas Development Division, Department of Agricultural Extension	Committee
(10)	Department of National Park, Wildlife and Plants	Committee
(11)	National Economic and Social Development Board	Committee
(12)	Director of Natural Resources and Environment Management Coordination Division, Office of Natural Resources and Environment Plan and Policy	Committee
(13)	Director of Water Resources Development Bureau, Department of Water Resources	Committee and Secretariat
(14)	Director of Office of Water Resources, Region 1, Department of Water Resources	Committee and Assistant Secretariat

Appendix V
Member List of JTWCHRD (Myanmar Side)

(1)	Deputy Director General, Department of Agriculture Planning Ministry of Agriculture and Irrigation	Chairman
(2)	Director, Irrigation Department Ministry of Agriculture and Irrigation	Member
(3)	Director, Water Resources Utilization Department Ministry of Agriculture and Irrigation	Member
(4)	General Manager, Myanmar Agriculture Service Ministry of Agriculture and Irrigation	Member
(5)	Director, Settlement and Land Record Department Ministry of Agriculture and Irrigation	Member
(6)	Director, Survey Department Ministry of Agriculture and Irrigation	Member
(7)	Deputy. Director, Department of Agricultural Planning Ministry of Agriculture and Irrigation	Member
(8)	Representative, Foreign Economic Relation Department Ministry of National Planning and Economic Development	Member
(9)	Representative, Department of Hydroelectric Power Ministry of Electrical Power	Member
(10)	Deputy Director, Irrigation Technology Center Irrigation Department, Ministry of Agriculture and Irrigation	Secretary

Appendix VI
Member List of JTWCHRD (Thai side)

(1)	Deputy Director General of the Department of Water Resources	Chairman
(2)	Director or East Asian Affairs Division 1, Department of East Asian Affairs	Committee
(3)	Senior Environmental Technician, Project Management Bureau, Royal Irrigation Department	Committee
(4)	Director of Groundwater Resources Conservation and Rehabilitation Bureau, Department of Groundwater Resources	Committee
(5)	Director of Specific Agricultural Areas Development Division, Department of Agricultural Extension	Committee
(6)	National Economic and Social Development Board	Committee
(7)	Director of Natural Resources and Environment Management Coordination Division, Office of the Natural Resources and Environmental Plan and Policy	Committee
(8)	Director of Human Resources Development Institute (Town Development) Department of Public Works and Town Planning	Committee
(9)	Thailand International Development Cooperation Agency	Committee
(10)	Director of Foreign Relations and International Cooperation Division, Bureau of International Cooperation, Department of Water Resources	Committee and Secretariat

Appendix VII
Overall Workplan

Year	2005										2006												2007		
Month	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M
1. Meeting	M							T				M							T					M	
1.1 JSC Meeting (Venue)	▽							▽																	
1.2 JTWCTC/JTWCHRD							▽				▽	▽						▽	▽				▽	▽	
2. Study visit in Myanmar/Thailand	—					—			—					—							—		—		
3.Human Resources Development																									
3.1 Agriculture and Irrigation Training in Thailand									—	—						—	—								
3.2 Hydropower and Irrigation Training in Thailand				—	—										—										
3.3 Seminar/Workshop in Myanmar		—						—						—						—			—		
3.4 Irrigation Experience Exchange in Myanmar/Thailand				—	—							—	—				—	—						—	
4. Master Plan Study for water resources management and development in specific target areas in Myanmar and Thailand	▪▪▪▪	▪▪▪▪	▪▪▪▪	▪▪▪▪	▪▪▪▪	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5. Feasibility Study For (1)Nam Kok river basin (2)Nam Mae Sai river basin	▪▪▪▪	▪▪▪▪	▪▪▪▪	▪▪▪▪	▪▪▪▪	▪▪▪▪	▪▪▪▪	▪▪▪▪	▪▪▪▪	▪▪▪▪	—	—	—	—	—	—	—	—	—	—	—	—	—	—	

Legend; Y: Yangon, B: Bangkok
▪▪▪▪▪▪▪▪ Data collection

Appendix VIII
List of the studies

1. Master Plan Study for water resources management and development in Nam Kok and Nam Mae Sai river basins and other prospective and potential river basins

2. Feasibility Study for

(1) Nam Kok river basin
(2) Nam Mae Sai river basin

Terms of Reference

Master Plan for Water Resources Development and Management between Thailand and Myanmar

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1. Study approach and target area

The study aims to identify available water to meet water demand in specific target areas as mentioned in the TOR of Biennial Technical Cooperation The study includes water potential and appropriate measures for water delivery to demand areas of both countries for the purpose of agriculture, domestic use, industry and others.

2. Objectives

The objectives of the study are as follows:

1. To study the potential of the project and review the relevant previous studies on development and supply available water, improvement of water resources to increase available water for existing water resources including distribution system in order to respond to water need , to prevent drought and to relieve flood in the river basin.

2. To formulate the master plan for water resources development and management to supply water to the target areas in both countries by adopting appropriate measure taken into account the cost - effective and least environment impact.

3. To identify proper water distribution system among the water sources and the beneficiary areas in order to ensure the utmost efficiency of water distribution and management.

3. Scope and details of the Project

1. Formulation of Master Plan

1.1 Study for project potential and various measures for water resources development and management. This is done by water need assessment in order to increase available water to the targeted areas. The previous study are reviewed to obtain the potential available water and water demand in the future. The most appropriate measure for water diversion and the water distribution systems are selected. Also, the priority of the measures is set up and the most proper measure will be selected including specification of TOR of feasibility study and detailed design and financial mechanism for further study.

1.2 Pre- feasibility Study will be conducted to study the most appropriate measure for water resources development and management. The Pre - feasibility Study will cover physical terrain, methodology, investment cost, operation and maintenance costs.

1.3 Initial Environment Examination (IEE) of the areas identified in the study will be conducted. The examination will include various aspects namely current environment conditions such as physical and biological environmental resources, human values and quality of life. The primary environmental impact assessment includes impact on adjacent area of the project site, summary on environmental assessment and proposal for mitigation measures.

2.Detailed Scope of Works

2.1 Study of Project potential and various options : the following tasks will be carried out:

1. Gathering relevant data and information, in order to assess situation of water resources development, water sources improvement in the study areas already implemented and to be implemented as planned including water

demand assessment . Also, the previous relevant studies conducted by the government agencies and academic institutes has to be reviewed in order to assess the potential of available water resource development in the study area.

2. Review on water usage in the future, determine beneficiary areas, targeted areas as already studied and planned. Also study on tendency of increasing water usage due to increasing available water, distribution system and security on water supply to support domestic consumption, agriculture, industry and water - related activities such as tourism etc.

3. Formulate a master plan for water resources development the study areas which will distribute water to target beneficiary areas under the Project such as agricultural area, Industry, community and drought vulnerability areas. The priority for water distribution is set up as follows:

Water system network within the basins

(in case available water is sufficient)

Water system network inside receipient basins by diverting water from in - country nearby basin in case available water in the receipient basin is insufficient

Transboundary Water network system by diverting water from neighboring country in case available water in the country is insufficient

4. Specify pattern , type and component of diversion system , connecting system and distribution system which include construction improvement of water sources , distribution system of various types such as piping , channel canal and storage pond. Pumping stations will be considered in order to be able to manage water distribution from various sources which will increase efficiency in water management.

5. Study guidelines and measures for water diversion from available source, based on physical terrain , investment cost , construction and maintenance cost. The study on water diversion will be conducted comparing with and without construction of dam.

6. Study on measures for mitigation and relief of flood in the study area by considering on water storage, natural or constructed drainage system and benefit gained.

7. Conduct the economic analysis of the project comprising cost estimation of the construction and benefit from investment of each alternative. The result of the analysis will be used to determine the best alternative for the proposed project. Sensitivity analysis will also be made.

8. Study on organizational structure and Project management . The study will cover rules and regulations of water control, international agreement on water usage and water resources development. Relevant rules and regulation on water uses as well as prevention measures for water pollution will be determined. Also, there should be preliminary study on dam management organization set-up such as in the form of joint water management organization.

2.2 Pre - feasibility study: The pre - feasibility study on the most appropriate measure for water are as follows:

1. Survey and gather additional significant information investigate and check the data before analyze details of data on specific aspect in order to specify types and component of diversion route, storage and distribution system to be in compliance with engineering concept. It has to be taken into account the Project' with least environment impact.

2. Study and design detailed components of the Project based on the potential study. At this stage, more detailed and reliable information and data will be applied such as topography map, data on geology , hydrology , hydraulics etc. The beneficiary areas will be clearly identified. Water demand for various activities will be assessed. Maps of appropriate scale showing water distribution system and beneficiary areas will be prepared.

3. Economic and financial analysis will be provided to consider investment cost and return of investment of the Project in order to select the project that gains the utmost benefit.

4. Set up the initial construction plan that includes completion time for each stage of construction and detailed construction from the beginning to the completion of construction.

5. The GIS and the data base for formulation of the Project will be provided.

6. Specification and terms of reference as well as financial mechanism for the feasibility study of the most appropriate water diversion project will be provided for further stage of implementation.

2.3 Initial Environment Examination (IEE) will be conducted in order to review level of environment impact derived from the construction. Significant selected measure that cause impact will be considered. Construction and rehabilitate measures for upstream and water quality in the basin will also be provided. The environmental examination will include, at least, the followings:

Current environment condition namely physical and biological environment resource, human use values, and quality value of life.

Summary of the initial environmental assessment and provision of mitigation measures

3.Public Relations and Participation

To publicize the Project in Thai side there must be the pro - active study , planning and implementation for public relation is paralled with the whole steps of project implementation. The public relations could be done through various media at the appropriate interval. It is expected to draw the result from provincial authority level , people , academic professionals and stakeholders in order to understand of the Project clearly and continuously. It is aimed to obtain cooperation and participation from people at all level including organizations involved.

During the study, the seminar will be held.

Besides, the occasionally meetings and seminars will be organized for the sub-basin authority in order to present result of the study as necessary.