No.

ラオス国
水道事業体人材育成プロジェクト
実施協議報告書

平成 15 年 9 月
(2003 年)

国際協力事業団

ラオ事
JR
03-001

ラオス国
水道事業体人材育成プロジェクト
実施協議報告書

平成 15 年 9 月
(2003 年)

国際協力事業団

序　　文

ラオスは一人当たりのGDPが400ドルに満たないLLDC（後発開発途上国）であり、人々が安全かつ快適に生活していくためには道路・橋梁、電気、上下水道等、あらゆる面で社会インフラ整備の拡充の必要があります。

現在、ラオスでは都市部においてすら上水道を利用できる人口は 48.9%（2002 年現在）にとどまっており、安全な水の安定供給は国民の健康と生活の向上のための重要課題となっています。このような中で、ラオス国公共事業省は1999年に全国の給水計画を策定し、2020年までに都市部の人口の80%に対して安全な水道水を供給することを目標に上水道施設整備とその運営のための人材育成に取り組んでいるところです。

この様な背景のもと、わが国はこれまでラオス上水道分野に対する協力を継続的に実施してきており、首都ヴィエンチャン市においては1964年の市内最初のカオリオ浄水場建設を初めとし、国内最大のチナイモ浄水場の拡張工事、高架タンク、配水管など主要水道施設の整備と運営に協力してきました。加えて、第2の都市サバナケットではナケ浄水場の改修を行うなど、日本による無償資金協力及び技術協力はラオス上水道分野の発展に大きく貢献してきました。

こうして上水道施設が整備される中、水道施設の運営/維持管理を行う人材は依然として質量ともに不足していることに加えて、上記の上水道投資計画によると、2020 年までに設立される水道局は現在の 21 水道局（県水道局 18、支局 3）から 5.8 倍の 123 水道局となり、その運営・管理に携わる技術系職員数は現状の 507 人が約 4 倍の 2,037 人に急増すると予測されており、将来的に上水道事業の実施に必要な人材の不足が懸念されています。

このような背景からラオス国政府は公共事業省水道局（WASA）、ヴィエンチャン市水道局（NPV）および主要都市水道局の指導的技術者の育成、また各県の水道局においては水道施設の運転・維持管理に従事する技術者の育成を行うとともに、浄水場のマネジメントに携わる人材の育成をも含めた水道事業体の人材育成を目標とする本プロジェクトを日本政府に対して要請しました。

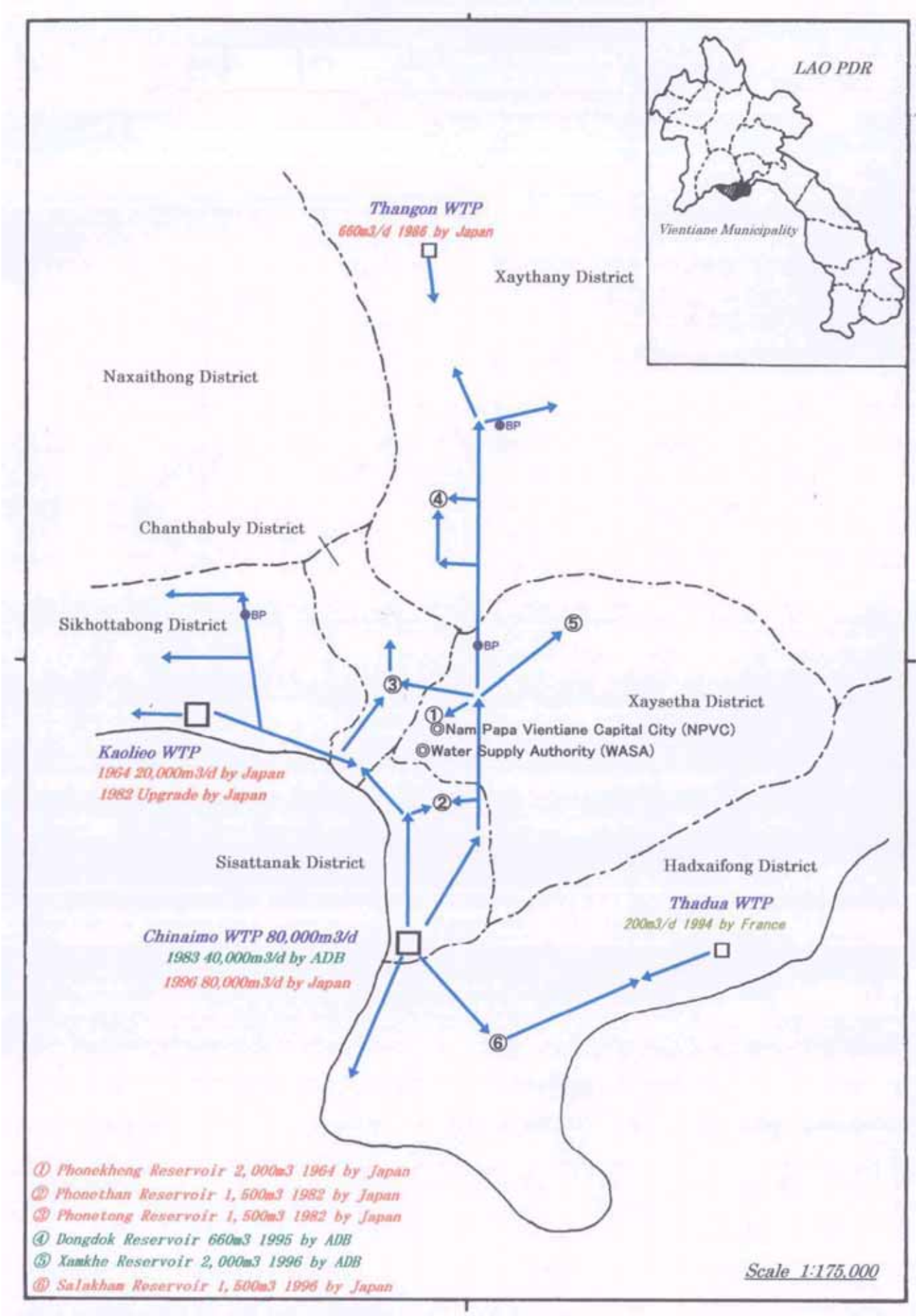
これを受けて当機構はラオス公共事業省水道局に派遣中の水道計画専門家を中心に要請案件の妥当性を検討するとともに、ラオス政府と協議の上プロジェクト設計及びプロジェクトの戦略についてラオス側と共同で形成するプロセスを経た上で JICA ラオス事務所を通じて実施協議を行い、プロジェクトの実施について合意しました。

ここに、本調査の実施に際してご協力とご支援を賜った関係機関の各位に対し深甚なる謝意を表すとともに、今後の更なるご支援をお願いする次第です。

平成 15 年 9 月

国際協力事業団

理事　泉　堅二郎


LAO PDR
Vientiane Municipality
Thangon WTP
660m3/d 1986 by Japan
Xaythany District
Naxaithong District
BP
④
Chanthabuly District
Sikhottabong District
BP
BP
⑤
③
Xaysetha District
①
©Nam Papa Vientiane Capital City (NPVC)
©Water Supply Authority (WASA)
Kaolieo WTP
1964 20,000m3/d by Japan
1982 Upgrade by Japan
②
Sisattanak District
Hadxaifong District
Thadua WTP
200m3/d 1994 by France
Chinaimo WTP 80,000m3/d
1983 40,000m3/d by ADB
1996 80,000m3/d by Japan
⑥
① Phonekheng Reservoir 2,000m3 1964 by Japan
② Phonethan Reservoir 1,500m3 1982 by Japan
③ Phonetong Reservoir 1,500m3 1982 by Japan
④ Dongdok Reservoir 660m3 1995 by ADB
⑤ Xamkhe Reservoir 2,000m3 1996 by ADB
⑥ Salakham Reservoir 1,500m3 1996 by Japan
Scale 1:175,000

調査対象流域図

目　　次

1．要請背景

現在、ラオスでは都市部において上水道を利用できる人口は 48.9%（2002 年現在）にとどまっており、安全な水の安定供給は国民の健康と生活の向上のための重要課題となっている。

この様な背景から、わが国はこれまでラオス上水道分野に対する協力を継続的に実施してきており、首都ヴィエンチャン市においては 1964 年の市内最初のカオリオ浄水場建設を初めとし、国内最大のチナイモ浄水場の拡張工事、高架タンク、配水管など主要水道施設の整備と運営に対して、日本による無償資金協力及び技術協力が大きく貢献してきた。

また、上水道分野については、ADB(アジア開発銀行)が主体となり全国の人口 2,000 人～15,000 人のスモールタウンを対象として、Water Supply and Sanitation Sector Project が実施されるなど、2020 年までに都市部人口の 80%に対して安全な水道水供給を行うことを目標とするラオスの国家開発計画の実現に向けて、各ドナーが役割分担を行いつつ上水道分野の協力を実施している。

このような中で、水道施設の運営/維持管理を行う人材は質量ともに不足していることに加えて、1999 年に策定されたラオス水道部門の投資計画によると、上記のようなプロジェクトによって 2020 年までに設立される水道局は現在の 21 水道局（県水道局 18、支局 3）から 5.8 倍の 123 水道局となり、その運営･管理に携わる技術系職員数は現状の 507 人が約 4 倍の 2,037 人に急増すると予測されており、将来的に上水道事業の実施に必要な人材の不足が懸念されている。

全国の水道局数と技術系職員数の動向

	－1995	1996 － 2000	2001 － 2005	2006 － 2010	2011 － 2015	2016 － 2020
既存水道局	9	9	21	33	63	93
新設水道局	―	12	12	30	30	30
拡張水道局	―	6	6	4	7	―
技術系職員	308 人	507 人	687 人	1,137 人	1,587 人	2,037 人

※技術系職員数は地方水道局の現況平均 10 人と希望人数 20 人の平均を採用し一水道局あたり 15 人として算出

このような背景からラオス国政府は公共事業省水道局（WASA）、ヴィエンチャン市水道局（NPV）および主要都市水道局の指導的技術者の育成、また各県の水道局においては水道施設の運転･維持管理に従事する技術者の育成を行うとともに、浄水場のマネジメントに携わる人材の育成をも含めた水道事業体の人材育成を目標とする本プロジェクトを要請した。

2．調査･協議の経過と概略

本ﾌﾟﾛｼﾞｪｸﾄの形成にあたっては、ラオス公共事業省水道局（WASA）に派遣中の川島康弘専門家（水道計画分野　派遣期間：2002.5.15～2004.5.14）に技術的な観点からのサポートを受けつつ、JICA ラオス事務所の主導によりラオス側との協議を行い、ﾌﾟﾛｼﾞｪｸﾄの具体的な実施内容について合意形成を行った。具体的な調査･協議の経緯は以下のとおり。

(1) 事前評価調査

1） 実施期間 ： 2003 年 4 月 5 日 ～ 5 月 4 日

2） 調査委託先 ： Mixai Techno Engineering & Consulting Co., Ltd

3） 調査内容 ： 上記ローカルコンサルタントを傭上して本ﾌﾟﾛｼﾞｪｸﾄに関連するデータの収集を行うとともに、評価五項目の観点からﾌﾟﾛｼﾞｪｸﾄの実施妥当性について検証を行い、ﾌﾟﾛｼﾞｪｸﾄ事前評価レポートを作成する。

(2) ＰＣＭワークショップの実施

1） 実施日 ： 2003 年 4 月 7 日

2） 参加者 ： WASA 及び主要各県 PNP 局長等

3） 実施方法 ： 事前評価調査を委託した Mixai Techno Engineering & Consulting Co., Ltd がモデレーターとなり、PCM 手法を用いた問題分析に基づいて PDM 案を作成した。

(3) タイ国水道技術訓練センター(NWTTI)への事前調査団派遣

1） 派遣期間 ： 2003 年 4 月 8 日 ～ 4 月 9 日

2） 調査団員 ： 川島康弘 ラオス水道計画長期専門家
作道俊介 JICA ラオス事務所員

3） 派遣目的 ： ラオスの上水道技術者に対する技術移転をタイ NWTTI を活用して実施することにつき、NWTTI と実施の可能性につき協議するとともに、研修実施可能な技術分野、研修実施時期、研修委託にかかる諸手続き等について確認を行った。

(4) 実施協議

1) 日 時 ： 2003 年 7 月 3 日

2) 協議内容 ： 事前評価調査結果に基づきラオス側 WG とともに作成したﾌﾟﾛｼﾞｪｸﾄ戦略と概要につき説明を行い、具体的な実施に向けてその実施内容について意見交換を行った。

⑸ 実施協議報告書署名

1) 日 時　　：2003 年 8 月 22 日

2) 実施概要　：上記実施協議の内容に基づき、公共事業省水道局長及と JICA ラオス事務所長により実施協議報告書が署名された。

3．事業事前評価表(技術協力プロジェクト)

作成日 ： 平成 15 年 8 月 30 日

担当部･課 ： JICA ラオス事務所

案件名 ： ラオス国水道事業体人材育成プロジェクト	
対象国 ： ラオス	実施地域 ： 全国
実施予定期間 ： 2003 年 9 月 1 日～2006 年 8 月 31 日(3 年間)	

1. プロジェクト要請の背景

現在、ラオスでは都市部において上水道を利用できる人口は 48.9%(2002 年現在)にとどまっており、安全な水の安定供給は国民の健康と生活の向上のための重要課題となっている。

このような背景から、我が国はこれまでラオス上水道分野に対する協力を継続的に実施してきており、首都ヴィエンチャン市においては 1964 年の市内最初のカオリオ浄水場建設を初めとし、国内最大のチナイモ浄水場の拡張工事、高架タンク、配水管など主要水道施設の整備と運営に対して、日本による無償資金協力及技術協力が大きく貢献してきた。

また、上水道分野については、ADB(アジア開発銀行)が主体となり全国の人口 2,000 人～15,000 人のスモールタウンを対象として、Water Supply and Sanitation Sector Project が実施されるなど、2020 年までに都市部人口の 80%に対して安全な水道水供給を行うことを目標とするラオスの国家開発計画の実現に向けて、各ドナーが役割分担を行いつつ上水道分野の協力を実施している。

このような中で、水道施設の運営/維持管理を行う人材は質量ともに不足していることに加えて、1999 年に策定されたラオス水道部門の投資計画によると、上記のようなプロジェクトによって 2020 年までに設立される水道局は現在の 21 水道局(県水道局 18、支局 3)から 5.8 倍の 123 水道局となり、その運営･管理に携わる技術系職員数は現状の 507 人が約 4 倍の 2,037 人に急増すると予測されており、将来的に上水道事業の実施に必要な人材の不足が懸念されている。

全国の水道局数と技術系職員数の動向

	－1995	1996－2000	2001－2005	2006－2010	2011－2015	2016－2020
既存水道局	9	9	21	33	63	93
新設水道局	—	12	12	30	30	30
拡張水道局	—	6	6	4	7	—
技術系職員	308 人	507 人	687 人	1,137 人	1,587 人	2,037 人

※技術系職員数は地方水道局の現況平均 10 人と希望人数 20 人の平均を採用し一水道局あたり 15 人として算出

このような背景からラオス国政府は公共事業省水道局(WASA)、ヴィエンチャン市水道局(NPV)および主要都市水道局の指導的技術者の育成、また各県の水道局においては水道施設の運転･維持管理に従事する技術者の育成を行うとともに、浄水場のマネジメントに携わる人材の育成をも含めた水道事業体の人材育成を目標とする本プロジェクトを要請した。

2. 相手国実施機関

プロジェクト監督および実施機関：公共事業省水道局(WASA)、ヴィエンチャン市水道局(NPV)

3. プロジェクトの概要および達成目標

(1) 達成目標

1) プロジェクト終了時の達成目標(プロジェクト目標)

[目標]

- ラオス全国の水道事業体職員の業務遂行方法(水道管敷設・管理、浄水場運転管理、水質管理の各分野)が改善される。

[指標]

各水道局において以下の状態が達成される。

- 業務実施マニュアルが完備される(管布設、給水管、浄水場運転管理、ポンプ運転管理、水質検査、漏水調査)
- 日常の水質検査が適切に実施される。
- 施設保守管理業務が適切に実施される。
- 漏水調査が定期的に実施される。
- 管路等修繕に必要な体制及び資機材の準備が行われる。
- 上記業務の実施によるデータに基づき WASA に正確な報告が行われる(水質、配水量等)。

2) 協力終了後に達成が期待される目標(上位目標)

[目標]

- ラオス全国の水道事業体職員の業務遂行方法(水道管敷設・管理、浄水場運転管理、水質管理の各分野)が改善される。

[指標]

- 供給水の質の向上
  (各水道局において濁度が水質基準をクリアーする)
- 効率的な配水方法による水圧の安定化
  (管網として整備されている給水区域において必要水圧を確保する)

3) 国家開発計画終了時(2020 年)に達成される目標(将来目標)

[目標]

- ラオス都市部の住民に安全な水道水が安定的に供給されるようになる。

[指標]

- 2020 年までに都市部人口の 80%に飲料水を供給
  (2002 年現在、都市部における 48.9%の家庭が水道水を利用可能)

(2) 成果(アウトプット)と主な活動

以下の活動が全て実施されると、全国の水道技術者 500 名全員と水道事業経営に携わる管理者および財政/計画担当者 160 名、合計 670 名がそれぞれの業務に関連する分野の訓練を受ける事となる。

成果1. 適正な研修体制が確立し、且つ、講師(33 名)が育成される。

1-1 既存のトレーニングニーズアセスメントを検証する。
1-2 タイの水道技術訓練センター(NWTTI)での研修プログラムを策定する。
1-3 NWTTI で研修管理者研修を実施する。
1-4 都市上水道技術者の研修カリキュラムを策定する。
1-5 全国から上水道技術トレーナー候補者 20 名を選定する。

1-6 NWTTI で上水道施設管理及び配管に係わるﾄﾚｰﾅｰ研修を実施する。
1-7 日本でのカウンターパート研修を実施する。
1-8 現地国内研修の研修ｶﾘｷｭﾗﾑを作成する。
1-9 新講師 20 名の育成を目的とした現地国内研修を実施する。
1-10 現地国内研修の評価を実施し、ｶﾘｷｭﾗﾑの改善を図る。

成果2. 主任技術者用テキスト及び教材が開発され、研修所に配備される。
2-1 研修テキスト作成に関わるワーキンググループを編成する。
2-2 既存研修テキストを検討する。
2-3 研修テキストを作成する。(英語/ラオス語)
①計画/設計 ②管布設/給水 ③浄水場管理 ④水質管理 ⑤無収水量管理

成果3. 上水道各分野における主任技術者の能力が向上する。
3-1 全国の主任技術者を対象とした現地国内研修のｶﾘｷｭﾗﾑを策定する。
3-2 全国の主任技術者 115 名を対象とした現地国内研修を主要都市(3 箇所)で実施する。
3-3 現地国内研修の評価を実施し、ｶﾘｷｭﾗﾑの改善を図る。
3-4 現地国内研修を通して 20 名のアシスタントﾄﾚｰﾅｰを選定する。
3-5 NWTTI でのアシスタントﾄﾚｰﾅｰ研修プログラムを策定する。
3-6 NWTTI での上水道施設管理及び配管に係わるアシスタントﾄﾚｰﾅｰ研修を実施する。

成果4. 日常業務におけるマニュアルが開発され、適所(主に現場)に配備される。
4-1 日常業務マニュアル作成に関わるワーキンググループを編成する。
4-2 マニュアル作成に必要な技術情報を収集する。
4-3 日常業務マニュアルを英語/ラオス語で作成する。
①本管敷設 ②給水管 ③浄水場運転管理 ④水質管理 ⑤漏水調査日常業務

成果5. 現場に配属されている技術者の日常業務技術が改善する。
5-1 全国 360 名の技術者を対象とした現地国内研修プランを作成する。
5-2 中央部 6 県を対象に日常業務マニュアルを活用した現地国内研修を実施する。
5-3 南部 5 県を対象に日常業務マニュアルを活用した現地国内研修を実施する。
5-4 北部 6 県を対象に日常業務マニュアルを活用した現地国内研修を実施する。
5-5 現地国内研修の評価を実施し、ｶﾘｷｭﾗﾑの改善を図る。

成果6. 各水道局の管理者、計画担当者の経営手法が向上する。
6-1 全国 40 名の管理者、120 名の計画担当者を対象とした現地国内研修の準備を行う。
6-2 上記現地国内研修を実施する。
6-3 上記研修受講者から各水道局 1 名を選抜し、合計 20 名をﾀｲの水道技術訓練センター(NWTTI)へ研修生として派遣する。
6-4 各県水道局において水質、給水量等の日常業務に係わるデータを収集し、統計資料を作成する。
6-5 各水道局において 2020 年までの給水計画/財政計画を策定する。

(3) 投入(インプット)

日本側総額 約 1.5 億円
1) 長期専門家派遣 1 名(給水計画)
2) 短期専門家派遣 6 名(現地国内研修講師)
3) 現地国内研修
4) 日本におけるカウンターパート研修他
5) ﾀｲの水道技術訓練センター(NWTTI)を活用した海外研修 合計 68 名
6) ﾀｲの水道技術訓練センター(NWTTI)からの指導員受け入れ 2 名
7) 必要機材、資材

[その他]
ボランティア 3 名(①浄水場管理 ②水質管理 ③無収水量管理)を、必要に応じて現地国内研修等の講師として活用する。

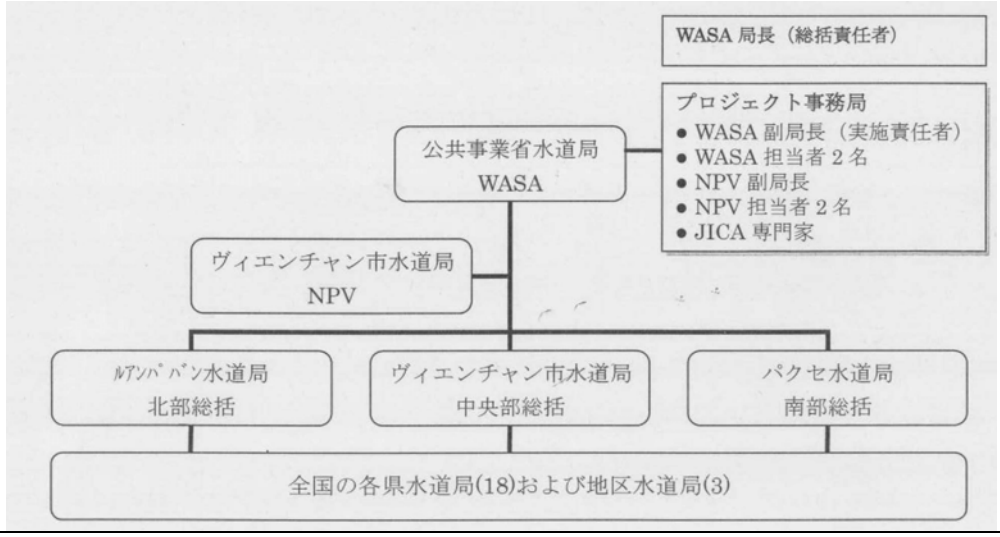
ラオス側
1) カウンターパートの配置

2） プロジェクト事務所および設備
3） 電気、水道等

（4） 実施体制

公共事業省水道局長をプロジェクトの総括責任者（プロジェクト・ダイレクター）、同副局長を実施責任者（プロジェクト・マネージャー）とする。また、プロジェクトの円滑な実施のため、公共事業省水道局の関係者、ヴィエンチャン市水道局の関係者、日本人専門家によって構成するプロジェクト事務局を設置する。

プロジェクト実施体制



4. 評価結果（実施決定理由）

（妥当性）

ラオスにおいて安全な水の安定供給を行うことは重要な国家課題となっており、1999 年の首相府令では、都市部で上水道を利用できる人口を 2020 年までに 80%に向上することを目標とした水道部門の投資計画が策定されている。（2002 年現在の給水率は 48.9%）

現在、水道技術者は質・量ともに不足した状況にあり上水道施設の維持管理状況に問題があることに加え、ADB が主体で計画/実施している Water Supply and Sanitation Sector Project によって、2020 年までに 100 を越える地方都市で上水道プロジェクトが実施され、完了後はプロジェクト個々に水道局が設立される事となるため、将来的には上水道施設運営/維持管理を行う人材の不足が現在以上に深刻化することが懸念されている。

以上のように、ラオスの上水道事業人材は質量ともに不足し、その育成が急務となっていること、また、本プロジェクトは ADB をはじめとする他ドナーの援助動向や報告内容を踏まえつつ、ラオス側のニーズに即してプロジェクト設計が行われている事から実施の妥当性は高い。

（有効性）

第一段階でﾄﾚｰﾅｰを育成し、第二段階では第一段階で育成されたﾄﾚｰﾅｰが講師を務めながら、全国の主任技術者 115 名を対象に国内研修を実施する。さらに次の第三段階では主任技術者を講師として各県の現場に配属されている 360 名の水道技術者の日常業務技術の改善を目的とした国内研修を実施するという段階的な人材育成を行う事により、全国の水道技術者の技術水準をくまなく向上させるとともに、組織的な人材育成体制の構築が可能となる。

さらに、技術的側面のみならずマネジメント面においても各水道局の管理者、財政/計画担当者を対象に研修を実施することにより、マネジメントレベルの人材の経営意識の改善を促す。

以上により、技術者のみならず管理者、計画担当者の育成を図る事でラオス水道事業体の技術力･運営能力が向上するとともに、WASA を中心とする人材育成体制が構築される。

（効率性）

主要なﾌﾟﾛｼﾞｪｸﾄ活動はラオス側のﾄﾚｰﾅｰを中心に実施され、本邦からは長期専門家 1 名の派遣を基本として、セミナーの実施等必要に応じて短期専門家やシニアボランティアの協力を仰ぐという方式をとることで、投入を最小限に抑えている。

また、JICA が長年にわたり支援してきた隣国タイの水道技術訓練センター（NWTTI；National Waterworks Technology Training Center）を活用することにより、安価かつ効果の高い（ラオスとタイの言語的、文化的近似を背景とする）技術移転が可能となる。

3 年間のﾌﾟﾛｼﾞｪｸﾄ活動により、ラオス全県の水道技術者全員が訓練を受けることとなり、間接的にはラオスの全給水人口が受益者となることから、本ﾌﾟﾛｼﾞｪｸﾄの費用対効果は極めて高い。

（インパクト）

ADB が計画/実施している Water Supply and Sanitation Sector Project により、2020 年までに全国の水道局は現在の 21 水道局から 5.8 倍の 123 水道局となり、そのために必要な技術系職員数は現在の 507 人の約 4 倍にあたる 2,037 人に増加すると予測されており、人材の不足が危惧されている。本ﾌﾟﾛｼﾞｪｸﾄの実施は、この ADB をはじめとする他ﾄﾞﾅｰの事業を補完して人材育成体制を強化することにより、将来の人材不足解消のための一助となる。また、現在実施中の開発調査「ヴィエンチャン上水道施設拡張整備計画」による報告では、将来的な水需要の増加は政府の財政能力を超えるものとなることが予測されているが、同調査が提案予定の需要抑制策についても、本ﾌﾟﾛｼﾞｪｸﾄのｺﾝﾎﾟｰﾈﾝﾄの一部として取り組む予定であり、我が国が行う同分野の協力を補完し、プログラム協力としての効果を高めることが期待される。

（自立発展性）

本ﾌﾟﾛｼﾞｪｸﾄによって全国の水道事業人材が訓練されるばかりでなく、ﾄﾚｰﾅｰが育成され、研修実施に必要なｶﾘｷｭﾗﾑと教材が開発される。これにより、ﾌﾟﾛｼﾞｪｸﾄ終了後もラオス側独自で人材育成を実施する体制が整備される。また、本邦からの投入を最小限に抑え、ラオス側による活動を中心にﾌﾟﾛｼﾞｪｸﾄ設計が行われていることにより、ﾌﾟﾛｼﾞｪｸﾄ期間終了後もラオス側独自の予算と人材で人材育成を実施する自立発展性が確保される。

5. 外部要因ﾘｽｸ（外部条件）

（1） WASA を中心とした各水道局の経営改善努力が継続する。

（2） 水道局職員が民間などの別企業へ転職しない。

6. 今後の評価計画

ﾌﾟﾛｼﾞｪｸﾄ終了 6 ヶ月前に終了時評価を実施する。

4．事前調査報告書

PREPARATORY EVALUATION REPORT

CAPACITY DEVELOPMENT OF URBAN WATER SUPPLY AUTHORITY IN LAO PDR

Water Supply Authority (WASA)

Japan International Cooperation Agency (JICA)

25 June 2003

TABLE OF CONTENTS

ABBREVIATIONS

ADB	Asian Development Bank
DHUP	Department of Housing and Urban Planning
GDP	Gross Domestic Product
HRD	Human Resource Development
JICA	Japan International Cooperation Agency
Lao PDR	Lao People's Democratic Republic
M&E	Monitoring and Evaluation
MCTPC	Ministry of Communication Transport Post and Construction
NEM	New Economic Mechanism
NPV	Nam Papa Vientiane
NRW	Non Revenue Water
NWTTI	National Water Works technology Training Institute (Thailand)
O&M	Operation and Maintenance
PCM	Project Cycle Management
PDM	Project Design Matrix
PNPs	Provincial Nam Papas
ToT	Training of Trainers
UFW	Un-Accounted For Water
UNDP	United Nation Development Program
UWS	Urban Water Supply
STEA	Science Technology and Environment Agency
SOE	State Owned Enterprises
WASA	Water Supply Authority
WRCC	Water Resource Conservation Committee

1. Introduction

The Japan International Cooperation Agency (JICA) is preparing the inception report for a project for the "Capacity Development of Urban Water Supply Authority in Lao PDR", which suppose to be in operation from August 2003. The objective of the project is to develop the capacity of the engineers, technicians and management employees of the different urban water supply authorities of Vientiane Municipality and of the major cities and town in Lao PDR

In relation to the planned technical cooperation in this field, a JICA Expert to Water Supply Authority (WASA) was fielded since May 2002 to study the present water supply situation and to analyze the issues to build up the capacity of the existing urban water supply authorities. The expert has come up with some ideas and suggestions, which need to be further, discussed and analyzed with WASA and concerned local authorities.
In parallel With Mr. Kawashima work, a JICA Development Study on Vientiane Water Supply Development Project was conducted since March 2003, and shall be completed in November 2003. The objectives of the JICA Study are to: (1) prepare a long term master plan for the Vientiane water supply (target year of the master plan is 2020, while target year of facility planning is year 2015); (2) to conduct feasibility study on priority project(s) identified in the master plan; and (3) to pursue technology transfer to the counterpart personnel in the course of the study.

On 7 April 2003, a PCM Workshop was held at the MCTPC to identify the priority and to elaborate a Project Design Matrix (PDM) for the future activities of the proposed project. In conjunction with JICA procedure for project design, this Preparatory Evaluation Report has been elaborated to image the situation and needs of the Urban Water Supply Sub-sector and to confirm the relevance of the proposed project. It is anticipated that this document shall be the base for the Record of Discussion (R/D) between JICA and the Government of Lao PDR.

2. Background Information

(1) Lao PDR / Socio-economic Context

Geography and Population

Lao PDR is a landlocked country covering 236,800 km^2, and situated in South-East Asia, bordered by Thailand Cambodia, Vietnam, China and Myanmar. The country is mountainous in the north and in the east with the Annamite mountain chain running southeast. The Mekong River running southwest with its major rainfall catchments (35% of its total flow) located in Lao PDR is the major source of water that influences development and way of life in the country.

The population is about 5.23 million growing at 2.6% per annum (as of the year 2000) and has one of the lowest population densities of 21 people per km^2. Population settlement has been concentrated in the major plains located in the Mekong River corridor. About 80 percent (4 million) of the people live in small rural villages scattered sparsely throughout the country. The urban population (about 1 million) is divided between Vientiane Municipality (420,000 habitants), 16 provincial capitals (320,000 habitants) and some small town settlements (260,000 habitants). Lao PDR is a country with more than 47 official ethnic groups. Its cultural domains represented by the main ethno linguistic distinction are broadly separable into highland and lowland, the Tai - Kadai (Lao Lum) groups inhabiting the lowlands, the Mon-Khmer (Lao Kaang), Hmong-Mien and Tibeto-Burman (Lao Soung) groups living in the mountains.

Economy and socio-economic context

Lao PDR has an isolated landlocked economy, with limited and high-cost access to foreign markets. Because major part of the country is mountainous, remote settlement and low population density are barriers to access and the cost-efficient delivery of social and other services. Physical constraints, including a lack of direct access to seaports, poorly developed infrastructure, and a small domestic market, have increased business costs and discouraged commercial investment.

The country has underdeveloped human resources. Key indicators of human development, including life expectancy, infant and maternal mortality, and education levels are among the lowest in the region. The United Nations Development Program's (UNDP) human development index ranks Lao PDR at 140 out of 174 countries, making the Lao PDR one of the poorest countries in the region. Low education, health, and nutrition standards are major constraints to productivity growth. Some 70% of the workforce has not completed primary school, and poor technical and management skills have discouraged business investment.

The country is in transition to a market-oriented economy. The public sector still plays a major role in industry, in the financial sector, and in some services. Frequent policy and institutional changes, bureaucratic interference in business decisions, and administrative

discretion add to business costs. Institutions are weak in terms of protecting property rights, enforcing contracts, and providing professional and financial services. Institutional weakness and severe public sector budget constraints inhibit the delivery of public services, and limit capacity to maintain physical infrastructure, reducing the delivery of public services, and limit capacity to maintain physical infrastructure, reducing the development impact of past public investments and official development assistance. Since the introduction of the New Economic Mechanism (NEM)[1] in 1986, the Government has adopted more open economic policies and a development strategy that emphasizes the country's location at the hub of trade routes linking emerging Asian economies. Albeit starting from a very low base in the late 1980s, during the last five year the country has achieved average economic growth of about 6 % per annum and reduced the incidence of poverty from 45% in 1995 to 39% in 2000. Because of the country's undeveloped monetary economy, the Asian crisis in the late 1990s has had little implication to the local economy and growth.

Table 1: Structure of the Economy

	1990		**1999**		**2000**	
	°/. of GDP	**ave. annual growth**	**°/. of GDP**	**ave. annual growth**	**°/. of GDP**	**ave. annual growth**
Population (millions)	4.14		5.09		5.22	
GOP (US$ billions)	0.85	6.5	1.8	7.3	2.1	6.6
GOP per capita (USS)		3.8	286	4.7	354	4.0
Agriculture	61.2	4.9	53.5	8.2	52.9	5.0
Industry	14.5	11.0	22.5	8.0	22.8	7.6
Manufacturing	10.0	11.0	16.9	7.1	17.2	7.8
Services	24.3	6.6	24.0	6.7	24.3	6.0

Source: The World Bank Group *I* Lao POR at a glance

Agriculture accounts 52.9 % of the GDP and provides about 80-90% of total employment. Industrial, manufacturing and services sectors are progressing with an average annual growth exceeding 6% per annum while the annual growth in agriculture is decreasing. Among 4.2 million of the rural people in Lao POR approximately 2 million (about 40% of total population) people are estimated to live under poverty. These people, comprising about 300,000 households scattered in more than 6,300 villages, are largely small farmers who live in upland forested areas and practice shifting cultivation. Those people depend on precarious livelihoods and live in remote and highly diversified biophysical environments.

In Urban area the incidence of poverty is estimated to 29 % of the urban population. Poverty in the urban areas has recently emerged, and rural-urban migration trends to explain the diminishing share of the rural population. The following table shows the share of population between urban and rural areas.

[1] From chin thanakaan mai "new thinking" and kanpatihup setthakit "reform of the economy".

Table 2: Distribution of the Lao Population by Urban and Rural Areas

Year	Total population	Urban (Number)	Urban (%)	Rural (Number)	Rural (%)
1995	4,574,800	781,753	17.1%	3,793,100	82.9%
2000	5,218,300	1,043,700	20.1%	4,174,600	79.9%

Source: Lao Census 1995 and estimate for 2000 (National Human Development Report 2001)

Life expectancy rate is 59 years in 2000, sanitation and other environmental factors influence the socio economical status of the rural and urban areas. Only 45% of rural households had access to piped water or a protected well in 1997 as opposed to 75% in urban areas. About 80% of rural households did not have access to a toilet. Rural people sent a minimum 15 minutes per day per person to fetch water, as compared to 4 minutes in urban areas. Urban centers benefited more than rural villages from the immunization program and other health development. Only 43% of village countrywide had a pharmacy and only 70% of rural households have access to primary health care services. In 1999, in the rural areas almost 60% of rural children under 5 years were considered malnourished compared to 40% in urban areas. The difficult health related circumstances are often directly related to poverty.

The knowledge and education is low, adult literacy rate is high in rural areas. 40% of rural children between 6 and 19 years had never attended school, whereas only 1 % of urban youngsters experienced comparable deprivation from education. By 2000 only half of the rural children of primary school age went to school, as compared with 80% in urban areas. In term of social integration, rural society is more isolated than its urban counterpart, and the level of isolation of rural communities serves as good prediction of standard of living.

(2) National Development Goals

The main national development objectives include: poverty reduction; economic growth at the most appropriate rate; progressively and greatly developing/production in agriculture, industry and the standard service sectors; improving living standards in term of both physical and mental well being step by step; disseminating the education and health service throughout the country; enlarging of national culture's attractiveness; providing social welfare; increased capacity of labor; keeping of peaceful society; political stability under strong leadership; broadly opening up for international cooperation and integration into the world's changing environment.

The Government has set a vision for 2020. In 2020, the expected Lao population is estimated to be around 8.3 million people, with annual average growth rate of 2.2%.
In order to flee from poverty, the Government needs to accomplish the following struggling goals; reach a GDP per capita of 1,200 US$; increase adult literacy rate to 90%; increase life expectancy to 70 years. To reach those objectives, the average GDP growth should be around 7% annually, with total investment of 25-30% of GDP. Besides, public investment should cover about 12-14% of GDP and private investment including foreign direct investment 25-30% of GDP. In parallel with increased investment, the Government needs to add the national saving of at least 15% of GDP in 2020.

(3) Description of the Sector / Sub-sector

The Urban Sector

Administratively, the country comprises of one Municipality (Vientiane), 16 provinces and one Special Region (Xaisomboun), 142 districts and 11,785 villages. About 42 percent of the urban population lives in Vientiane Municipality. In most provinces, 80 to 90 percent of the population lives in rural areas, and the provincial capitals are more or less having an urban character. In the initiation of urban development projects, it was just recently that major towns have defined specific urban limits. The towns in Lao PDR have been defined and ranked in terms of their administrative status and population as shown in the table below.

Table 3: Urban Center Categorization

Level	Town	Population range	Function	Infrastructure & services
1.	**Capital:** Vientiane Municipality	>150,000	National capital; all International communication	All basic services; public transport; private solid waste management
2.	**Regional centers:** Secondary Towns Khanthabury; Luanprabang; Pakse; Thakek	20,000 to 60,000	Regional economic center; international transit; provincial government and administration; tourism	All basic services
3.	**Other provincial capitals:** 13 No.	4,000 to 20,000	Provincial government and administration, some transit	Rudimentary services; water supply systems under improvement; no solid waste; new network electricity and telecom under construction
4.	**Small Towns:** 130 district & sub-district towns	< 2,000 to 15,000	District administration; rural support	Very rudimentary services; few serviced roads; few water supply systems; no solid waste management systems; little or no electricity, no telecommunication

Source: ADB, Lao PDR Urban Sector Strategy Study, July 1998

Vientiane Municipality is by far the largest urban center with a population of 160,000. The four largest provincial capitals are Luangprabang, Thakek, Savannakhet and Pakse, which have populations of 20,000 to 60,000 habitants. The rest of the provincial capitals have populations from 4,000 to 20,000 habitants. Finally, there are around 130 district and sub-district towns with populations between 2,000 to 15,000 habitants.

Although agriculture remains the largest sector contributing to GDP, the urban area, which comprises of the industrial and service sectors are increasingly playing an important role in the country's economic growth. The urban centers, mostly agglomerated geographically along the Mekong River and its tributaries, represent a total population of about one million habitants that is growing rapidly at 4.7 percent per annum. Projections suggest that the urban population has reached 1.4 million in 1997.

The municipality and the four major provincial towns have basic urban infrastructure and services. The rest of the provincial capitals have access to rudimentary services; electricity and telecommunication facilities are under construction, but wastewater and solid waste collection is not yet available. Over the past decade most provincial capitals have been provided with new or extended piped water supply systems. On the other hands the district and sub-district towns have even less access to urban and other infrastructure. The increasing rates of urbanization and the urban infrastructure

deficiencies are placing a considerable burden on the urban environment, undermining human development and limiting economic activity.

Legal and Regulatory Framework

A law on Water and Water Resources was signed under presidential Decree No. 126/PR on November 1996. The law establishes the principles, regulations and measures for the management, exploitation use and development of water and water resources in Lao PDR. The aim of the law is to preserve water and water resource's sustainability and to ensure their volume and quality meets the people's requirements in their livelihood, to promote agriculture and forestry, industry, national economic development as well as avoiding any environmental impact.

The Prime Ministerial Decision No. 37/PM signed on 30 September 1999, defines government policy on management and development of the water supply sector. The decision describes the division of responsibilities for administration of the sector, covering water supply and wastewater management in urban and rural areas through out the country. The main operational impact of the decision is the creation of a new organization, the Water Supply Authority (WASA)" under the Ministry of Communication, Transport, Post and Construction (MCTPC), and the substantial devolution of responsibility for water supply and sanitation from central to provincial government. The decision also clarifies the Government's policy in terms of sector regulation, financing, cost recovery, utility operation, community awareness and participation, human resource development and private sector participation.

Water Resource Coordination

A Water Resource Coordination Committee (WRCC) was established within the Science, Technology and Environment Authority (STEA), under the authority of the Prime Minister's Office (Note No. 1335/PMO of 12/8/1997 and Prime Ministerial Decree No. 09/PM of 8/2/1999). WRCC's function is to assume responsibility for coordinating cross-sectoral activities involving or impacting on the nation's water resources.

WRCC policy framework particularly focuses on integrated river basin management planning, but also covers issues such as; financing, development and cost recovery; water access/use permit system; water resource demand management; waste discharge; activities in or on water bodies; institutional issues; capacity building and public awareness; community action and consultation; and data collection and management. Currently the main areas of concern for WRCC are irrigation, hydropower, navigation, fisheries and environmental protection as these sectors are the actual country's main water users. However, as urban development proceeds and the demand for piped water supplies increases, competition for water between domestic, industrial and other consumers will inevitably arise, thus increasing the role and responsibility of WASA within the WRCC.

Organization of the Urban Water Supply Sector

Urban water supply falls under the overall responsibility of MCTPC. At the central level, the Department of Housing and Urban Planning (DHUP) is assigned to set broad strategies on water supply development, planning for staff training, and studying, in collaboration WASA, standards, specifications and performance indicators of water supply systems operations. The Organization of MCTPC is enclosed in **Appendix 5.**

WASA is directed by a Regulatory Board, which has the duty to direct the operation of WASA including consideration of regulatory and complaints or grievance from consumers or Nam Papa entities. The Board has nine members, seven from the Government as well as external members from the industrial and residential consumers. A Vice-minister of MCTPC chairs the Board. The Vice-Chair is attributed to the Director General of the DHUP of MCTPC. The Director General of WASA is appointed as Permanent Secretary General of the Board Secretariat. Other Government members are appointed from different ministries and approved by the Prime Minister. The two private sector representatives are selected by invitation and appointed by the Government. All board positions are of three years terms.

WASA's function covers; strategic planning for water supply standards; and generally directing management and monitoring of water supply sector policy throughout the country. DHUP and WASA together provide the focus for donor liaison. At the local level the function of WASA is secured to provide technical and administrative support to the Provincial Nam Papas (PNPs) in the design and construction of their urban water supplies. WASA is organized with 3 divisions and one project unit and is staffed with 15 engineers and employees, to assume its function and responsibility as specified above. The Organization Chart of WASA is enclosed as per **Appendix 6.**

After the reorganization of the urban water supply sector and the establishment of WASA, the responsibility for provincial urban water supply was delegated to the Provincial Department of Communication, Transport, post and Construction (DCTPC). Provincial Nam Papas have been established and operate as State Owned Enterprises (SOEs) in all provinces with the main office attached to the provincial capital. In province where there is more than one water supply system, each system has its own office (called PNP Branch) and personnel. The staff of PNPs varies depending on the requirements of each system and generally comprise of management, administrative, technical and O&M personnel. Nam Papa Vientiane (NPV) that formed the core of the former Nam Papa Lao. The central organization that had managed all urban water supplies in the country before the reorganization is also providing training and technical support through its training center located in Chimaimo, Vientiane Municipality.

The organization chart of Nam Papa Vientiane, Luangprabang Nam Papa and other provincial Nam Papa corresponding respectively to the urban center categories is enclosed as per **Appendix 7.**

(4) National Strategy

The urban water supply sector in Lao PDR is facing the common problems on institution, human resource, engineering, hydrologic, climatic, social and development problems similar to other developing countries in the region.

In the last decade the Government has undertaken massive infrastructure investment in the sector to cope with the increasing urban population and developing industrial and service sectors. The Government has also made significant improvement in the institutional reform by establishing WASA and by decentralizing responsibility for urban water supplies to the provinces and by incorporating PNPs as State Owned Enterprises (SOEs). It is anticipated that localization of institutional autonomy should encourage efficiency and financial self-sufficiency. However, this new autonomy has put a burden to the PNPs to raise institutional and human resource capacity in order to achieve the desired sustainable operating efficiency, water service and financial viability.

Compiled form the Lao PDR Urban Sector Strategy and the Government's Water Supply and Sanitation Profiles, the following issues need to be addressed for the development of urban water supply in the next decades.

Equity in Urban Water Supply Coverage

In the last five years the development of urban water supply focused on the rehabilitation and extension of 21 water supply systems in Vientiane Municipality and in the rehabilitation and construction of new systems in the four secondary towns, in all provincial capitals and in some district capitals. According to WASA statistics for 2000, the national water supply system is presently servicing 378,400 people or about 48.9% of the total urban population.

The government medium and long term objective is to transform small district towns throughout the country into economic zones to enhance human development and living standard within the communities, and to act as effective service centers to support the agriculture and the evolving industrial and service sectors. The Government has considered the provision of basic social infrastructure to be fundamental for the development of these small town communities, and has identified water supply and sanitation as key components for small town development plans. The equity in urban water supply will be reached through the expansion of existing water supply system and the development of water supply system in the district small towns. The challenge facing WASA is to demonstrate its ability to seek funding and to develop its human resource capacity for developing and operating the remaining small town water supplies (about 100 towns) in order to reach 80% equity by the year 2020.

WASA short-term goal is to develop 15 new small town water supply systems by the end of 2005. At the completion of those projects, the national water supply system grid will be able to service about 755,000 people or 64% of the total projected urban population in 2005.

Water System Design

The design of new water systems has been constrained by the initial identification of inappropriate raw water resource and improper design. A number of systems had to be amended significantly during detailed design and construction stage. There have been a number of systems that have become partially or seriously unserviceable soon after their completion.

The strategy for the design of water supply system should be to take into account, in order to secure water supply solution that are technically appropriate, and that are appropriate to the particular circumstances at the site. This can best be achieved by high quality, adequately resourced, feasibility assessment, using local knowledge and taking local realities into account. The assessment of raw water resource should given special attention in the design.

Cost Recovery

The responsibility for all capital investments for water supply and wastewater management systems falls to the PNPs. Therefore; the PNPs are responsible for setting tariffs that should be sufficient to generate revenue to meet full cost recovery. There should not be a tariff less than required to meet all recurrent costs, including the cost for operation and maintenance.

Utility Operation and Non-revenue Water Management

PNPs are responsible for the management and operation of all metered water supplies within their respective provincial boundaries. PNPs' Operations are undertaken on commercial principles in accordance with three-year rolling corporate plans. The objective set for the PNPs is to maintain non-revenue water (NRW) at a level less than 30%.

The responsibility of the PNPs is to operate and maintain their water supply system in accordance with performance indicators such as; water use efficiency; water quality; reliability of supply; staff utilization; and the level of consumer complaints. PNPs have to adopt and maintain a full commercial accounting system and prepare annual financial accounts. The policy to improve the water bills collection efficiency is to disconnect consumers with water supply whose bills are more than three months overdue in order to maintain the limit of accounts receivable.

Financial Aspect and water Pricing

The Government recognizes that to have viable sustainable systems tariffs must be to achieve full cost recovery. The previous national water supply company (Nam Papa Lao) managed its financial affairs on the basis of state controlled tariffs. Following decentralization, PNPs are now required to be financially self-supporting and not to depend on budget allocations to meet any shortfall in revenue. However, there are

difficulties to apply appropriate tariff structures for full cost recovery because the current tariffs are politically difficult to change. One of the main reasons is that the consumers especially the ones living in small towns are usually poor with limited disposable income, but nonetheless they are willing to pay the cost for piped water. One strategy is to gradually introduce step-by-step tariff adjustments. In some remote and poor provinces, full cost recovery may not be possible to apply due to their stage of development. The Government will have to subsidize tariffs from the national budget.

Policy and Institutional Setting

The Water Law and the Prime Ministerial decision No. 37/PM provided a sound policy framework for the management and development of the water supply sector. The policy also established new institutional arrangement with the establishment of WASA and PNPs. The institutional development process under the new policy is not yet come into place because of the low level of experience and excessive bureaucracy. To address the institutional weakness, assistance need to be further provided to the sector for human resource and institutional development of WASA and PNPs.

Capacity Building

The strategy is to develop the capacity of WASA to undertake its function and responsibility set by national water supply policy mentioned above. The strengthening of PNPs will be the base of full cost recovery with equity.

There is shortage of appropriately skilled people in all areas of water supply planning, design, construction, operation and maintenance. This remains one of the most significant constraints to quality water supply development. On the other hands, despite the decentralization of water supply management to the provinces, most of the institutional capacity in water supply is still located in Vientiane Municipality. The strategy is to build up the capacity of PNPs' engineers, operation and maintenance technicians and management and administration employees in order for them to provide quality water supply service on the basis of the full cost recovery approach.

Water Supply Information System

WASA has been given the task for planning, coordinating, monitoring and evaluation of urban piped water supplies in Lao PDR. Information on piped water supplies is lacking and scattered among many documents and reports. The strategy is to develop a management information system and a statistical database at WASA that can support the regulatory work of WASA and the PNPs.

Environmental Issues

There are two main environmental issues to be considered; the first is watershed catchments management and its potential impact on raw water sources. Some raw water sources have deteriorated as a result of upstream deforestation to the extent that the viability of the raw water intake is seriously threatened in the dry season. There are also reduced dry season spring, stream flows, and falling ground water levels that are

attributed to watershed decline. The design of new water system has to properly identify appropriate raw water resources, and coordination through the WRCC should be made permanently to prevent the shortfall in urban water supply.

The second environmental issue is related to urban drainage that is created by added load on the urban drains, which are often rudimentary and open. In particular, effluent from flush toilets and wastewater from kitchens and bathrooms is commonly discharged into open drains, and resulting in severe pollution particularly in flat and low-lying areas. The strategy is to incorporate a drainage and sanitation components in water supply projects to address those issues and preserve the environment.

Community Awareness and Private Sector Participation

Water supply policy is moving toward the full participation of the community in the development of water supply and wastewater systems from the project design stage to the operation stage. Water supply system designers have to consult communities as to get their needs, expectation, affordability and willingness to pay, and feedback is to be incorporated in the project design. PNPs are instructed to carry out regular consumer survey to gauge public appreciation of the service provided, and incorporate the feedback into their operation and maintenance system.

Currently there is no private sector investment in urban water supply sector in Lao PDR. New directive from the Government encourages private sector involvement in the development of water supply and wastewater management systems. WASA mandate is to establish appropriate regulatory framework for private sector participation.

(5) Prior and On-going Project Assistance

Assistance to Urban Water Supply Sector

Urban water supply in Vientiane Municipality has been developed since the French colonial period. It comprise of a series of wells in the sediments along the Mekong River from which water was pumped to small, elevated reservoir and fed into a pipe system in the old town center. Actually the system has been improved with the assistance of Japan and the ADB since 1963. Currently the system has a treatment capacity of 100,000 m3/d, but utilizes only 70% of its capacity to meet the demand from 35,000 connections (approximately 210,000 persons) in four districts.

Since 1990, the ADB funded two programs for rehabilitating and extending, and conducting new water supply schemes. The First Town Water Supply and Sanitation Project covered 4 provincial capital towns in southern Laos. The second project, called "Northern Provincial Town Water Supply and Sanitation Project", was implemented from 1994 to 1998 and installed new water supply system in seven provincial capitals in northern Laos. In Luangprabang, the German Government funded a major upgrading and expansion of the existing system, which was built in 1969. The system is operational since 2000 and should be provide adequate water for the next decade. Other assistance in the water supply sector was made under French assistance, the World Bank and the Government its self

Urban Water Supply Sector Investment Plan

Actually about 28 projects of urban water supply have been completed. Total investment has been about US$ 104 million to serve for 488,000 people. There are also 18 projects under constructions, which will be completed before 2005. Their total investment is estimated to be US$ 41 million to serve about additional 210,000 people. Together these 46 schemes are estimated to serve 698,900 persons. Table 6 shows the actual urban water supply coverage.

Table 4: Urban Water Supply - Key population and Service Coverage

Indicator	**Total Lao PDR**	**Vientiane Municipality (% of total)**
Total population	5.2 million	0.6 million (12%)
Urban population	1 million	417,000 (42%)
Urban water supply system	36 existing and imminent	3 existing (8%)
Urban population served	488,000	240,400 (49%)
No. of service connections	85,700	39,957 (47%)
Capital investment	US$ 129 million	US$ 58.6 million (45%)
Per capita investment	US$ 265	US$ 244 (92%)

Source: Water Supply & Sanitation in Lao PDR, an overview into the millennium, urban water supply profiles, Final Draft, February 2000.

WASA projection for 2020 is to reach the equity of 80% for urban water supply with a serviced population of l,868,800 people. Table 5.1 and 5.2 summarize the number of water supply projects completed, ongoing and planned for the period of 2000-2020.

Table 5.1: Urban Water Supply Work Plan from The year 2001 - 2020 (Completed & On going Projects)

No		Descriptions	No. of actual Water Supply Consumers (person)	Targeted consumers after extension (person)	Implementation of work plan																	Estimated Budget	Budget sources
					2001-05					2006-10					2011-15					2016-20				
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	x 1,000 $	
I		Extension and improvement of existing water supply system project	341,065	462,516																				71	
	1	Improvement project of Pakse & Lamarm water supply system		9,222																				1,189	NORAD
	2	Construction project of Xai district water supply system, Oudomxai province	16,208	9,042																				2,685	IDA
	3	Construction project of Khwua district water supply system, Phongsaly province	2,708	4,692																				1,009	IDA
	4	Extension water pipe system in Vientiane Prefecture	259,826	65,000																				5,508	AFD
	5	Extension project of whole water supply system in Vientiane Prefecture		263,927																				27,000	JICA
	6	Extension/ Improvement of water supply system in Khanthabury, Savannakhet	46,885	66,439																				10,000	JICA
	7	Improve the system of water supply plant Phongsaly district, phongsaly province		4,248																				1,000	ADB
	8	Improve the system of water supply plant Xamneua district, Houaphan province		6,897																				1,000	GOL
	9	Improve the system of water supply plant Thakhek district, Khammouane province	15,438	25,441																				1	GOL
	10	Improve the system of water supply plant Samakhixay district, Attapeu province		7,608																				1,000	ADB
II		Extending water supply system in the capital city of 4 Southern provinces	56,308	65,805																				10,000	ADB
	11	1). Pakse district, Champasack province	38,826	39,835																					
	12	2). Saravan district, Saravan province	6,300	5,579																					
	13	3). Lamarm district, Sekong province	4,882	10,533																					
	14	4). Samakhixay district, Attapeu province	6,300	9,858																					
III		Extending water supply system in the capital city of 7 Northern provinces	47,788	141,818																				10,000	ADB
	15	1). Houixay district, Borkeo province	6,525	10,907																					
	16	2). Paksan district , Borikhamxay province	6,200	14,316																					
	17	3). Xamneua district, Houaphanh Province	9,250	15,703																					
	18	4). Phongsaly district, Phongsaly province	3,500	6,421																					
	19	5). Xayabury district, Xayabury province	7,517	39,443																					
	20	6). Phonhong district, Vientiane province	6,250	5,388																					
	21	7). Phonsavanh district, Xiengkhouang province	8,546	49,640																					
		Other Urban Water Supply Projects	43,400	28,760																					
IV	22	Namtha district water supply project, Luangnamtha province	3,500	2,000																					
V	23	Sing district water supply project, Luangnamtha province	2,500	1,200																					
VI	24	Luangprabang district water supply project, Luangprabang province	22,850	20,000																					
VII	25	Thoulakhom district water supply project, Vientiane province	7,750																						
VIII	26	Vangvieng district water supply project, Vientiane province	6,300																						
IX	27	Saisomboun special zone water supply project		5,560																					
X	28	Mahaxai district water supply project, Khammouane province	500																						
XI		Capacity building project for Water Supply Organization																						1,250	JICA
XII		Strategy Improvement Project for Water Supply Organization																						3,830	
		Total:	488,561	698,899																					

Completed projects

Source: WASA

Table 5.2: Urban Water Supply Work Plan from The year 2001 - 2020 (On-going & Planned Projects)

No		Descriptions	No. of Water supply consummers (Person)	Target of extension consummers (Person)	Implementation of work plan 2001-05 1	2	3	4	5	2006-10 6	7	8	9	10	2011-15 11	12	13	14	15	2016-20 16	17	18	19	20	Estimated Budget x 1,000 $	Budget sources
I		Water Supply and Health care project in small city from 2001-2010		436,988																					39,527	ADB
	1	Bounneua district, Phongsaly province		11,024																					
	2	Tonpheung district, Borkeo province		11,298																					
	3	Nambark district, Luangprabang province		13,683																					
	4	Nongbok district, Khammouane province		13,600																					
	5	Outhoumphone district, Savannakhet province		37,953																					
	6	Vingxay district, Houaphanh province		5,956																					
	7	KM 52, Phonehong district, Vientiane province		17,129																					
	8	Khongsedon district, Saravan province		5,929																					
	9	Phonthong district, Champasack province		18,632																					
	10	Khong district, Champasack province		5,635																					
	11	Kham district, Xiengkhuang province		15,985																					
	12	Khamkeud district, Borikhamxay province		23,132																					
	13	Paklai district, Xayabury province		30,949																					
	14	Thateng district, Sekong province		7,447																					
	15	Houn district Oudomxai province		29,477																					
	16	Songkhone district, Savannakhet province		13,356																					
	17	Hongsa district, Xayabury province		21,900																					
	18	Saisetha district, Attapeu province		10,025																					
	19	Mai Pakgneum district, Vientiane Municipality		8,737																					
	20	Sangthong district, Vientiane Municipality		11,037																					
	21	Namor district, Oudomxay province		4,800																					
	22	Nonghaed district, Xiengkhouang province		3,368																					
	23	Thaphabath district, Borikhamxay province		7,497																					
	24	Feuang district, Vientiane province		8,351																					
	25	Paksong district, Champasack province		10,342																					
	26	Sanasonboun district, Champasack province		10,409																					
	27	Atsaphangthong district, Savannakhet province		8,746																					
	28	Champhone district, Savannakhet province		17,687																					
	29	Phonexay district, Luangprabang province		14,971																					
	30	Chomphet district, Luangprabang province		13,321																					
	31	Nan district, Luangprabanf province		10,203																					
	32	Xienggneun district, Luangprabang province		14,589																					
II		Water Supply and Health care project in small city from 2011-2020		244,384																					35,000	
	33	Sanakham district, Vientiane province		12,690																					
	34	Kasi district, Vientiane province		7,197																					
	35	Keo-oudom district, Vientiane province		13,322																					
	36	Pak-Ou district Luangprabang province		9,786																					
	37	Gnoy district, Luangprabang province		5,556																					
	38	Phoukhoune district, Luangprabang province		11,326																					
	39	Pakseng district, Luangprabang province		9,269																					
	40	Viengkham district, Luangprabang province		12,299																					
	41	Borten district, Xayabury province		9,847																					
	42	Khob district, Xayabury province		6,498																					
	43	Kenthao district, Xayabury province		11,253																					
	44	Phieng district, Xayabury province		25,372																					
	45	Gneun district, Xayabury province		11,867																					
	46	Gna district, Xayabury province		5,035																					
	47	Gnommalath district, Khammouane province		4,292																					
	48	Khoun district, Xiengkhouang province		12,174																					
	49	Phoukoud district, Xiengkhouang province		6,430																					
	50	Meung district, Borkeo province		4,465																					
	51	Xiengkhor district, Houaphanh province		3,762																					
	52	Xienghone district, Xayabury district		18,041																					
	53	Thongmixay district Xayabury province		3,994																					
	54	La district, Oudomxay province		4,802																					
	55	Pakbeng district, Oudomxay province		5,175																					
	56	Xaiphouthing district, Savannakhet province		6,141																					
	57	Xepone district, Savannakhet province		7,628																					
	58	Thaphalanxay district, Savannakhet province		6,088																					
	59	Viengphoukha district, Luangnamtha province		3,163																					
	60	Dakcheung district, Sekong province		4,007																					
	61	Viengthong district, Houaphan province		2,905																					
		Total:		681,372																					

Source: WASA

Remarks:

1). Estmated population in urban area in 2020: 2,333,165

2). Estmated population in urban area and receiving water supply service 1,868,832 or 80%

3). For others small cities in remote area were under the responsibility of department of safety water, sanitation and environment of Ministry of Health.

3. Problems to be Addresses and the Current Situation

(1) Institutional Framework for the Sector

Following the decentralization policy of the Government, the water supply authority is divided in three levels. At central level, WASA has been established under the MCTPC to regulate the water supply and sanitation sector in the country. Because WASA is newly established, it does not have the complete institutional framework such as; the human resource, the finance, the tools and equipments and facilities execute its roles and responsibilities efficiently and properly. Actually, WASA does not have staff dedicated to the regulatory function and assistance in this field is required to develop its regulatory function in the legal, technical, financial/economic and public/customer relation fields.

The capacity in water supply actually relies on Nam Papa Vientiane, which inherited from Nam Papa Lao, the former national water supply authority. NPV is a SOE that has to operate under company and business laws and supervised by the Ministry of Finance. Following the full cost recovery policy and water pricing strategy, the SOB has still to depend on subsidies from the government in term of capital investment.

NPV has a training center at Chinaimo, opposite to the water treatment plant, which is providing short in-service training courses to NPV staff and to other PNPs in the country.

In all provinces (including the Xaisomboun special zones) PNPs have been established. The PNPs status as SOEs operates under the same rules and regulations as the NPV. However, the "Second Towns" PNPs have more capacity in terms of human resource, finance, tools/equipments and facilities. NPV and PNPs are forming the second institutional level of the water supply sector.

The third institutional level comprise of PNPs Branches that are established within the district towns with established urban water supply system. The PNPs organization and institutional set-up is under the PNPs and sometime considered as part of the PNP.

As a summary, the institutional set-up of the NPVs, PNPs and PNPs branches is related to the size of physica1 infrastructures set-up (water treatment plants, delivery system, etc.). Human resource development set-up and facilities are mostly located in Vientiane Municipality with NPV.

(2) The Current Situation and Problems

The efficiency of the urban supply sector will depend on the capacity of WASA for regulating the water supply sector and for supporting/assisting the NPV/PNPs to operate within the water supply policy and strategy framework specified in the previous paragraphs. The water supply sector faces many problems and constraints defined by many reports on urban water supply and confirmed by the PCM workshop held on 7 April 2003. The major problems as defined in the sector problem tree are related to:

- People awareness and participation.
- The management capacity of NPV/PNPs in term of; water supply management, operation and maintenance; water quality analysis; control of physical and financial losses.
- The background and experience of engineers, technical employees and management/ administration employees.
- The capacity of existing water supply infrastructures, water treatment plant and pipe system.
- The growing demand of piped water compared to the water supply capacity.

(i) People Awareness and Participation

People attitude towards the protection and maintenance of Nam Papa public assets is low. There are people stealing water meters and water through by-pass connections. Water is over utilized or utilized for agriculture. People do not inform NPV/PNPs about leakage. Water bills not paid on time resulting in increasing water supply accounted for Non-Revenue Water (NRW). .

The reasons of those problems are attributed to the lack of public awareness campaign and public relation within the NPV/PNP, and perhaps due to the low price of water. Therefore there is a need to develop the public relations and marketing functions of NPV/PNPs.

(ii) Management Capacity of NPV/PNPs

<u>Water supply management and O&M</u>

PNPs operate their water supplies without proper operation and maintenance manuals or practical work descriptions. The few manual available at the water supplies are written in either English or German, of almost zero effect to Lao operation staff'.

There is a need to prepare concise and clearly understandable operational manual in Lao language together with appropriate monitoring procedures and to elaborate and implement preventive maintenance procedures. In relation to human resource development, there are requirements from PNPs for further training in most technical aspect of water supply management.

Water Quality Analysis

Water quality is not good in some areas as it has high turbidity or contains high chorine.

There is very low level of water quality control. PNPs carry out basic water quality analysis on site and have the necessary minimum equipment to perform such minimum analysis. Only NPV and Nam Papa Luangprabang have sophisticated equipment to carry out comprehensive water analysis.

There is a need; to enhance the water quality control on site in terms of materials and human resources; to establish external control system (e.g. independent regional testing facilities), and to establish regulatory control, e.g. quality audit etc., to ensure compliance with prescribed water quality standards.

Control of water from leakage and financial water losses

Old water supplies experienced higher Unaccounted For Water (UFW) than newer schemes simply due to corrosion effects over time.

There is a need to improve the leakage detection procedures for controlling the water losses in the pipeline systems; and to assist PNPs in applying correct measures and actions for reducing the UFW.

According to the urban water supply profiles given by WASA[2], the measured specific water production per person ranges between 200 l/d and 318 l/d, which is quite high compared with normal figures of 150-170 l/d. High water production figures per capita may be due to water loss from leakage and water not being billed. This might also be due to low water tariffs, giving the consumers little incentives in conserving water by reducing any excess water consumption.

The growing amount of water bills not being paid for creates huge outstanding arrears for the PNPs. Most common defaulters were government institutions and public offices. In some cases amount of unpaid bills of which the public customers constituted 70% of the total outstanding depts. Therefore, there is a need to establish effective methods of encouraging/ensuring all customers to pay their water bills in time.

Poor Planning and Commercial Operations

PNPs managers have limited corporate management knowledge and skills. SOEs commercial system based on cost recovery is not effective due to low water fee resulted from the water pricing strategy and from heavy UFW related to poor consumption measurement and recording system.

One of the main management weaknesses is the lack of water supply planning skills

[2] Refers to Water Supply & Sanitation in Lao PDR, an overview into the millennium, urban water supply profiles, Final Draft, February 2000.

of the PNPs. There are obviously no water supply plans projected according to future demand and no water distribution plans.

The financial loss is partly due to a weak financial and accounting system with lack of economic and financial planning.

(iii) Background and Experience of Engineers and Technical Employees

Most of PNPs technical employees, especially at the top and medium level, have got adequate theoretical background and experience. Some of the technical staff members at the lower level have secondary school background and limited professional training. PNPs stated that they require more training for their technical employees.

There is a need to formulate a detailed training and human resource development program within various aspects of technical and financial management of water supplies for PNPs. Previous Training Needs Assessment in the technical fields (TNA) identified the following subjects

- Water production and treatment process including water quality analysis,
- Mechanical and pump operation and maintenance,
- Electrical and electronic operation and maintenance,
- Leakage detection and repair,
- Pipe laying and pipe repairs (plumbing),
- Water meter service and repairs, and
- Water meter reading.

Training needs assessment for the financial management and related corporate issues identified the following subjects;

- Financial,
- Economic,
- Commercial, and
- Regulatory.

The job descriptions issued to the employees is not detailed and clear so staff members do not know his/her responsibilities and appropriate lines of command. There is a need to assist the PNPs is the development of proper and relevant job descriptions for their employees.

(iv) Capacity of Water Supply Infrastructure

The water supply infrastructures in some second towns are old. The pipe system is not standardized and old pipes are leaking largely due to corrosions.

PNPs are also lack of vehicle, equipments and management tools to undertake preventive maintenance and repairs.

(v) Growing Demand of Piped Water Supply

As explained in the previous paragraph the water supply sector is constrained by the rapid expansion of the rural areas due to rural-urban migration and the fast development in the industrial and service sectors.

The water supply sector has also limited capacity in term of human resource and financing to accomplish the water supply equity within the urban sector. The vision of WASA in 2020 is to accomplish 80% water supply equity in relation to the increased population and urban sector.

4. Project Strategy

(1) Overall Project Strategy

The project will assist the development of the urban water supply sector through strengthening the capacity of water supply authorities with the focus on building up the capacity of engineers, technicians and management personnel working in the water supply sector.

The project will start with re-assessing the capacity of existing water supply authorities by studying previous survey and training need assessments made under the ADB and other donor agencies' financing program.

A human resource development plan and training strategy and program will be elaborated from the result of the assessment for the engineers, technicians and managerial employees of WASA, NPV and PNPs. Project activities will be implemented in relation to the HRD plans and training strategy and program until the end of the three-year project.

Pre-service training (for new employees) and in-service training will be provided using the facilities of NPV training center and by establishing a training of trainers program (ToT) for the PNPs. Part of the training will be done abroad in Thailand for managers, trainers, and chief engineers at the National Water Works Technology Training Institute (NWTTI). There will also be training in Japan as counterpart training for this project, although the allotment of the seats is uncertain.

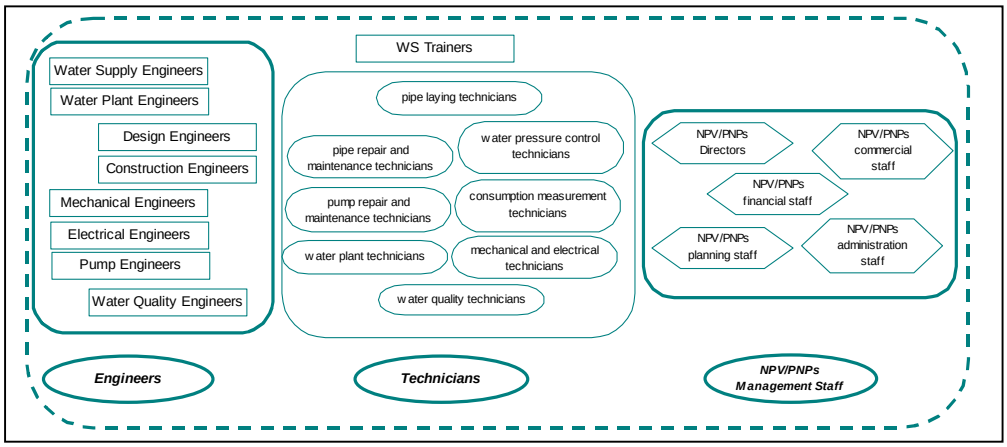
Aside from human resource development, the project approach is also to develop technical and management tools in the form of O&M manuals, planning and management systems to improve the effectiveness and efficiency of the water supply services provided by the NPV and PNPs, and to improve the regulatory function of WASA.

To assure sustainability of the activities after the completion of the project, it is recommended to develop a competency based training system, which would be certified by the Ministry of Education. Technical and vocational training would be developed in partnership between the Ministry of Education, NPV's Chinaimo Timing Center and the PNPs. National Competency Certification of the training will give incentive to the PNPs employees and will enable them to develop their carrier within the sector.

(2) Selection of Target Basins

In was clearly defined during the PCM workshop that the target group will be the employee of WASA and NPV /PNPs. The project will benefit about 670 engineers, technicians and management employees during its 3 years of operations. The target groups were categorized according to their function and responsibility as in the figure below.

Figure 1: Target Groups



The group analysis conducted during the PCM process identified the following categories:

- Decision makers such as the NPV/PNPs directors and executives will benefit from training and capacity building initiative to up-grade their knowledge and skills in corporate management (business and administration) of their enterprises.
- WASA and NPV/PNPs Chief Engineers will benefit from the training and capacity building initiative to up-grade their knowledge and skills in planning water supply consumption and distribution, in the operation and maintenance of water treatment plants and water supply networks, as well as in the different technical and technology subjects provided by Japanese Experts.
- NPV/PNPs Engineers will benefit from the training and capacity building initiative to up-grade their engineering knowledge and skills in their different fields of competency and responsibility.
- NPV/PNPs Technicians and skilled workers will benefit from the training and capacity building initiative to up-grade their knowledge and skills in their different technical fields of competency and responsibility.
- NPV/PNPs management employees will benefit from the training and capacity building initiative to up-grade their knowledge and skills in their different management fields of competency and responsibility.
- Water Supply Trainer developed under the project will benefit from the training of trainers program and other engineering and technological knowledge and skills provided by the Japanese Experts.
- Water consumers will benefit from better services from the NPV/PNPs in term of water consumption measurement, accurate and fast billing, quick and appropriate repairs and maintenance, better water distribution, better water pressure, and better water quality.

5. Project Design

(1) Project Purpose

Means of service performance of the staff of UWS authorities in Lao PDR are improved in the field of water pipe laying and maintenance, plant operation and maintenance, and water quality control.

(2) Overall Goal and Long-Term Goal

People in urban areas can access safe water stably. In concrete, 80% of the people living in the urban area are supplied with safe piped water by the year 2020 (actually 48.9% of the urban population are having piped water). The overall goal is to enhance the capacity of the Urban Water Supply Authorities in a sustainable ways.

(3) Project Outputs and its Activities

The following outputs are specified for the project:

Output 1: Appropriate UWS training system is elaborated and Trainers are trained.

Activities related to output 1:

1.1 To review the existing training needs assessment.
1.2 To prepare the training programmes in Thailand.
1.3 To conduct the training programme on training management in Thailand.
1.4 To make a plan of UWS training programme.
1.5 To select twenty (20) trainers from nation wide.
1.6 To conduct the training programme on the plant and piping work for the trainers in Thailand.
1.7 To dispatch a trainee to Japan as a counterpart training programme.
1.8 To prepare training curriculum for In-country Training Programme(ICTP).
1.9 To conduct the ICTP for trainers.
1.10 To evaluate, review and improve the ICTP for trainers.

Output 2: Training textbooks and materials are developed

Activities related to output 2:

2.1 To organize a working group on training textbook.
2.2 To review and improve existing textbooks prepared by Nam Papa Vientiane(NPV) trainers.
2.3 To compile and print the textbook of each field.

Output 3: UWS engineers are upgraded in each technology subjects.

Activities related to output 3:

3.1 To prepare the ICTP for engineer in each field.
3.2 To prepare the ICTP for 115 engineers from Water Supply Authority(WASA), NPV and PNP in Vientiane, Luangprabang and Pakse.
3.3 To evaluate, review and improve the ICTP for engineers.
3.4 To select twenty (20) assistant trainer from ICTP for engineers.
3.5 To prepare the training programme on the plant and piping work for assistant trainers in Thailand.
3.6 To conduct the training programme on the plant and piping work for assistant trainers in Thailand.

Output 4: Manuals for routine works are developed.

Activities related to output 4:

4.1 To organize a working group of manuals for routine works.
4.2 To collect technical information and prepare the materials.
4.3 To edit the manuals for routine works in English and Lao.

Output 5: The routine work skills of UWS technicians are upgraded

Activities related to output 5:

5.1 To prepare the ICTP for 360 technicians of PNP and their branches.
5.2 To conduct the ICTP in central region by using manuals.
5.3 To conduct the ICTP in southern region by using manuals.
5.4 To conduct the ICTP in northern region by using manuals.
5.5 To evaluate, review and improve the ICTP for technicians.

Output 6: Management skill of administrator and manager in Provincial Nam Papa(PNP) is upgraded.

Activities related to output 6:

6.1 To prepare the ICTP for administrators and managers.
6.2 To conduct the ICTP for 40 administrators and 120 managers from NPV and PNP.
6.3 To conduct the training programme on water supply management for the management staff in Thailand.
6.4 To keep the records on routine operation in each PNP and summarize records into statistics in WASA.
6.5 To formulate Water Supply and Financial Plan until 2020.

(4) Inputs

The inputs of the project are specified in following:

Japanese side:

The contribution from Japan is estimated to Yen 150 million, comprising of.

1. Long-term Japanese Expert (1 person on Water Supply Planning)
2. Short-term Japanese Experts (6 persons, 2 persons for each year)
   - Lectures on water supply engineering at the In-country training courses
   - Lectures on waterworks management at the in-country training courses
3. Lectures from NWTTI in Thailand (2 persons, 1 person for each subject)
   - Technical transfer on training curriculum
   - Technical transfer on making the training textbooks
4. Others (JICA Volunteers may support following subjects)
   - Water treatment plant management
   - Water quality management
   - Non-revenue water management
5. In country training
6. Equipment, tools and materials
7. Training in Japan
8. Training at NWTTI Thailand
9. Trainers from NWTTI
10. Others

Lao side:

The contribution for the Government of Lao PDR is estimated to Kip 287 million comprising of:

1. Counterparts (C/P)
2. Project office and necessary facilities
3. Electricity and water for the office
4. Others

(5) Important Assumptions and Risk Analysis

The important assumptions specified in the PDM are:

- WASA and NPV/PNPs employees are available and participate in the capacity building process and training.
- Trainees are selected properly according to criteria and their competence.
- In-country training is made within existing training institutions, such as the NPV Training Center, Training Centers from other authorities, Technical Schools, etc.
- Out-country training is planned to be in Thailand at the NWTTI and in Japan.
- That all planned inputs are delivered on time.

(6) Operational Implementation Strategy of the Project

The operation of the project will start by identifying the needs for up-grading the capacity and competency (knowledge and skills) of engineers, technicians, administrative and management staff working in the UWS.

Based on the strategy to develop those capacity and competency through the training of trainers approach, the second operation of the project will be to elaborate a general training strategy and program for the UWS and specifically for: (i) training of trainers, (ii) training of UWS engineers, (iii) training of UWS technicians, and (iv) training of NPV/PNPs administrators and management staff.

(i) Training of Trainers will be developed with the assistance of the NWTTI in Thailand. About 40 engineers will be selected from WASA, NPV and PNPs to participate in ToT training at NWTTI. and after conduct the training of UWS engineers and technicians specified in the general training strategy and program. Textbooks, teaching aids and other training materials will be developed with involvement of trained trainers.

(ii) Training of UWS engineers will be done for each specific engineering and technical subject that is related to the work place and competency of each engineers. Specific short courses will be elaborated and provided by the trainers to UWS in combination with the ToT program. NWTTI trainers and JICA senior volunteers will also be utilized as resource persons for the training of engineers.

Training of UWS technicians will be done for each specific engineering and technical subject that is related to the work place and competency of each technician. The focus will be in the improvement of existing operation and maintenance

(iii) manuals and in the development of new manuals for up-grading the capacity of the technician in their routine work. On the Job training will be provided to the technicians on how to use manuals for the implementation of preventive maintenance and for operation of UWS works.

(iv) Training of NPV/PNPs administrators and management staff will be done for each specific management and financial subjects that are related to the work place and competency of each employee. Specific short courses will be elaborated and provided by the trainers to UWS in combination with the ToT program.

The UWS training program would be organized at WASA with links to all NPV/PNPs. Therefore the person responsible for human resource development at each NPV/PNPs should be involved in the training design, planning, implementation and M&E. The persons responsible for training should also be involved in the pre-evaluation and evaluation of each employee's competency (background, knowledge and skill) and in the certification of each training course. In term of sustainability, it is recommended that training certification be related to carrier development.

Group works will be established to undertake specific training works such as; review of training needs, elaboration of general training program, elaboration of specific training programs (i, ii, iii, and iv), production of textbooks and teaching aids, and production of manuals, and etc.

One of the components is strengthening the regulatory work of WASA. This will be done through the elaboration of long term UWS development plans (until 2020), the development of statistical data base and information system for the UWS at WASA, and the establishment of a monitoring and evaluation system for WASA. .

(7) Prior Obligations and Preconditions

There is no specific obligation for the project, but the implementation of the project will depend on the delivery of inputs from both the Japanese side and the Lao side.

The precondition set for this project is the participation of all NPV/PNPs in the design, planning, implementation and M&E of the project.

(8) Monitoring and Evaluation

The Project will be organized under WASA and will be governed by a steering committee Chaired by the Director General of WASA and comprising of representative from WASA, and other relevant department in MCTPC. The person responsible for human resource development in each NPV/PNP will be the liaison officer for the project. They will be involved in all design, planning, monitoring and evaluation activities of the project, and the organization and implementation of the training within their province. A tentative organization chart of the project is shown in **Appendix 3**.

Monitoring and Evaluation of the project will be made by the project counterparts and experts with the participation of the person responsible for training from NPV and PNPs. The M&E will comprise of two components; (i) PDM evaluation, and (ii) M&E of the progress of planned training activities.

(i) PDM evaluation: The PDM evaluation is an evaluation system based on the objective, out-puts, activities and indicators that have been setup in the initial PDM. Therefore it is very important that verifiable indicators for each out-put, activity and input is defined already at the beginning. In case of training project, training indicators such as the number, background, knowledge and skill level of each target group (engineers, technicians, administrator, and management staff) need to be identified and utilized as a base line for evaluation. PDM evaluation will be made according to the relevance, effectiveness, efficiency, impact and sustainability specified at the initial stage of the project's design. The PDM evaluation is undertaken before the end of the project. The project should hire an external - person/enterprise to undertake the PDM evaluation in order to conserve neutrality and transparency.

(ii) M&E of the progress of planned training activities is the regular project M&E, which consists of recording the progress of planned activities at certain crosscut dates -following the planning schedule elaborated at the initial stage of the project. M&E system should be designed to record all physical and financial activities and transactions of the project from PNPs to WASA. Reporting of those physical and financial achievements should be made by reporting quarterly, and annually to the project's steering committee. The M&E and reporting work should be undertaken by the project counterparts and experts with the participation of the persons responsible for training assigned to the project from NPV/PNPs.

6. Overall Project Relevance

(1) Validity

This project is coherent with policy of the Lao government as the development of urban water supply facility is mentioned as a component in the national 5 year socio-economic development plan (2001-2005). On the other hands, the Prime Ministerial Decree No. 09/PM and 37/PM of 1999 have the objectives to increase the household coverage of urban water supply to reach 80% in the whole country.

This project is also consistent with the plan of other donors. At the completion of the ADB financed urban water supply projects, more than 100 water supply facilities will be constructed by the year 2002. Therefore, there is a need for human resource to operate and maintain those water treatment facilities. In response to such needs, this project will help to develop urban water supply human resource in term of quality and quantity.

(2) Effectiveness

This project aims to train all the technical staffs in the country within 3-year project period by using a step by step approach: (1) training of trainers, (2) training of Chief engineer, (3) training for all the technicians in PNPs. This will upgrades the technical level of technicians all over the country, as well as to prepares human resource development system for the Lao urban water supply authorities.

(3) Efficiency

Project activities will be build in the existing urban water supply organization and will be mainly conducted by the Lao authorities. Input from Japanese side will be carefully controlled and kept at low level. NWTTI in Thailand will be utilized for training Lao technicians. Training cost will not be high and effective because Lao people understand Thai language.

The target group of the project comprises of all the water supply technicians in the country. However, the population who receive urban water supply will also have benefit indirectly from the project.

The Project is cost effective as mentioned above.

(4) Impact

Through ADB urban water projects, more than 100 water supply facilities will be constructed by 2020, nevertheless, staff for the O&M of the water supply facilities has not been included in the scope of those projects. This project will support the development of the human resource for the urban water works in complementary to the infrastructure development provided by other donors.

Actually, there is an on going Development Study financed by JICA named "Vientiane Water Supply Development". The study is elaborating a master plan. It was forecasted that the future urban water demand in Vientiane will be so much that it would not be affordable by Lao government as well as by international donors' financial support. In connection with this issue, the project will tackle this problem by supporting the realization of a water conservation plan, which will be proposed by the above study. This project has important complementary role within projects concerned with urban water supply development in Lao P.D.R.

(5) Sustainability

Throughout the project activities, not only water supply human resource in all the provinces will be trained, but also the system for training will be developed through training of trainers, and through the development of curriculum and textbooks. That will secures the training system after project completion.

Project activities will be build in the existing urban water supply organization and will be mainly conducted by the Lao authorities. Input from Japanese side will be carefully controlled and kept at low level. Therefore, the sustainability of the training (human resource development system) for persons concerned with urban water supply will be secured after project completion in terms of budget and human resource.

(6) Overall Relevance of Project Implementation.

In order to achieve desired project impact, effectiveness, efficiency and sustainability as specified above, it is also very important to consider the following issues during the implementation of the project.

(i) Coordination with other project and Water Resource Management Program: The UWS Investment Plan and Program consists of many investment projects, which will be financed by development banks (ADB, the World Bank, etc) and other international and bilateral agencies. Most of the assistance project will have an institutional capacity building or human resource development components attached to the project. Hence, in order to save resources and manpower, and to avoid confusion in the implementation it is important to coordinate the project activities with other UWS project activities under the responsibility of WASA. To be relevant, the project could also be the main coordinator for all WASA HRD and training.

(ii) Local Integration and Employee Carrier Development: The relevance of the project will be further justified if project activities are sustainable after its completion. Therefore, the project activities have to be integrated in the daily administration and operation of the local institution. Parallel activities to the existing regulatory and operational work of WASA, NPV, and PNPs have to be avoided. Therefore, all training activities shall be integrated in the local institutions' HRD plans and employee carrier development scheme. The HRD division/unit of each NPV/PNP should be responsible of the training.

(iii) Certification of Training Course: To assure sustainability of the project it is important that the training system is designed in relation to existing national certification. This is a long process that requires the elaboration of competency standards and curriculum adapted to the vocational, technical and university level of the country, and that will be not able to accomplish during the time frame of the project. However, during the design of the training system and curriculum it is important to study the existing national curriculum.

Reference Documents and Reports

	Documents and Reports	*Authors*	*Organization*
1	*National Human Development Report Lao PDR 2001, Advancing Rural Development*		*UNDP*
2	*Poverty In Lao PDR*	*N Kakwani, Bounthavy, Sisouphanthong, Phonesaly, Souksavath, and Brent Dark*	*Asian Development Bank (ADB)*
3	*Participatory Poverty Assessment Lao People Democratic Republic Dec, 2001*	*James Chamberlain*	*Asian Development Bank (ADB)*
4	*Lao PDR Urban Sector Strategy, July I998*		*Asian Development Bank (ADB)*
5	*Water Supply & Sanitation in Lao PDR an overview leading into the new millennium, Final draft February 2000*		*Government of Lao PDR*
6	*Small Town Water and Sanitation Initiative in Lao PDR., Preliminary Desk Research: Inventory*		*WASA, DHUP &URI with the support from WSP-EASP*
7	*Technical Management of provincial Nam Papas, Phase I - Capacity Building for the Water Supply Sector, F'ebruary2002*	*INTERCONSULT International AS*	*WASA*
8	*Technical Management of provincial Nam Papas, Phase II - Capacity Building for the Water Supply Sector, February2002*	*INTERCONSULT International AS*	*WASA*
9	*Water Supply and Sanitation Sector Project Training Needs Assessment, June 2002*	*INTERCONSULT International AS*	*WASA*
10	*Summary of Five Year plan 1996-2000 and Five Year Plan 2001-2005*		*WASA*

Appendix 1:

Project Design Matrix (PDM)

PROJECT DESIGN MATRIX (PDM)
CAPACITY DEVELOPMENT OF URBAN WATER SUPPLY AUTHORITIES IN LAO PDR (1/2)

The first edition (2003.09.1)
Revision:

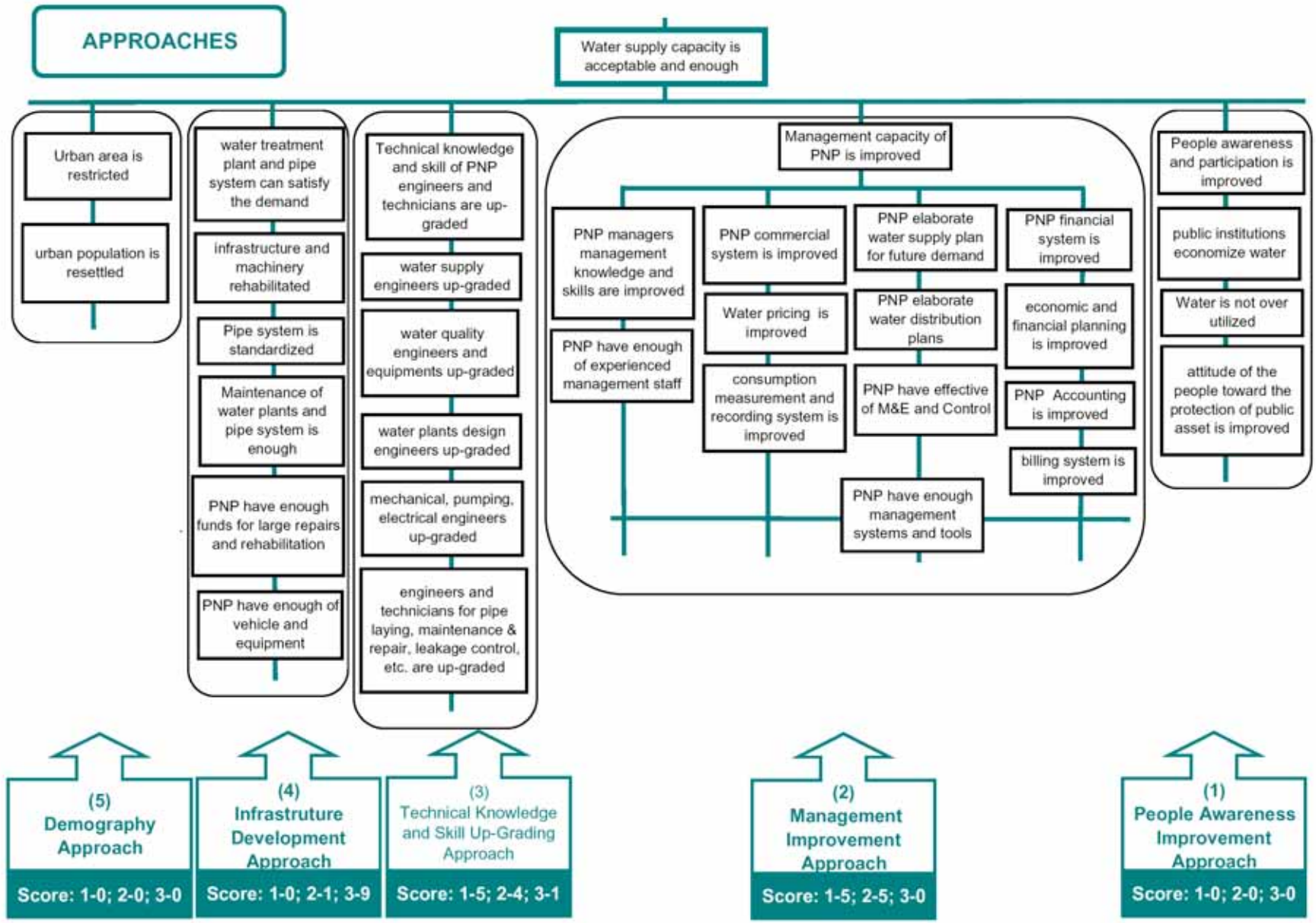
Duration of Project: 3 years (2003/9-2006/8)
Target: WASA(Water Supply Authority, MCTPC), NPV(Nam Papa Vientiane), PNP (Provincial Nam Papa)

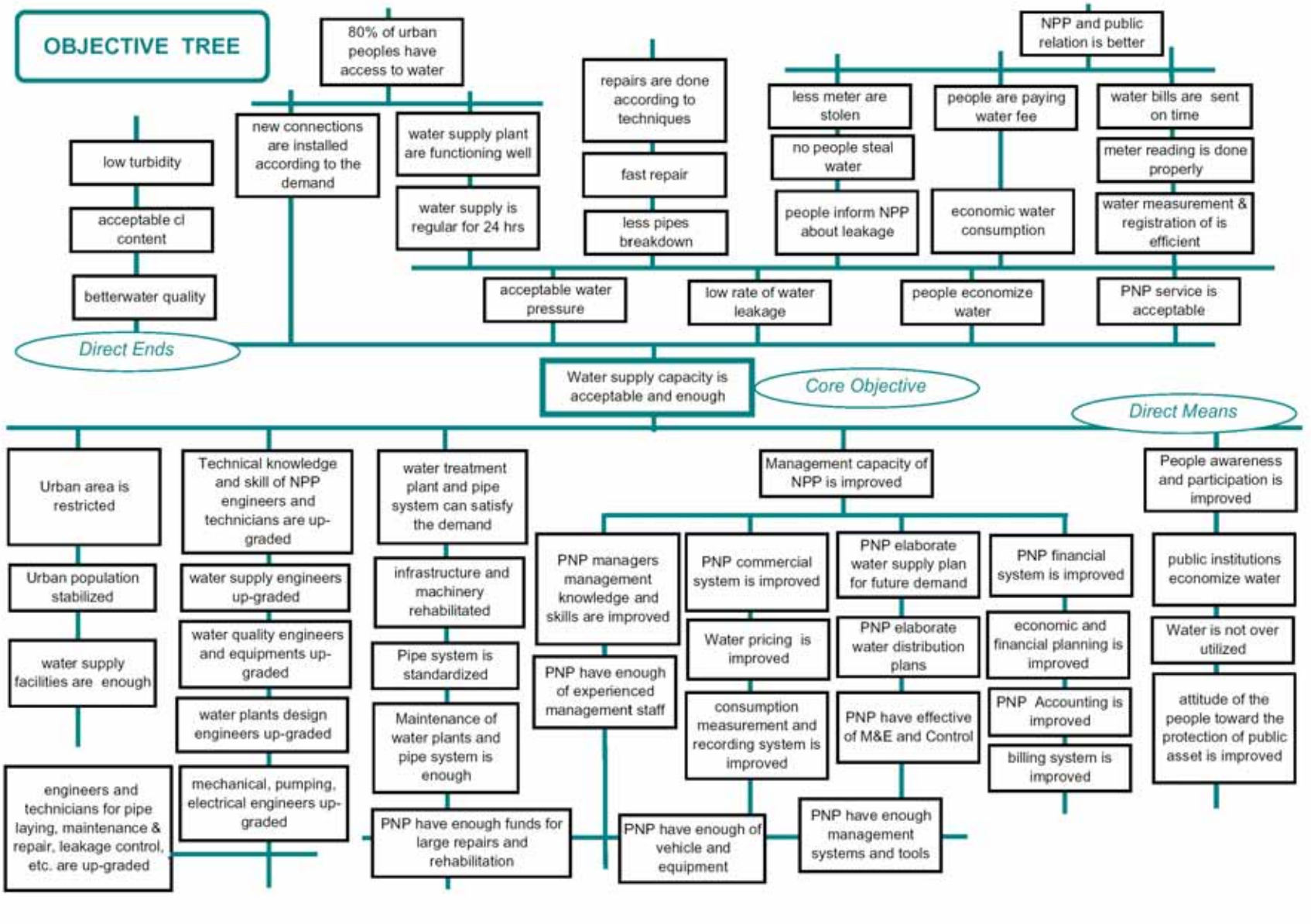
NARRATIVE SUMMARY	VERIFLABLE INDICATORS	MEANS OF VERIFICATION	
Super Goal People in urban areas can access safe water stably.	80% of the urban population are supplied with safe piped water by the year 2020 (in 2000, 378400 people or 48.9% have access to piped water)	NSC Basic Statistics	Urban Water Supply and Sanitation Projects under the assistance of ADB and others.
Overall Goal Capacity of Urban Water Supply Authorities is enhanced in sustainable ways	Quality of supplied water Stability of water pressure	Report of Water Quality Analysis Report on Water Pressure Survey	Trained engineers are engaged in the same jobs
Project Purpose Means of service performance of the staff of UWS authorities in Lao PDR are improved in the field of water pipe laying and maintenance, plant operation and maintenance, and water quality control.	Accuracy and efficiency of routine work Performance of water supply engineers and technicians Accuracy or reporting to WASA	Training Monitoring and Evaluation Report after the completion of training Summary reports by WASA	WASA, NPV and PNP staff are available for training.
Outputs 1. Appropriate UWS training system is elaborated and Trainers are trained.	1-1 Edited training curriculum 1-2 Number of NPV trainers upgraded (13 trainers) 1-3 Number of PNP trainers upgraded (20 trainers)	1-1 List of training curriculum 1-2 List of trainers	
2. Training textbooks and materials are developed	2-1 Number of text books and subjects (5 subjects) 2-2 Number of materials	2-1 Textbook for planning and design/ Pipe laying and connection/ Water treatment plant/ Water quality/ Non-revenue water. 2-2 List of materials	
3. UWS engineers are upgraded in each technology subjects	3-1 Number of engineers trained (115 engineers) 3-2 Trained engineers can deliver lectures at workshop/training	3-1 List of trained engineers 3-2 Report from PNP 3-3 Comprehension test	
4. Manuals for routine work are developed	4-1 Manual books for six subjects	4-1 Pipe laying/ Connection / Treatment plant/ Pumping/ Water quality/ Water leak detection	
5. The routine work skills of UWS technicians are upgraded	5-1 Number of technicians trained (360 technicians) 5-2 Proper performances of Operation & Maintenance	5-1 Training evaluation reports by PNP 5-2 O&M records by PNP 5-3 List of trained technicians	
6. Management skill of administrator and manager in Provincial Nam Papa (PNP) is upgraded	6-1 Number of PNP administrator trained (40 pers.) 6-2 Number of PNP manager trained (120 pers.) 6-3 Elaborated PNP water supply and financial plan	6-1 Water supply plan 6-2 Financial plan 6-3 Questionnaire 6-4 List of trained administrators and managers	

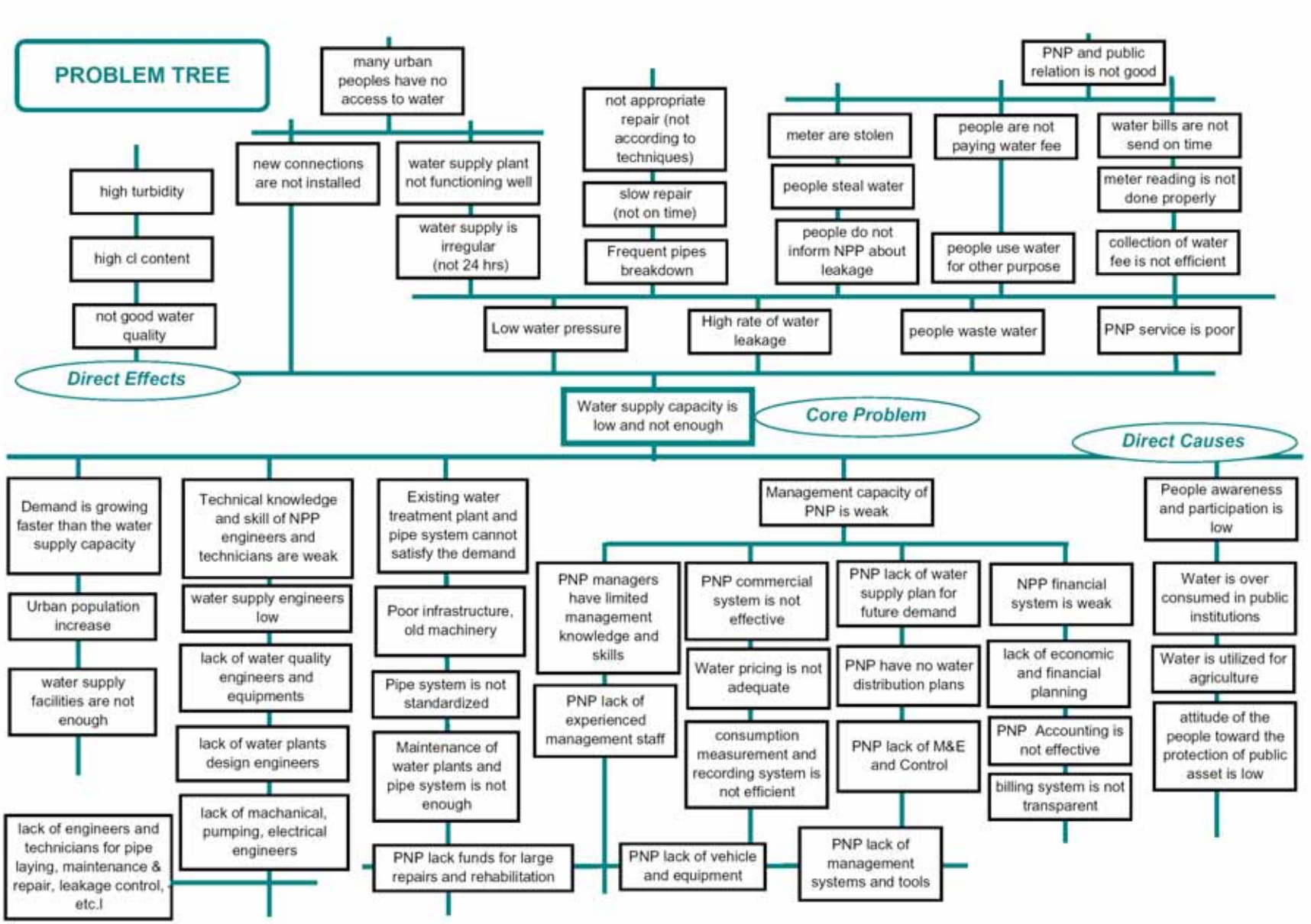
Activities	Inputs	
1.1. Review the existing Training Need Assessment (TNA) 1.2. Prepare the training programmes in Thailand 1.3. Conduct the training programme on training management in Thailand 1.4. Make a plan of UWS training programme 1.5. select twenty (20) trainers from nation wide 1.6. Conduct the training programme on the plant and piping work for the trainers in Thailand 1.7. Dispatch a trainee to Japan as a counterpart training programme 1.8. Prepare training curriculum for In-country Training Programme(ICTP) 1.9. Conduct the ICTP for trainers 1.10. Evaluate, review and improve the ICTP for trainers 2.1. Organize a working group on training textbook 2.2. Review and improve existing textbooks prepared by Nam Papa Vientiane(NPV) trainers 2.3. Compile and print the textbook of each field 3.1. Prepare the ICTP for engineer in each field 3.2. prepare the ICTP for 115 engineers from Water Supply Authority(WASA), NPV and PNP in Vientiane, Luangprabang and Pakse 3.3. Evaluate, review and improve the ICTP for engineers 3.4. Select twenty (20) assistant trainer from ICTP for engineers 3.5. Prepare the training programme on the plant and piping work for assistant trainers in Thailand 3.6. Conduct the training programme on the plant and piping work for assistant trainers in Thailand 4.1. Organize a working group of manuals for routine works 4.2. Collect technical information and prepare the materials 4.3. Edit the manuals for routine works in English and Lao 5.1. Prepare the ICTP for 360 technicians of PNP and their branches 5.2. Conduct the ICTP in central region by using manuals 5.3. Conduct the ICTP in southern region by using manuals 5.4. Conduct the ICTP in northern region by using manuals 5.5. Evaluate, review and improve the ICTP for technicians 6.1. Prepare the ICTP for administrators and managers 6.2. Conduct the ICTP for 40 administrators and 120 managers from NPV and PNP 6.3. Conduct the training programme on water supply management for the management staff in Thailand 6.4. Keep the records on routine operation in each PNP and summarize records into statistics in WASA 6.5. Formulate Water Supply and Financial Plan until 2020.	Japanese side: The contribution from Japan is estimated to Yen 150 million, comprising of. 1. Long-term Japanese Expert (1 person on Water Supply Planning) 2. Short-term Japanese Experts (6 persons, 2 persons for each year) – Lectures on water supply engineering at the In-country training courses – Lectures on waterworks management at the in-country training courses 3. Lectures from NWTTI in Thailand (2 persons, 1 person for each subject) – Technical transfer on training curriculum – Technical transfer on making the training textbooks 4. Senior Volunteers – Water treatment plant management – Water quality management – Non-revenue water management 5. In country training 6. Equipment, tools and materials 7. Training in Japan 8. Training at NWTTI Thailand 9. Trainers from NWTTI 10. Others Lao side: The contribution for the Government of Lao PDR is estimated to Kip 287 million comprising of: 1. Counterparts (C/P) 2. Project office and necessary facilities 3. Electricity and water for the office 4. Others	

Appendix 2:

PCM Problem Tree and Objective Tree

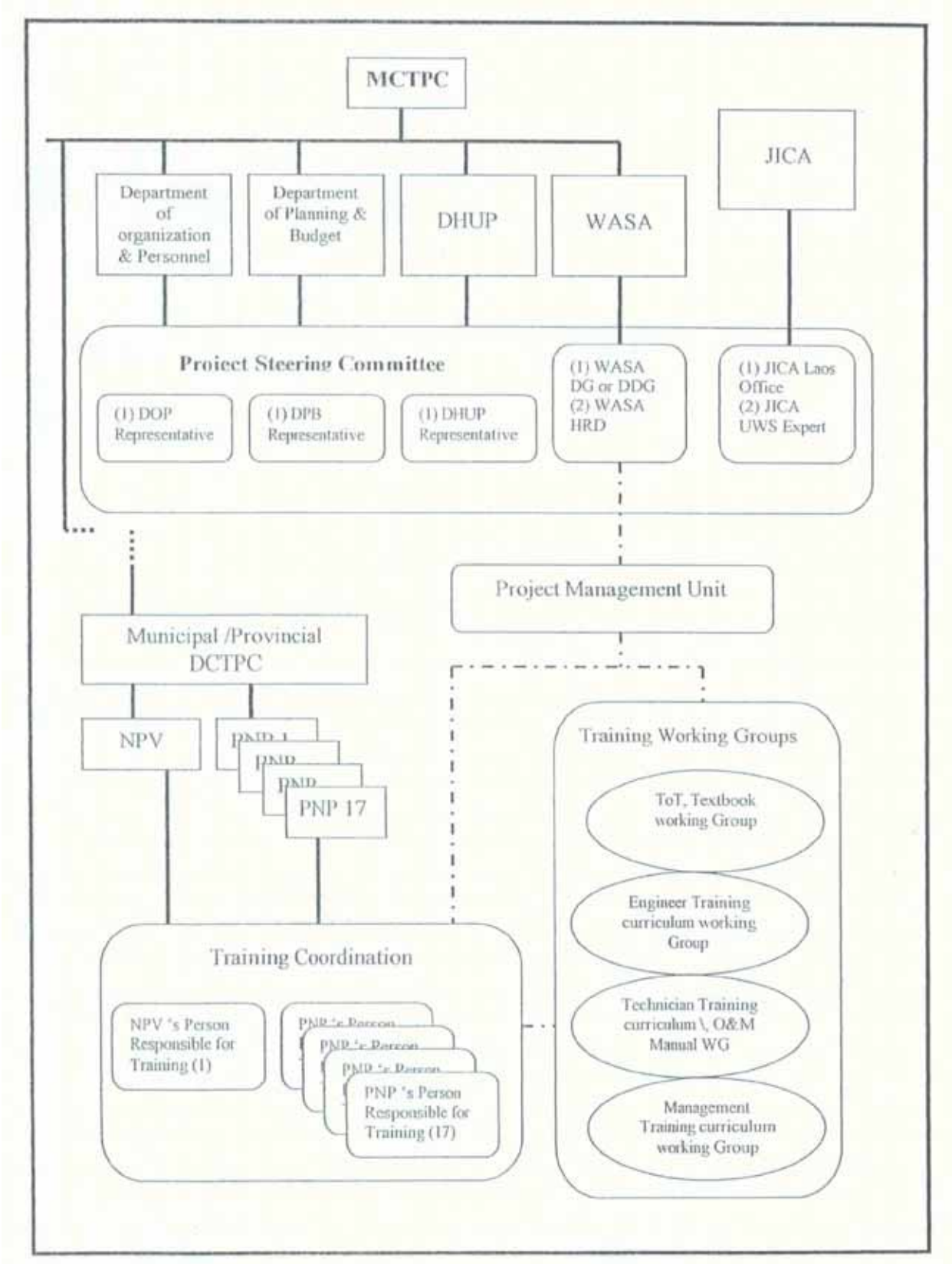

APPROACHES
Water supply capacity is acceptable and enough
Urban area is restricted
urban population is resettled
water treatment plant and pipe system can satisfy the demand
infrastructure and machinery rehabilitated
Pipe system is standardized
Maintenance of water plants and pipe system is enough
PNP have enough funds for large repairs and rehabilitation
PNP have enough of vehicle and equipment
Technical knowledge and skill of PNP engineers and technicians are up-graded
water supply engineers up-graded
water quality engineers and equipments up-graded
water plants design engineers up-graded
mechanical, pumping, electrical engineers up-graded
engineers and technicians for pipe laying, maintenance & repair, leakage control, etc. are up-graded
Management capacity of PNP is improved
PNP managers management knowledge and skills are improved
PNP have enough of experienced management staff
PNP commercial system is improved
Water pricing is improved
consumption measurement and recording system is improved
PNP elaborate water supply plan for future demand
PNP elaborate water distribution plans
PNP have effective of M&E and Control
PNP have enough management systems and tools
PNP financial system is improved
economic and financial planning is improved
PNP Accounting is improved
billing system is improved
People awareness and participation is improved
public institutions economize water
Water is not over utilized
attitude of the people toward the protection of public asset is improved
(5) Demography Approach
Score: 1-0; 2-0; 3-0
(4) Infrastruture Development Approach
Score: 1-0; 2-1; 3-9
(3) Technical Knowledge and Skill Up-Grading Approach
Score: 1-5; 2-4; 3-1
(2) Management Improvement Approach
Score: 1-5; 2-5; 3-0
(1) People Awareness Improvement Approach
Score: 1-0; 2-0; 3-0


OBJECTIVE TREE
80% of urban peoples have access to water
NPP and public relation is better
low turbidity
acceptable cl content
betterwater quality
new connections are installed according to the demand
water supply plant are functioning well
water supply is regular for 24 hrs
repairs are done according to techniques
fast repair
less pipes breakdown
less meter are stolen
no people steal water
people inform NPP about leakage
people are paying water fee
economic water consumption
water bills are sent on time
meter reading is done properly
water measurement & registration of is efficient
acceptable water pressure
low rate of water leakage
people economize water
PNP service is acceptable
Direct Ends
Water supply capacity is acceptable and enough
Core Objective
Direct Means
Urban area is restricted
Urban population stabilized
water supply facilities are enough
engineers and technicians for pipe laying, maintenance & repair, leakage control, etc. are up-graded
Technical knowledge and skill of NPP engineers and technicians are up-graded
water supply engineers up-graded
water quality engineers and equipments up-graded
water plants design engineers up-graded
mechanical, pumping, electrical engineers up-graded
water treatment plant and pipe system can satisfy the demand
infrastructure and machinery rehabilitated
Pipe system is standardized
Maintenance of water plants and pipe system is enough
PNP have enough funds for large repairs and rehabilitation
Management capacity of NPP is improved
PNP managers management knowledge and skills are improved
PNP have enough of experienced management staff
PNP commercial system is improved
Water pricing is improved
consumption measurement and recording system is improved
PNP have enough of vehicle and equipment
PNP elaborate water supply plan for future demand
PNP elaborate water distribution plans
PNP have effective of M&E and Control
PNP have enough management systems and tools
PNP financial system is improved
economic and financial planning is improved
PNP Accounting is improved
billing system is improved
People awareness and participation is improved
public institutions economize water
Water is not over utilized
attitude of the people toward the protection of public asset is improved


PROBLEM TREE
many urban peoples have no access to water
high turbidity
high cl content
not good water quality
new connections are not installed
water supply plant not functioning well
water supply is irregular (not 24 hrs)
not appropriate repair (not according to techniques)
slow repair (not on time)
Frequent pipes breakdown
meter are stolen
people steal water
people do not inform NPP about leakage
PNP and public relation is not good
people are not paying water fee
people use water for other purpose
water bills are not send on time
meter reading is not done properly
collection of water fee is not efficient
Low water pressure
High rate of water leakage
people waste water
PNP service is poor
Direct Effects
Water supply capacity is low and not enough
Core Problem
Direct Causes
Demand is growing faster than the water supply capacity
Urban population increase
water supply facilities are not enough
lack of engineers and technicians for pipe laying, maintenance & repair, leakage control, etc.l
Technical knowledge and skill of NPP engineers and technicians are weak
water supply engineers low
lack of water quality engineers and equipments
lack of water plants design engineers
lack of machanical, pumping, electrical engineers
Existing water treatment plant and pipe system cannot satisfy the demand
Poor infrastructure, old machinery
Pipe system is not standardized
Maintenance of water plants and pipe system is not enough
PNP lack funds for large repairs and rehabilitation
Management capacity of PNP is weak
PNP managers have limited management knowledge and skills
PNP lack of experienced management staff
PNP commercial system is not effective
Water pricing is not adequate
consumption measurement and recording system is not efficient
PNP lack of vehicle and equipment
PNP lack of water supply plan for future demand
PNP have no water distribution plans
PNP lack of M&E and Control
PNP lack of management systems and tools
NPP financial system is weak
lack of economic and financial planning
PNP Accounting is not effective
billing system is not transparent
People awareness and participation is low
Water is over consumed in public institutions
Water is utilized for agriculture
attitude of the people toward the protection of public asset is low

Appendix 3:

Organization Chart of the Project


MCTPC
JICA
Department of organization & Personnel
Department of Planning & Budget
DHUP
WASA
Project Steering Committee
(1) DOP Representative
(1) DPB Representative
(1) DHUP Representative
(1) WASA DG or DDG
(2) WASA HRD
(1) JICA Laos Office
(2) JICA UWS Expert
Project Management Unit
Municipal /Provincial DCTPC
NPV
PNP 17
Training Working Groups
ToT, Textbook working Group
Engineer Training curriculum working Group
Technician Training curriculum \, O&M Manual WG
Management Training curriculum working Group
Training Coordination
NPV 's Person Responsible for Training (1)
PNP 's Person Responsible for Training (17)

Appendix 4:

Information on Counterpart Organization

NAME OF PROVINCE		DCTPC				PNP						
		CHIEF ENGINEER	ENGINEER	WORKER	TOTAL	CHIEF ENGINEER	PIPE LAYING/ INSTALLATION		WATER TREATMENT PLANT		WATER QUALITY LAB	TOTAL
							ENGINEER	WORKER	ENGINEER	WORKER		
1	Vientiane Pre.	1	9	3	13							
2	Savannakhet	1	10	0	11	1	6	13	3	9	2	34
3	Luangprabang	1	4	0	5	2	3	9	2	8	2	26
4	Champasack	1	5	2	8	1	2	9	6	20	1	39
5	Khammuane	1	5	2	8	2	3	5	3	8	0	21
6	Phongsaly	1	2	2	5	1	1	2	1	2	0	7
7	Luangnamtha	1	4	0	5	1	1	3	1	1	0	7
8	Oudomxay	1	5	4	10	1	1	8	1	4	0	15
9	Bokeo	1	4	7	12	1	1	2	(1)	2	0	6
10	Huaphanh	1	3	0	4	1	2	3	(2)	(3)	0	6
11	Xayabury	1	4	2	7	2	2	3	1	2	0	10
12	Xiengkhuang	1	2	0	3	1	1	3	1	1	0	7
13	Vientiane	1	6	1	8	1	3	4	3	6	0	17
14	Borikhamxay	1	3	2	6	1	2	5	(1)	2	0	10
15	Saravane	1	3	0	4	1	1	2	1	2	2	9
16	Sekong	1	5	1	7	1	1	2	1	3	0	8
17	Attapeu	1	4	0	5	1	1	2	(1)	2	0	6
18	Xaysomboun SR	1	7	2	10							0
TOTAL		18	85	28	131	19	31	75	24	72	7	228

[PHASE 1] CHIEF ENGINEER ⇒ 37 + 3 (WASA) = 40

Technical information on the water supplies
Phase 1 Provincial Nam Papas

	Province	Borkeo	Khammouan		Luangprabang	Savannakhet		Phongsaly	
	Provincial Nam Papa / Nam Papa	Provincial Nam Papa Borkeo	Provincial Nam Papa Khammouane	Nam Papa Mahaxay	Provincial Nam Papa Luangprabang	Provincial Nam Papa Savannakhet	Nam Papa Champhone (Run by district)	Provincial Nam Papa Phongsaly	Nam Papa Meuangkhwua
A	**Water source**						Not visited No information available		
	Deep wells / boreholes / infiltration galleries		*						
	Spring or stream	*			OS			*	*
	River		* SUC	*	NS	*			*
B	**Water treatment**								
	Pre-sedimentation				NS				*
	Flocculation		SUC	*	OS/NS	*		*	*
	Sedimentation		SUC	*	NS	*		*	*
	Rapid sand filtration	*	SUC	*	OS/NS	*		*	*
	Slow sand filtration	*							
	Chlorination	*	*	*	*	*		*	*
C	**Type of water transmission from water source to treatment plant**								
	Gravity	*			OS				* (RS)
	Pumping		*	*	NS	*		*	*
D	**Type of water transmission from treatment plant to reservoir**								
	Gravity	Main zone	* (SUC)		OS			*	*
	Pumping	High zone	* (OS)	*	NS	*			
E	**Storage**								
	Combined storage capacity (m3)	650	1650	200	3295	2000		300	500
	Storage security (hours consumption)	13.0	11.3	8.3	9.1	3.9		20.6	34.3
	Number of water reservoirs	2	1	1	3	1		2	1
F	**Water transmission / distribution pipe network**								
	Total length (km)	29.3	37.8	6.6	68.5	90.2		15	9
	Number of separate pressure zones	2	1	1	2	1			
	Bulk meters installed for pressure zones	2	1	0	2(NW)	1 (NW)			
G	**Water pressure**								
	Maximum water pressure (m)	60/87(RW)	45	25	36	NIP		NIP	65
	Minimum water pressure (m)	10	10	10	14	NIP		NIP	NIP
	Regular occurance of too low pressure in the network (Y/N)	Y (DS)	Y (DS)	Y Daily	Y (DS)	N			
H	**General status of water supply**								
	Completion year of water scheme	1998	98/01	1997-	1969/2001	1997		1999	2001
	Capacity of water supply system (m3/d):								
	* During rainy season	1200	7000(OS+SUC)	800	15000	15000		1300	1000
	* During dry season	1200	5000(OS+SUC)	800	15000	15000		1200	1000
	Estimated current water demand (m3/d)	2000	4500	700	12500	13000			
	Capacity related to present demand								
	* Excess (spare)		* (OS+SUC)		*				*
	* Satisfactory					*			
	* Unsatisfactory	*	* (OS)	*				*	

Legend: SUC = Scheme under construction and nearly completed. **OS**=Old scheme. **NS**= New scheme. **DS**=Dry szeason. **NW**=not working.
RW= Raw water pipe. **NIP**= No information provided

Technical training needs / new technical staff requirements

Phase 1 Provincial Nam Papas

	Province	Borkeo	Khammouane		Luangprabang	Savannakhet		Phongsaly	
	Provincial Nam Papa / Nam Papa	Provincial Nam Papa Borkeo	Provincial Nam Papa Khammouane	Nam Papa Mahaxay	Provincial Nam Papa Luangprabang	Provincial Nam Papa Savannakhet	Nam Papa Champhone(run by district)	Provincial Nam Papa Phongsaly	Nam Papa Meuangkhwua
A	**Training needs in:**								
	* Mechanical/pump maintenance	4	4	4	5	5		5	4
	* Electrical/electronic maintenance	4	4	4	5	5		5	4
	* Water treatment process incl. analysis	5	4	4	4	5		5	4
	* Pipe laying / repairs (plumbing)	4	4	1	1	4		5	4
	* Leakage detection	3	5	3	3	4		5	4
	* Water meter reading / billing preparation	5	1	1	3	3		5	4
	* Water meter service and repair	3	3	3	3	3		5	4
NOTE:									
* The above prioritisations are done in collaboration with the PNP staff									
* Rating 5 **(five)** is the **highest priority** and **1 (one)** is the **lowest priority**									
B	**Exisiting number of technical staff**								
	* Water production (Mechanics)	1	2	1	2	7		1	1
	* Water production (Electricians)	2	3	1	2	4		0	0
	* General operators	3	5	2	7	10		1	1
	* Skilled personnel (plumber/welder)	5	6	1	10			1	1
C	**Assessment of technical number of staff**								
	* Water production (Mechanics)	All right	All right	All right	All right	All right		All right	All right
	* Water production (Electricians)	All right	All right	All right	All right	All right		All right	All right
	* General operators	All right	All right	All right	All right	TM		NM	NM
	* Skilled personnel (plumber/welder)	TM	All right	All right	TM	TM		All right	All right

NB! These recommendations are for the existing schemes only and do not include additional staff for the management of new schemes to be constructed during the programme.

Legend: NM= Need more staff

Technical information on the water supplies
Phase 2 Provincial Nam Papas

	Province	Attapeu	Champasack	Huaphanh	Saravane		Vientiane			Xaiyaboury	Xiengkhuang
	Provincial Nam Papa / Nam Papa	Provincial Nam Papa Attapeu	Provincial Nam Papa Champasack	Provincial Nam Papa Huaphanh	Provincial Nam Papa Saravane	Nam Papa Lao Ngarm	Provincial Nam Papa Vientiane	Nam Papa Tula Khon	Nam Papa Vangvieng	Provincial Nam Papa Xayabury	Provincial Nam Papa Xiengkhuang
A	**Water source**					Not visited No information available					
	Deep wells / boreholes / infiltration galleries	* (IG) NW									
	Spring or stream	*		*					*		*
	River	*	*		*		*	*		*	
B	**Water treatment**										
	Pre-sedimentation		*		*						
	Flocculation		*		*		*	*		*	
	Sedimentation		*		*		*	*	*	*	
	Rapid sand filtration		*		*		*	*	*	*	
	Slow sand filtration			*							*
	Chlorination		*	*	*		*	*	NW	*	*
C	**Type of water transmission from water source to treatment plant**										
	Gravity	N/A		*					*		*
	Pumping	N/A	*		*		*	*		*	
D	**Type of water transmission from treatment plant to reservoir**										
	Gravity	*		*					*		*
	Pumping	*	1		*		*	*		*	
E	**Storage**										
	Combined storage capacity (m3)	200	2050	1000	380		500	200	250	1200	2000
	Storage security (hours consumption)	5.2	3.3	24.0	8.6		24.0	8.0	5.9	31.0	26.7
	Number of water reservoirs	1	4	1	2		1	1		2	2
F	**Water transmission / distribution pipe network**										
	Total length (km)	33.4	91(OS)+35(NS)	22.9	15		31.5	17.2	20.1	69.8	33.6
	Number of separate pressure zones	1	18	2	5		1	1	1	2	1
	Bulk meters installed for pressure zones	1	15	3	5		1	1	1	2	1
G	**Water pressure**										
	Maximum water pressure (m)	NIP	32	NIP	20		NIP	30	48	38	50
	Minimum water pressure (m)	NIP	7	NIP	5		NIP	15	<10	28	15
	Regular occurance of too low pressure in the network (Y/N)	Y	Y (DS)	Y	N		NIP	N	Y (DS)	Irregular	N
H	**General status of water supply**										
	Completion year of water scheme	1992/97	1973/1997	1998	1997		1998	1995	1980/96	1998	1998
	Capacity of water supply system (m3/d):										
	* During rainy season	2000	2x7500 (N+OS)	1000	2200		2100	600	1200	1150	5616
	* During dry season	850	2x7500 (N+OS)	<1000	<2200		2100	600	1200	1150	5616
	Estimated current water demand (m3/d)	1200	~15000	1000	1100		500	600	1400	700	1300
	Capacity related to present demand										
	* Excess (spare)				*		*			*	*
	* Satisfactory		*					*			
	* Unsatisfactory	*		*					*		

Legend: SUC= Scheme under construction and nearly completed. **OS**=Old scheme. **NS**= New scheme. **DS**=Dry szeason. **NW**=not working.
RW= Raw water pipe. **NIP**= No information provided

Technical training needs / new technical staff requirements Phase 2 Provincial Nam Papas												
Province		Attapeu	Champasack	Huaphanh	Saravane		Vientiane			Xaiyaboury	Xiengkhuang	
Provincial Nam Papa / Nam Papa		Provincial Nam Papa Attapeu	Provincial Nam Papa Champasack	Provincial Nam Papa Huaphanh	Provincial Nam Papa Saravane	Nam Papa Lao Ngarm	Provincial Nam Papa Vientiane	Nam Papa Tula Kom	Nam Papa Vangvieng	Provincial Nam Papa Xayabury	Provincial Nam Papa Xiengkhuang	
A	**Training needs in:**					Not yet established NO information available						
	* Mechanical/pump maintenance	5	5	3	5		4	4	4	4	3	
	* Electrical/electronic maintenance	5	5	3	5		5	5	5	4	3	
	* Water treatment process incl. analysis	5	3	5	5		4	5	4	5	5	
	* Pipe laying / repairs (plumbing)	3	3	1	3		3	4	3	3	5	
	* Leakage detection	4	4	3	4		3	3	3	3	3	
	* Water meter reading / billing preparation	2	2	5	2		2	3	2	4	3	
	* Water meter service and repair	3	3	3	3		3	3	3	3	3	
		27	25	23	27		24	27	24	26	25	
NOTE:												
* The above prioritisations are done in collaboration with the PNP staff												
* Rating 5 **(five)** is the **highest priority** and **1 (one)** is the **lowest priority**.												
B	**Exisiting number of technical staff**											
	* Water production (Mechanics)	1	3	1	1		1	1	1	2	1	
	* Water production (Electricians)	0	2	0	1		0	0	0	1	1	
	* General operators	2	17	1	4		1	1	3	4	2+2	
	* Skilled personnel (plumber/welder)	2	9	3	4		3	2	2	3	3+1	
C	**Assessment of technical number of staff**											
	* Water production (Mechanics)	All right	All right	All right	All right		All right	NM	All right	All right	All right	
	* Water production (Electricians)	All right	All right	All right	All right		NM	NM	NM	All right	All right	
	* General operators	All right	Too many	NM	All right		NM	NM	Too many	Too many	All right	
	* Skilled personnel (plumber/welder)	NM	NM	All right	Too many		All right	All right	All right	NM	All right	
NB! These recommendations are for the existing schemes only and do not include additional staff for the management of new schemes to be constructed during the programme.												
Legend: NM= Need more staff												

Summary Profile of Urban water Supply System (existing, under, construction, funned, or planned) as at December 1999 (by Province and District)

No	Province/Prefecture/ Special Region	District Town	Urban water supplies-existing, under construction, funned, or planned (December 1999)						Provincial Capital & Priority Small Town System in SIP 1998 - 2020
			Summary Description	Estimated '99 District Population	Estimated 99 Urban Population	No. service connection	Urban pop' In served	% Urban pop' In served	
1	**Vientiane Prefecture** Vientiane Water Supply	Chanthabuly Sikhottabong Xaysetha Sisattanak	Originally built in 1963 under Japanese Loan $1.2 Expand 1974 ADB Loan $8.0m Upgrade 1986 Japan $5.0m Rehab. & Upgrade 1997-ADB$12.0m Expand 1998-Japan $25m Expand 2004-Ph. 1 ADB WS$S Sector Loan $6.0m Expansion planned under SIP for Vientiane Prefecture $27m	304,500	304,500: 348,000 in (2003)	38,000 (2003)	228,000 (2003)	64%	Investment to date $57.2m Expansion by 2010: see page (x)
		Hadxaifong/ Thadeua	New groundwater scheme completed 1994-France	74,200	28,200	1,457	8,800	say 60% Thadeua	investment $1.12m
		Xaythany/ Thangone	New Nam Ngum scheme completed 1995-Japan	111,750	42,800	520	3,626	42% Th'ngone	investment $0.32m
		Naxaithong		50,400	19,300	-	-	-	2nd Priority
		Mayparkngum		38,800	14,900	-	-	-	3rd Priority
		Sangthong		18,990	7,500	-	-	-	3rd Priority
			Prefecture sub-total	**598,640**	**417,200**	**39,957**	**240,426**	**58%**	**85.64m**
2	**Phongsaly**	Phongsaly	New scheme completed 1998- ADB Loan 1267-LAO Expansion planned under SIP for Northern Provincial Towns	28,150	5,000	596	3,052	62%	Investment $1.6m Expansion by 2012: see page (x)
		Khua	New System due complete 2001- WB	30,800	5,300	670	4,000	say 75%	Investment $1.0m
		Boon Neua	New scheme Ph. 1 ADB WS&S Sector Loan: complete 2004	15,350	3,900	590 (2003)	3,000	77%	Investment $1.03m
		Nhot Ou		26,300	800	-	-	-	3rd Priority
		Boontai		13,580	800	-	-	-	3rd Priority
		May		25,100	800	-	-	-	3rd Priority
		Samphanh		27,320	800	-	-	-	3rd Priority
			Province sub-total	**166,600**	**17,400**	**1,856**	**10,052**	**58%**	**$3.63m**

Summary Profile of Urban water Supply System (existing, under, construction, funned, or planned) as at December 1999
(by Province and District)

(2/9)

No	Province/Prefecture/ Special Region	District Town	Urban water supplies-existing, under construction, funned, or planned (December 1999)						Provincial Capital & Priority Small Town System in SIP 1998 - 2020
			Summary Description	Estimated '99 District Population	Estimated 99 Urban Population	No. service connection	Urban pop' In served	% Urban pop' In served	
3	**Luangnamtha**	Namtha	"old" Namtha-g/water scheme completed 1996-WS	37,606	5,800	approx. 700	3,500	say 60%	Ivestment $0.21m+ IDA No. 2579La
			"New" Namtha-New spring scheme completed 1996-WS						Investment $0.28mm+ IDA No.
		Sing	"Sing 1" New scheme from Nam Ya completed 1996-WS	24,115	4,200	approx. 500	2,500	say 60%	Investment $10.05m+ IDA No.
			"Sing 2" New scheme from Nam Le completed 1996-WS						Investment $1.04m+ IDA No.
		Long		23,765	5,000	-	-	-	3rd Priority
		Viengphoukha		16,550	5,000	-	-	-	3rd Priority
		Nalec		22,964	5,000	-	-	-	3rd Priority
			Sup-total	**125,000**	**25,000**	**1,200**	**6,000**	**24%**	**$2.7m**
4	**Oudomxay**	Xay	Original system built 1985-GOL	52,500	23,000	2,664	15,000	say 65%	Investment $1.9m
			Upgrade & expand in 2001- WB						Investment $2.0m
		Namor		27,690	4,500	-	-	-	1st Priority
		La		15,870	3,000	-	-	-	3rd Priority
		Pakbeng		24,760	2,500	-	-	-	3rd Priority
		Nga		26,360	2,500	-	-	-	3rd Priority
		Hoon		52,500	2,500	-	-	-	3rd Priority
		Beng		29,320	2,500	-	-	-	3rd Priority
			Provincial Sub - Total	**229,000**	**40,500**	**2,664**	**15,000**	**37%**	**$3.9 m**
5	**Bokeo**	Huoixai	New scheme complete 1998- ADB Loan 1267-LAO	48,600	6,500	721	4,600	70%	Investment $2.028m
			Expansion planned SIP for Northerrn Provincial Towns						Expansion by 2012: see page (x)
		Tonpheung	Phase: 1 ADB WS &S Sector Loan: due complete 2004	21,670	4,800	600 (2003)	3,600	say 75%	Investment $0.73m
		Pha Oudom		29,100	1,000	-	-	-	2 nd prioity
		Paktha		17,100	500	-	-	-	3rd priority
		Meung		8,500	500	-	-	-	3rd priority
		Special Region		incl.above	-	-	-	-	-
			Provincial Sub - Total	**124,970**	**13,300**	**1321**	**8200**	**62%**	**$2.76m**

Summary Profile of Urban water Supply System (existing, under, construction, funned, or planned) as at December 1999 (by Province and District)

(3/9)

No	Province/Prefecture/ Special Region	District Town	Urban water supplies-existing, under construction, funned, or planned (December 1999)						Provincial Capital & Priority Small Town System in SIP 1998 - 2020
			Summary Description	Estimated '99 District Population	Estimated 99 Urban Population	No. service connection	Urban pop' In served	% Urban pop' In served	
6	**Luangprabang**	Luangprabang	Original system constructed in 1969; Upgrade & Expansion due for completion 2000-Germany	71,117	39,000	5,062	29,500	75%	Investment $8.9m
		Nambak	Phase 1 ADB WS&S Sector Loan: due completed 2004	51,800	6,900	870 (2003)	4,500	65%	Investment $1.1m
		Nan		31,150	600	-	-	-	2nd Priority
		Park Ou		23,400	500	-	-	-	3rd Priority
		Phonxay		27,000	500	-	-	-	3rd Priority
		Ngoi		43,750	500	-	-	-	3rd Priority
		Chomphet		27,350	500	-	-	-	3rd Priority
		Viengkham		42,800	500	-	-	-	3rd Priority
		Phoukhoune		17,800	500	-	-	-	3rd Priority
		Pakxeng		28,500	500	-	-	-	3rd Priority
		Xieng Ngeun		37,600	500	-	-	-	3rd Priority
			Provincial Sub - Total	**402,267**	**50,500**	**5,932**	**34,000**	**67%**	**$10.0m**
7	**Huaphanh**	Xamneua	New scheme completed 1998- ADB Loan 1267-LAO Expansion planned under SIP for Northern Provincial Towns	49,400	9,000	1,500	6,300	70%	Investment $1.41m Expansion by 2012: see page (x)
		Viengxay		35,400	1,500	-	-	-	1 st priority
		Viengthong		21,950	1,500	-	-	-	3rd Priority
		Huameuang		25,500	1,500	-	-	-	3rd Priority
		Xamtay		50,800	1,500	-	-	-	3rd Priority
		Xiengkhor		80,750	1,500	-	-	-	3rd Priority
		Sopbao		incl.above	1,000	-	-	-	-
		Add		incl.above	1,000	-	-	-	-
			Provincial Sub - Total	**263,800**	**18,500**	**1,500**	**6,600**	**36%**	**$1,41m**

Summary Profile of Urban water Supply System (existing, under, construction, funned, or planned) as at December 1999
(by Province and District)

(4/9)

No	Province/Prefecture/ Special Region	District Town	Urban water supplies-existing, under construction, funned, or planned (December 1999)						Provincial Capital & Priority Small Town System in SIP 1998 - 2020
			Summary Description	Estimated '99 District Population	Estimated 99 Urban Population	No. service connection	Urban pop' In served	% Urban pop' In served	
8	**Xayabury**	Xayabury	New scheme completed 1998- ADB Loan 1267-LAO Expansion planned under SIP for Northern Provincial Towns	66,150	10,000	1,139	7,200	say 70%	Investment $2.9m Expansion by 2012: see page (x)
		Parklai		67,400	2,000	-	-	-	1st Priority
		Hongsa		17,500?	2,000	-	-	-	1st Priority
		Kenethao		36,200	2,000	-	-	-	2nd Priority
		Xienghone		17,500?	2,000	-	-	-	3rd Priority
		Thongmyxay		17,500?	2,000	-	-	-	3rd Priority
		Botene		19,700	2,000	-	-	-	3rd Priority
		Phiang		44,300	2,000	-	-	-	3rd Priority
		Khop		17,500?	1,500	-	-	-	3rd Priority
		Ngeun		17,190?	1,500	-	-	-	3rd Priority
			Provincial Sub - Total	**320,940**	**27,000**	**1,139**	**7,200**	**27%**	**$2,9m**
9	**Xiengkhang**	Pek (Phonesavane)	New scheme completed 1998- ADB Loan 1267 Expansion planned under SIP for Northern Provincial Towns	63,000	12,000	1,460	8,436	say 70%	Investment $3.4m Expansion by 2012: see page (x)
		Kham		43,500	1,500	-	-	-	1st Priority
		Nonghed		36,700	1,000	-	-	-	2nd Priority
		Phookood		22,300	1,000	-	-	-	3rd Priority
		Khoune		31,950	1,000	-	-	-	3rd Priority
		Morkmay		8,500	1,000	-	-	-	3rd Priority
		Phaxay		14,730	500	-	-	-	3rd Priority
			Provincial Sub - Total	**220,680**	**18,000**	**1,460**	**8,436**	**47%**	**$3.4m**

Summary Profile of Urban water Supply System (existing, under, construction, funned, or planned) as at December 1999
(by Province and District)

(5/9)

No	Province/Prefecture/ Special Region	District Town	Urban water supplies-existing, under construction, funned, or planned (December 1999)						Provincial Capital & Priority Small Town System in SIP 1998 - 2020
			Summary Description	Estimated '99 District Population	Estimated 99 Urban Population	No. service connection	Urban pop' In served	% Urban pop' In served	
10	**Vientiane Province**	Thoulakham / Ban Keun	New scheme complete 1995: France (Nam Ngum)	62,900	10,700	750	3,750	say 35%	Investment $1.23m
		VangVieng	New scheme complete 1996: France (Houay Ngui)	48,800	8,700	1,028	6,200	say 72%	Investment $1.14m
		Phonhong	New scheme completed 1998 - ADB Loan 1267-LAO Expansion planned under SIP for Northern Provincial Towns	73,000	8,600	730	4,500	say 30%	Investment $1.4m Expansion by 2012: see page (x)
			Ban Km 52 community supply		6,000				1st Priority
		Xanakharm		35,000	5,000	-	-	-	2nd Priority
		Kasy		31,900	5,000	-	-	-	2rd Priority
		Keo Oudom		22,000	5,000	-	-	-	3rd Priority
		Feuang		41,600	5,000	-	-	-	3th Priority
		Hinhurp		incl.above	5,000	-	-	-	3th Priority
		Mad		incl.above	5,000	-	-	-	3th Priority
		Viengkharm		District created in 1999; details included in Phonhong District					
			Provincial Sub - Total	**315,200**	**64,000**	**2,508**	**14,450**	**23%**	**$3.77m**
11	**Borikhamxay**	Pakxanh	New scheme completed 1998- ADB Loan 1267-LAO	38,750	9,300	1,250	5,610	say 60%	Investment $2.1m
			Expansion planned under SIP for Northern Provincial Towns						Expansion by 2012: see page (x)
		Khamkeuth		52,500	1,500	-	-	-	1st Priority
		Thaphabath		22,000	600	-	-	-	2nd Priority
		Pakkading		32,300	600	-	-	-	3rd Priority
		Bolikhanh		16,500	500	-	-	-	3rd Priority
		Viengthong		17,950	500	-	-	-	3rd Priority
			Provincial Sub - Total	**180,000**	**13,000**	**1,250**	**5,610**	**43%**	**$2.1m**

Summary Profile of Urban water Supply System (existing, under, construction, funned, or planned) as at December 1999 (by Province and District)

(6/9)

No	Province/Prefecture/ Special Region	District Town	Urban water supplies-existing, under construction, funned, or planned (December 1999)						Provincial Capital & Priority Small Town System in SIP 1998 - 2020
			Summary Description	Estimated '99 District Population	Estimated 99 Urban Population	No. service connection	Urban pop' In served	% Urban pop' In served	
12	**Khammuane**	Mahaxay	New scheme completed 1997 - Lao PDR	25,300	31,000	74	450	41%	Investment $1.03m
		Thakhek(Capital)	New scheme completed 1996 - EU	75,300		2,120	12,300		Investment $6.3m
		Nongbok	Phase 1 ADB WS&S Sector Loan: due complete 2004	43,000	6,800	1,070 (2003)	5,300	approx 78%	Investment $1.5m
		Nhommalath		23,800	2,000	-	-	-	2nd Priority
		Nakai		17,200	1,500	-	-	-	3rd Priority
		Xaybuathong		16,400	1,300	-	-	-	3rd Priority
		Bualapha		21,000	1,300	-	-	-	3rd Priority
		Hinboon		55,900	1,300	-	-	-	3rd Priority
		Xebangfay		22,100	1,300	-	-	-	3rd Priority
			Provincial Sub - Total	**300,000**	**46,500**	**3,264**	**17,750**	**38%**	**$8.83m**
13	**Savannakhet**	Khanthabuli	Original systeme built approx. 1973 by French	129,800	90,500	8,678	43,000	47.50%	Investment $2.6m
			Expansion planned under SIP for Provincial Capital ($10.0m)						Expand & rehab by 2005: see page (x)
		Outhoomphone (seno)	Phase 1 ADB WS&S Sector Loan: due complete 2004	71,750	15,500	1,960 (2003)	11,500	74%	Investment $2.1m
		Songkhone		85,100	2,500	-	-	-	1st Priority
		Atsaphangthong		50,700	2,000	-	-	-	1st Priority
		Champhone		89,950	1,500	-	-	-	3rd Priority
		Thaphalanxay		incl.	1,500	-	-	-	3rd Priority
		Xonbuly		36,000	900	-	-	-	3rd Priority
		Atsaphone		42,700	900	-	-	-	3rd Priority
		Thapangthong		24,950	900	-	-	-	3rd Priority
		Sepone		37,150	900	-	-	-	3rd Priority
		Nong		17,400	900	-	-	-	3rd Priority
		Vilabuly		25,500	900	-	-	-	3rd Priority
		Xayphouthong		incl.	900	-	-	-	3rd Priority
		Phine		42,600	900	-	-	-	3rd Priority
		Xaybuly		44,638	900	-	-	-	3rd Priority
			Provincial Sub - Total	**698,238**	**121,600**	**10,638**	**54,500**	**43%**	**$4.7m**

Summary Profile of Urban water Supply System (existing, under, construction, funned, or planned) as at December 1999 (by Province and District)

(7/9)

No	Province/Prefecture/ Special Region	District Town	Urban water supplies-existing, under construction, funned, or planned (December 1999)						Provincial Capital & Priority Small Town System in SIP 1998 - 2020
			Summary Description	Estimated '99 District Population	Estimated 99 Urban Population	No. service connection	Urban pop' In served	% Urban pop' In served	
14	**Saravane**	Saravane	Original system constructed approx. 1992 No treatment.	72,700	8,700	1,071	6,400	74%	
			Rehab & upgrade - completed 1997 - ADB Loan 1122-LAO						Investment $2.7m
			Expansion planned under SIP for Southern Provincial Towns						Expansion by 2010: see page (x)
		Khongxedone	Original, Untreated, in 1997	50,900	3,119	423	-	-	1st Priority
		Lakhonepheng		33,500		-	-	-	3rd Priority
		Toomlarm		17,900		-	-	-	3rd Priority
		Lao Ngarm	Original, Untreated, in 1992	47,200	2,896	418	-	-	3rd Priority
		Vapy		29,400		-	-	-	3rd Priority
		Samuoi		8,400		-	-	-	3rd Priority
		Ta Oi		21,850		-	-	-	3rd Priority
			Provincial Sub - Total	**70,600**	**12,500**	**925**	**4,806**	**38%**	**$2.7m+**
15	**Sekong**	Lamarm	New scheme completed 1997- ADB Loan 1122-LAO	20,000	7,550	925	4,806	65%	Investment $0.7m
			Treatment plant being rehab: due complete 2001 - Norway						Investment $2.0m
			Expansion planned under SIP for Southern Provincial Towns						Expansion by 2010: see page (x)
		Dakcheung		18,500	2,000	-	-	-	3rd Priority
		Kaleum		15,100	1,500	-	-	-	3rd Priority
		Thateng		17,000	1,450	-	-	-	3rd Priority
			Provincial Sub - Total	**70,600**	**12,500**	**925**	**4,806**	**38%**	**$2.7m**

Summary Profile of Urban water Supply System (existing, under, construction, funned, or planned) as at December 1999 (by Province and District)

(8/9)

No	Province/Prefecture/ Special Region	District Town	Urban water supplies-existing, under construction, funned, or planned (December 1999)						Provincial Capital & Priority Small Town System in SIP 1998 - 2020
			Summary Description	Estimated '99 District Population	Estimated 99 Urban Population	No. service connection	Urban pop' In served	% Urban pop' In served	
16	**Champasack**	Pakse	Original system built approx. 1973 French grant	71,700	60,000	6,021	36,126	60% ?	Investment $1.8m
			Rehab & upgrade - completed 1997 - ADB Loan 1120-LAO						Investment $6.5m
			Intake being relocated: complete 2001 - Norway						Investment $2.0m
			Expansion planned under SIP for Southern Provincial Towns						Expansion by 2010: see page (x)
		Khong	New systen due complete 2001 - France	71,700	9,500	1,200	7,000	say 74%	Investment $3.0m
		Phonthong		80,100	3,000	-	-	-	1st Priority
		Paksxong		49,000	2,500	-	-	-	1st Priority
		Champasack		54,200	2,500	-	-	-	2nd Priority
		Bachiangchaleun - sook		37,800	1,000	-	-	-	3rd Priority
		Sanasomboon		61,300	1,000	-	-	-	3rd Priority
		Moonlapamok		35,400	1,000	-	-	-	3rd Priority
		Pathoomphonr		47,500	1,000	-	-	-	3rd Priority
		Sukhuma		42,800	1,000	-	-	-	3rd Priority
			Provincial Sub - Total	**551,500**	**82,500**	**7,221**	**43,126**	**52%**	**$13.3m**
17	**Attapeu**	Samakkhixay	Original system built approx. 1992; No treatment.	20,800	3,000	1,280 ?	2,400	say 80%	
			Rehab & upgrade - completed 1997 - ADB Loan 1120-LAO						Investment $1.1m
			Urgent need for water treatment plant						**Urgent funding being sought**
			Expansion planned under SIP for Southern Provincial Towns						Expansion by 2010: see page (x)
		Xaysetha		28,800	1,000	-	-	-	2nd Priority
		Phouvong		11,400	500	-	-	-	3rd Priority
		Sanamxay		21,600	1,000	-	-	-	3rd Priority
		Sanxay		13,400	500	-	-	-	3rd Priority

Summary Profile of Urban water Supply System (existing, under, construction, funned, or planned) as at December 1999 (by Province and District)

(9/9)

No	Province/Prefecture/ Special Region	District Town	Urban water supplies-existing, under construction, funned, or planned (December 1999)						Provincial Capital & Priority Small Town System in SIP 1998 - 2020
			Summary Description	Estimated '99 District Population	Estimated 99 Urban Population	No. service connection	Urban pop' In served	% Urban pop' In served	
			Provincial Sub - Total	**96,000**	**6,000**	**570**	**3,420**	**57%**	**$1.1m+**
18	**Xaysomboun (SR)**	Saysomboun	New scheme completed 1997: France	14,251	2,700	350 aaprox.	2,000	say 75%	Investment $0.8m
		Longsane		17,810	900	-	-	-	1st Priority
		Hom		6,396	800	-	-	-	3rd Priority
		Thathom		7,926	800	-	-	-	3rd Priority
		Phun		8,332	800	-	-	-	3rd Priority
			Provincial Sub - Total	**54,715**	**6,000**	**350**	**2,000**	**33%**	**$0.8m**
			Total	**5,000,000**	**1,000,000**	**85,667**	**487,976**	**48.90%**	**Total $129.34m**

SUMMARY: 1 Prefecture (Vientiane); 16 Provinces; 1 Government Special Region (Xaysomboun); 141 District; 1 Provincial Special Region (Bokeo)

NOTES:

1. Province and district populations shown in the above table for December 1999 are **estimates only.** They are based on 1995 census figures increased by between 1.2 and 14.7% depending on limited contemporary information. Where on recent population data are available, a growth factor of 10% has been adopted. Figures were adjusted to round off the total population at 5 (five) million.
2. Urban populations, in both provinces and district have also been **estimated.** They too are based on the 1995 Census data (Appendix 7), increased by 28%. Adjustments were made when any contemporary urban population data were available. Figures were adjusted to round off the total urban population 1 (one) million.
3. The adopted authority for spelling of Province and district names is the 1996 edition of "Basic Statistics about the Socio-economic Development in the Lao PDR", issued by the National Statistical Centre of the State Planning Committee.
4. As indicated in Column 10 in the above table, the Lao Government has proposed, under its Water Supply Sector Plan 1998 - 2020 (SIP), that the Vientiane Prefecture and Provincial Capital town water supplies shown in the following table be further developed. As with most of the planned small town water supplies, **at the time of writing funding sources for these project have not been identified and they remain open for participation by interested development partners:**

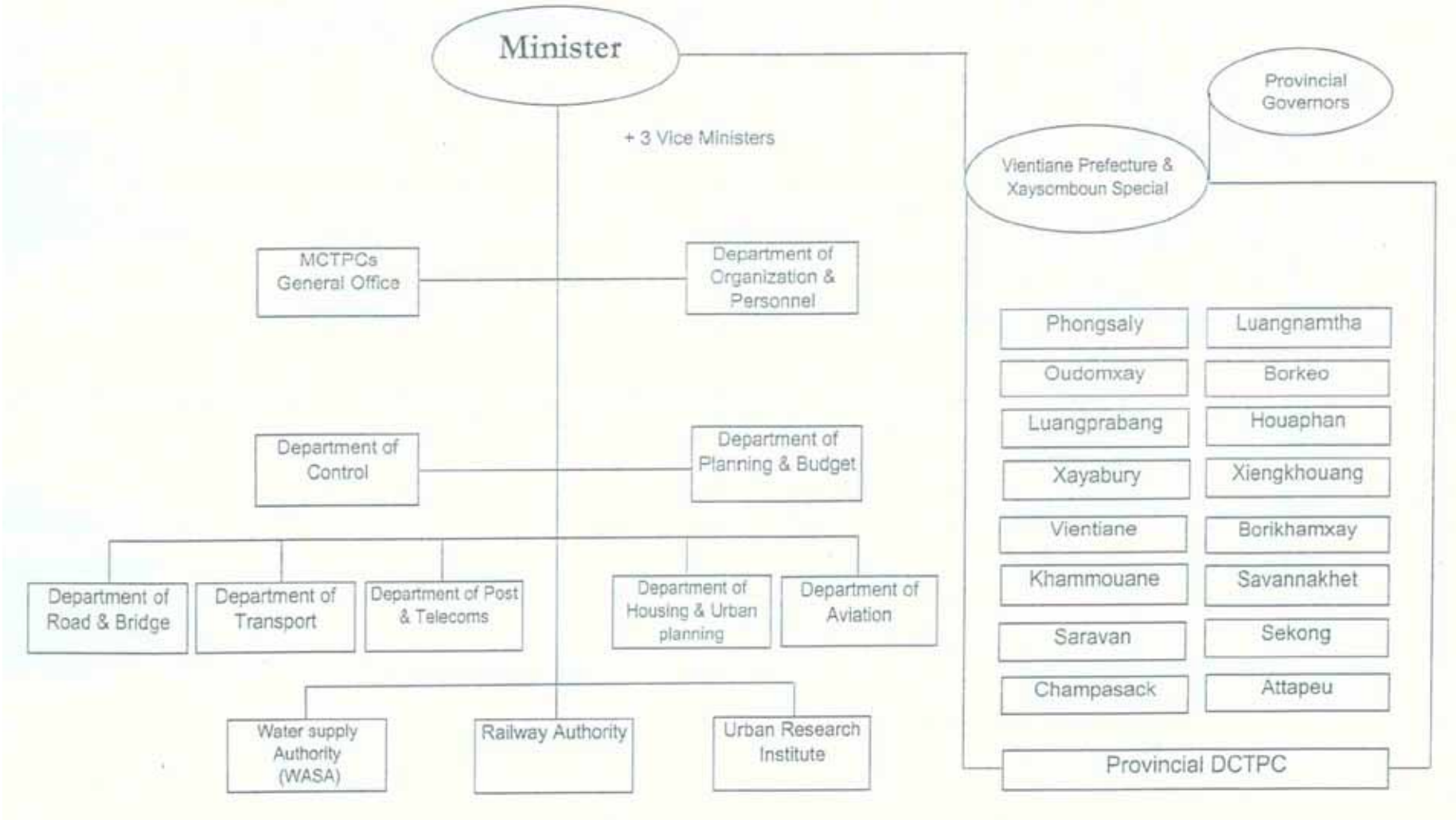
Vientiane Prefecture and Provincial Capital towns proposed for expansion under the SIP 1998-2020

No.	Province/Town	Estimated Completion date	Estimated investment (US$	Target population
	Vientiane Prefecture			
1	Expansion of the Vientiane Water Supply System (Vientiane prefecture)	2003	27.00	200,000
	Provincial capital			
1	Rehabilitation and Expansion of the Savannakhet (Khanthabouly) Water Supply System (Savannakhet province)	2005	10.00	50,000
2	Southern Province Towns Water Supply Expansion Project (phase II) - Pakse (Champasack Province) - Saravane (Saravane province) - Lamarm (Sekong province) and - Sammakkhixay (Attapeu Province)	2010	10.00	50,000
3	Northern Provincial Towns Water Supply Expansion Project (phase II) - Huoixai (Bokeo province) - Pakxanh (Borikhamxay Province) - Xamneua (Huaphanh Province) - Phongsaly (Phongsaly Province) - Xayabury (Xayabury Province) - Phonhong (Vientiane Province) - Pek (Phonsavane) (Xiengkhuang Province)	2012	10.00	50,000

Appendix 5:

Organization chart of Ministry Concerned

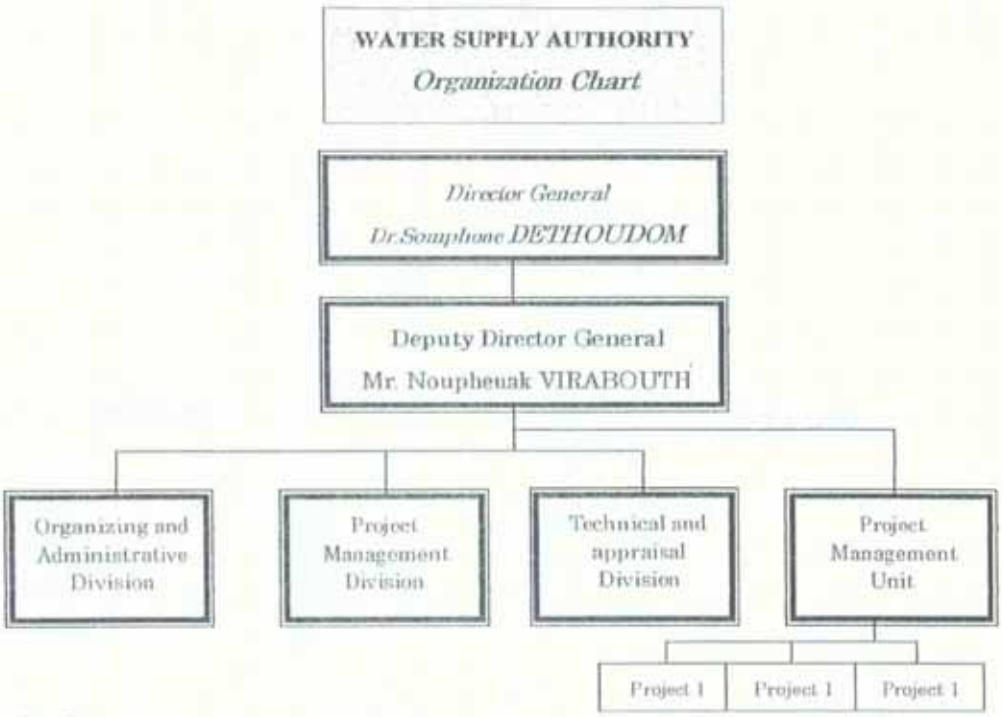
ORGANIZATION CHART - MINISTRY OF COMMUNICATION, TRANSPORT, POSTS AND CONSTRUCTION (MCTPC)



Appendix 6:

Organization Chart of WASA

WASA Organization Chart



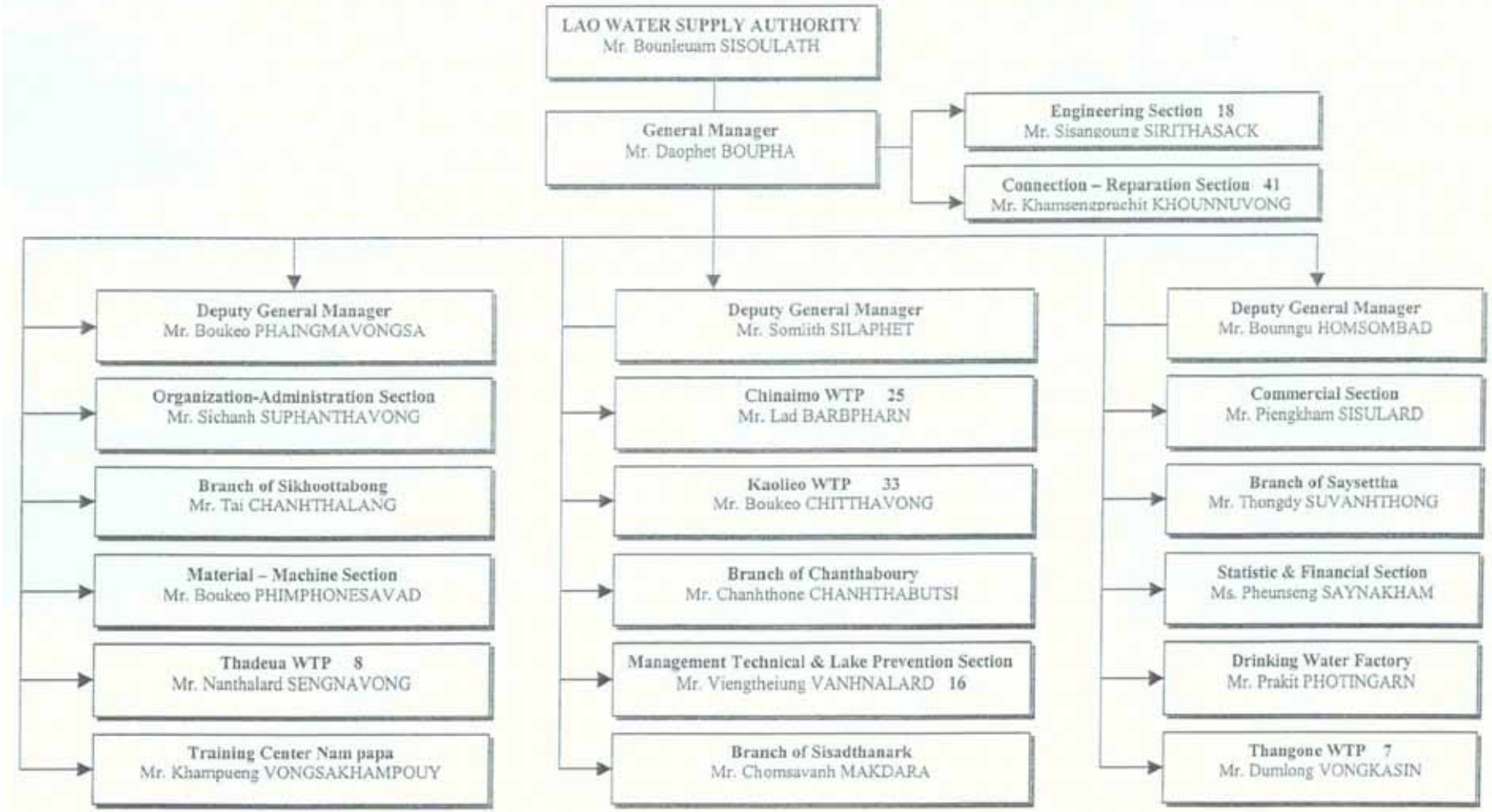
Staff

No	NAME	POSITION	Division or TASK	AGE	SPECIALTY
1	Dr. Soupphone Dethoudom	Director General		53	B.S &M.S in Architecture PH. D in Economics
2	Mr. Noupheuak Virabouth	Deputy Director General		45	GDip in Civil Engineering
3	Mr. Sompong Sitthivong	Project Manager	Project Division	37	Civil Engineer
4	Mr. Vilasack Litthavong	Dep. Head Organizing & Administrative Division	Organizing & Administrative Division	39	Finance
5	Mr. Somvan Mongphachanh	Staff	Technical and Appraisal Division	42	Economic & Construction Engineer
6	Ms. Kongsay Ouchit	Dep. Project Manager	Project Division	38	Hydro Engineer
7	Ms. Phoutthalom Saysanavongphet	Dep. Project Manager	Project Division	30	Civil Engineer
8	Mr. Bounthong Phanouvong	Staff	Project Division	37	Water Supply Engineer
9	Mr. Soutchay Buaphaivanh	Staff	Project Division	40	Water Supply Engineer
10	Mr. Soulideth Naovalangsy	Staff	Technical and Appraisal Division	38	Bridge and Road Engineer
11	Mr. Boualap Keokittisack	Staff	Technical and Appraisal Division	36	Civil Engineer
12	Ms. Phanthamaly Phandara	Staff	Project Division	32	Civil Engineer
13	Mr. Phouthong Phasavat	Staff	Technical and Appraisal Division	28	Civil Engineer
14	Ms. Somphet Chanthaphone	Staff	Organizing & Administrative Division	27	Public Administration
15	Mr. hamphouvong Sikolom	Staff	Project Division	25	Civil Engineer

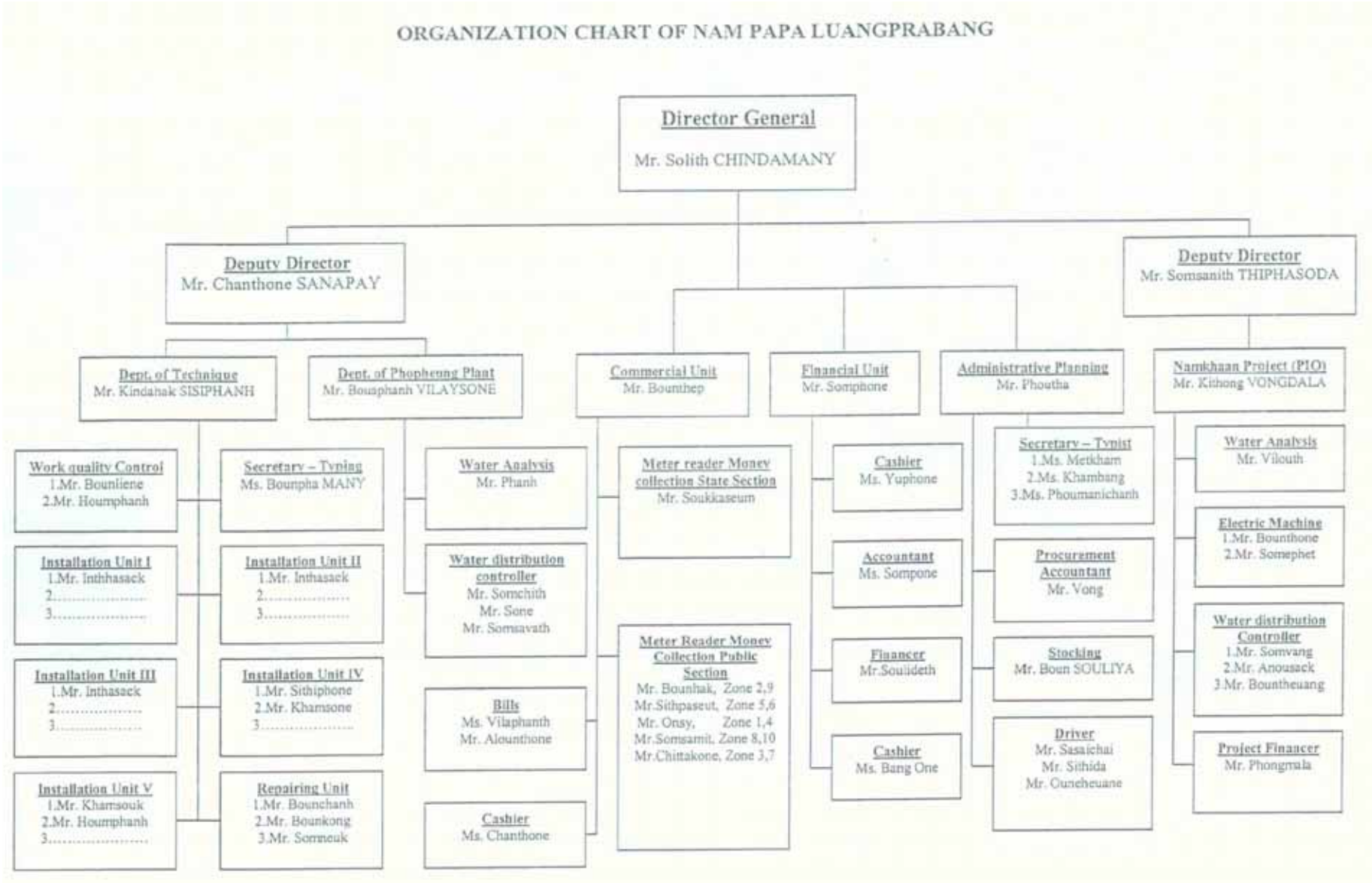
Appendix 7:

Organization Chart of NPV and PNP

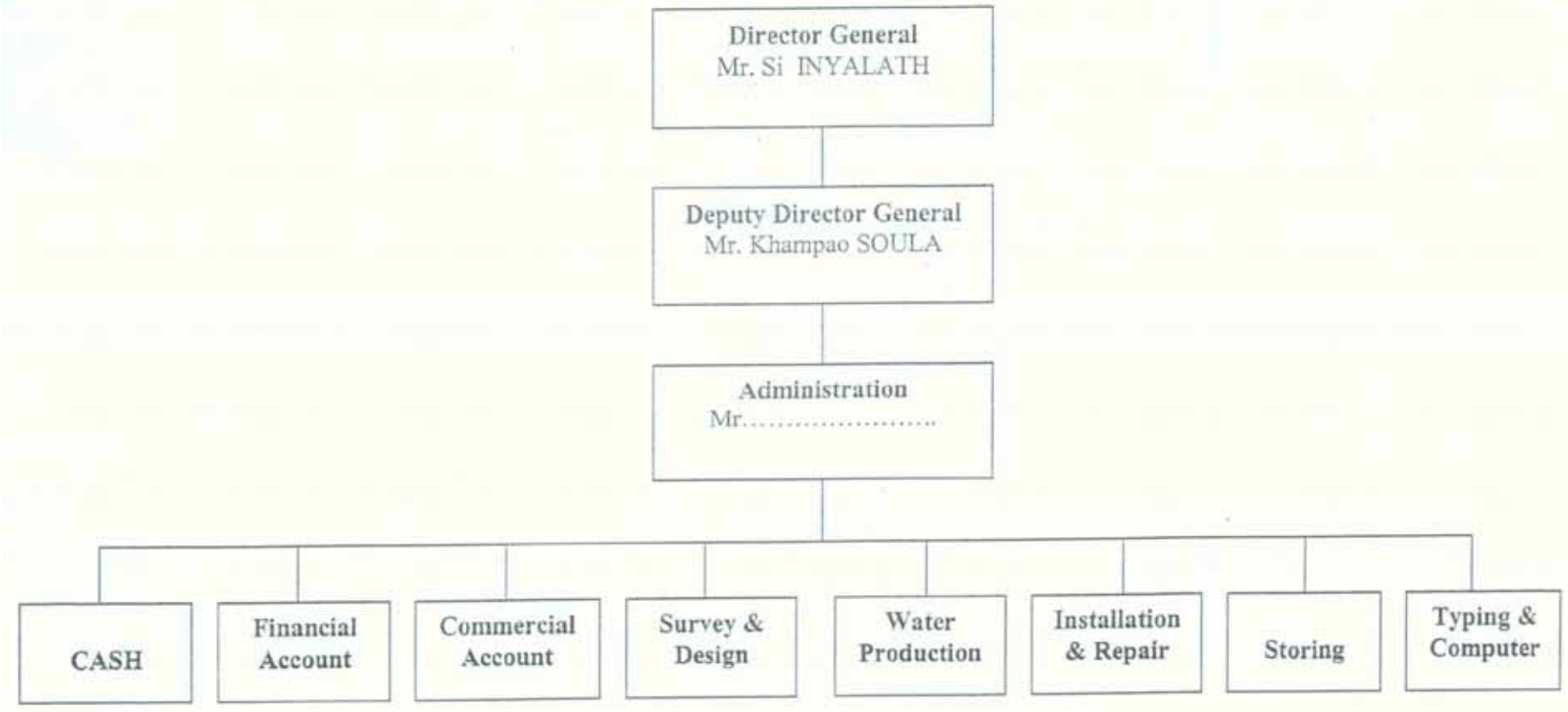
ORGANISATION CHART OF STATE ENTERPRISE OF WATER SUPPLY YEAR 2001



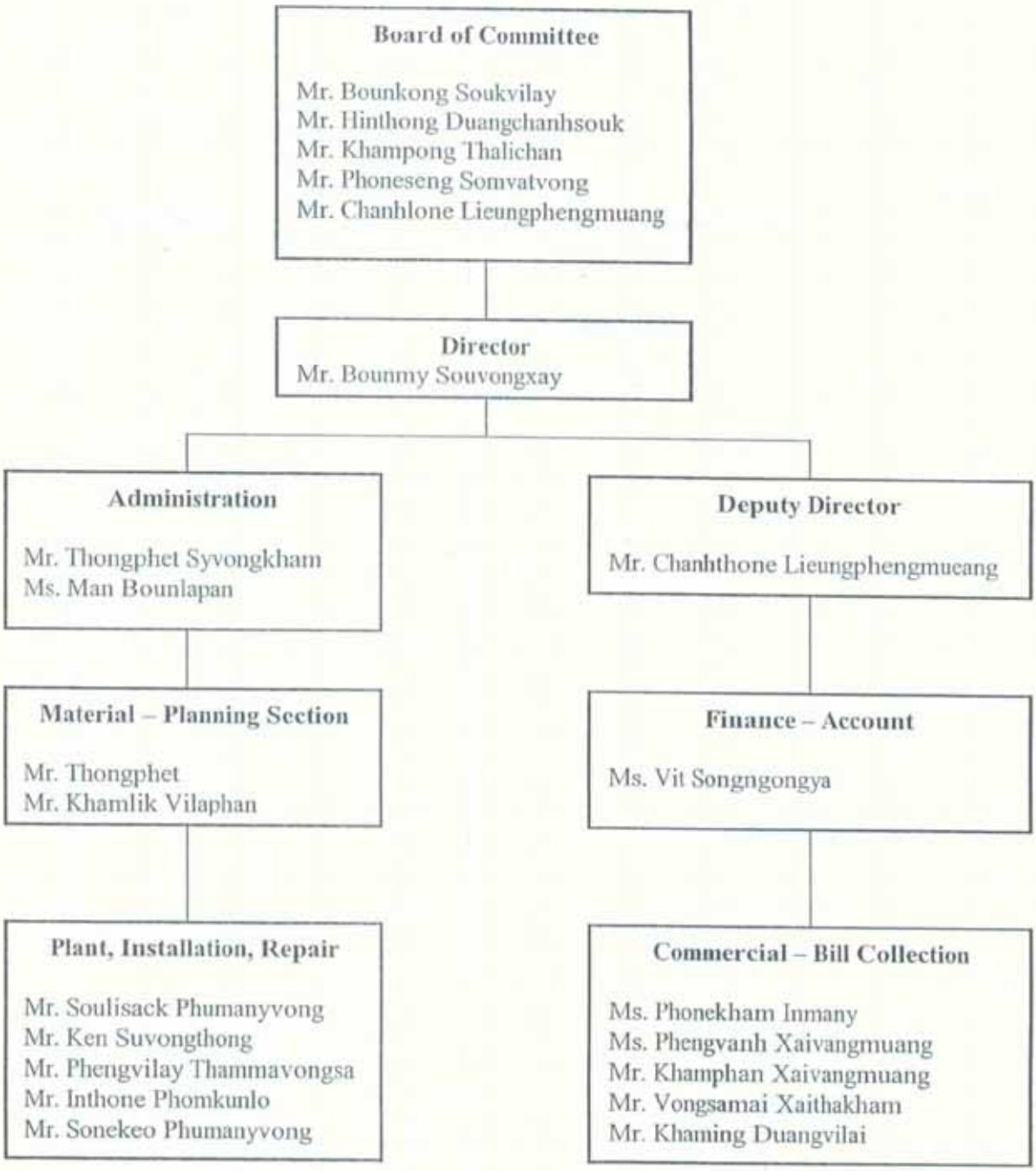
ORGANIZATION CHART OF NAM PAPA LUANGPRABANG



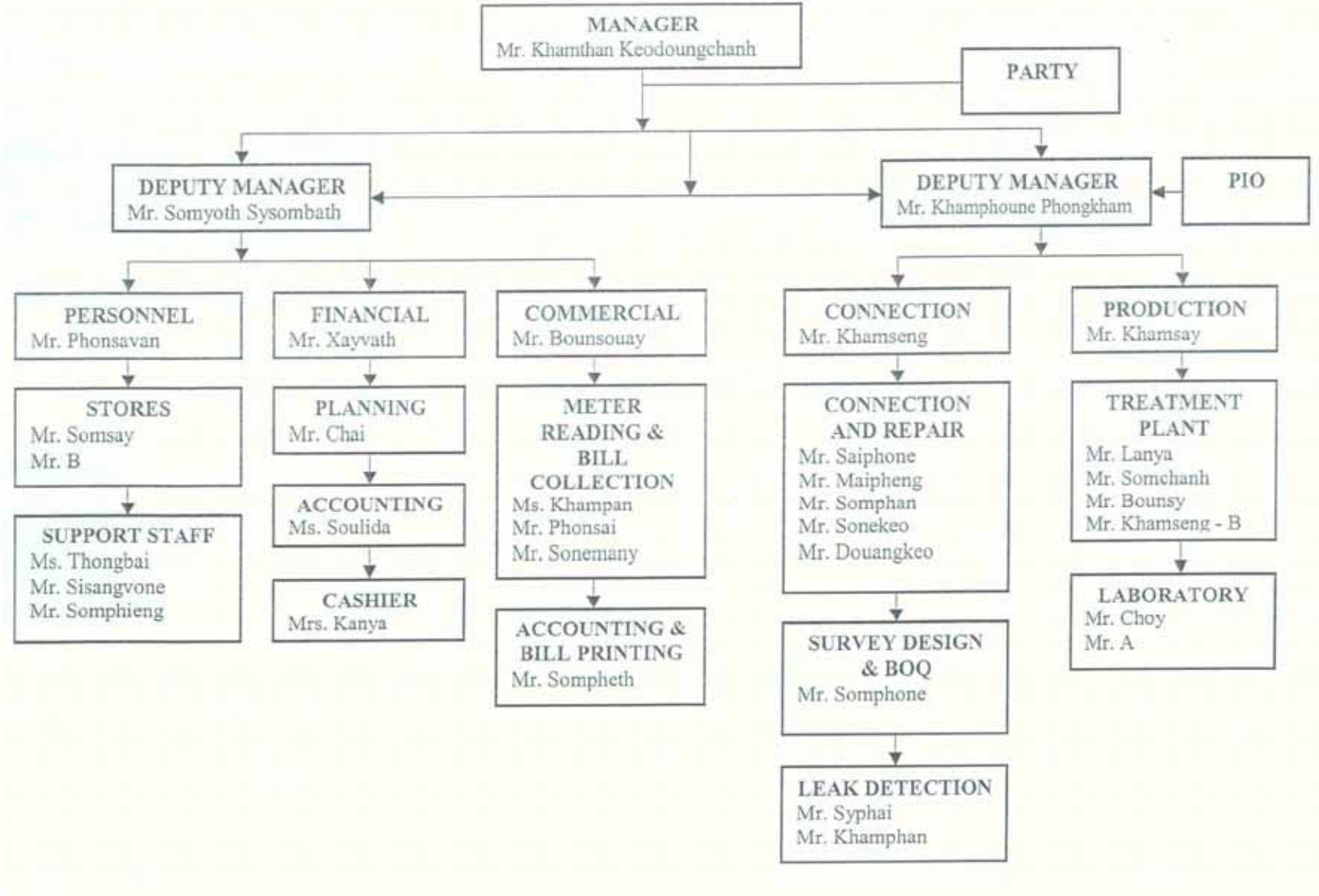
ORGANIZATION CHART OF NAM PAPA PHONGSALY PROVINCE

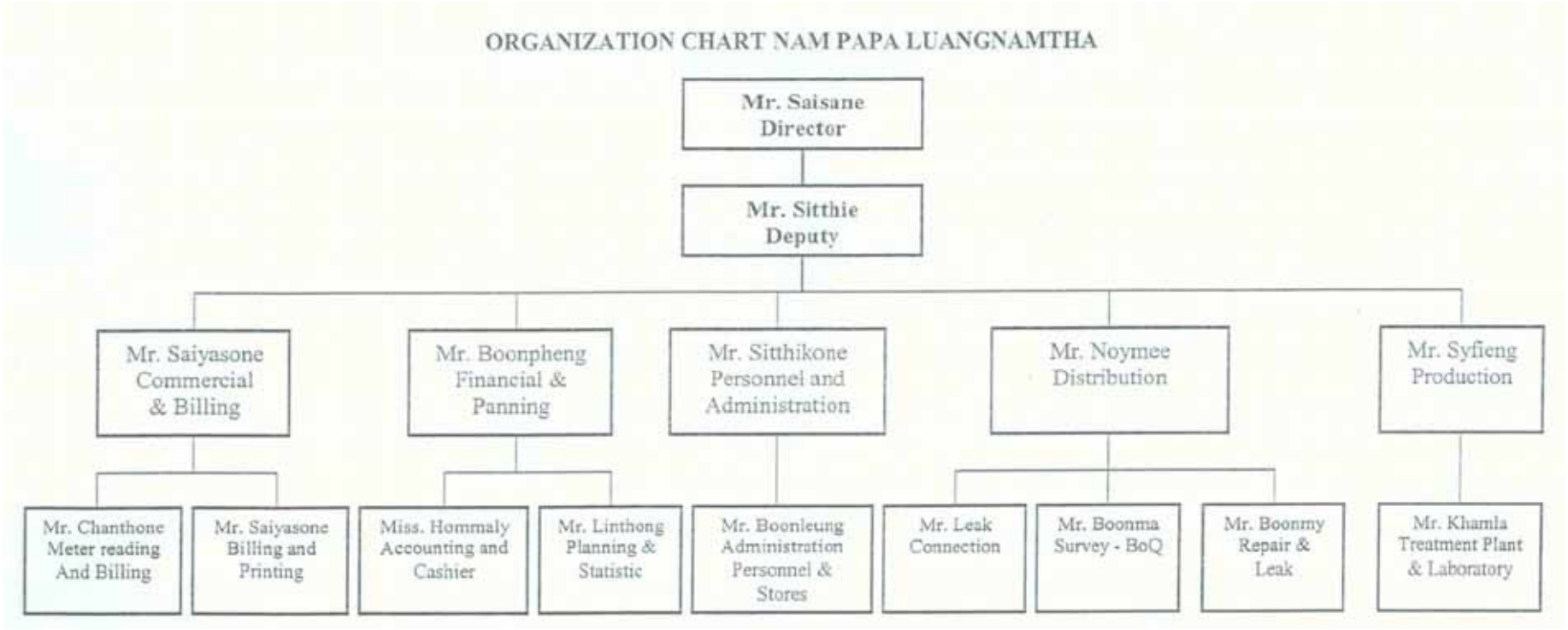


Organization chart of Nam papa Xamnua

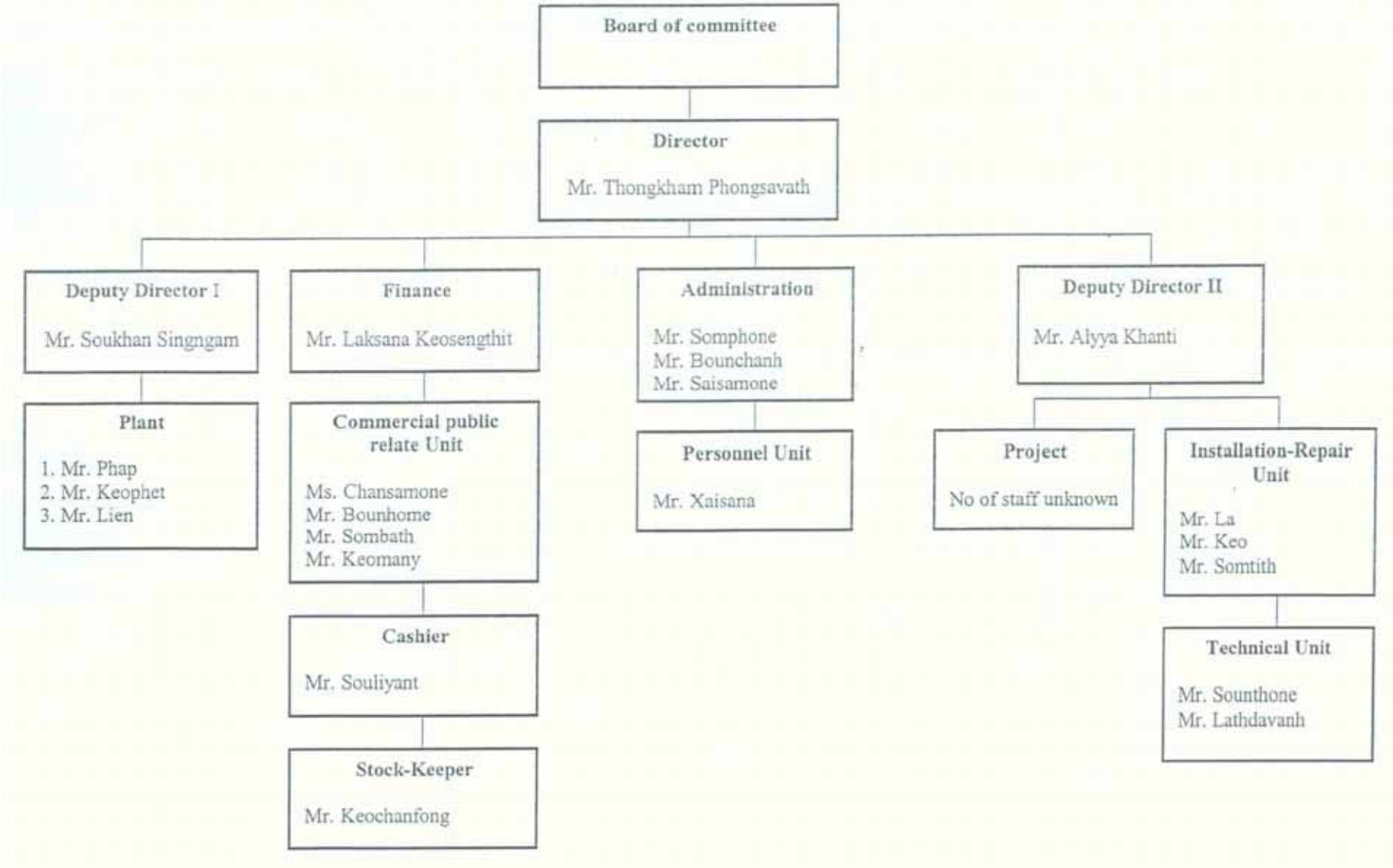


ORGANIZATION CHART NAM PAPA, OUDOMXAI

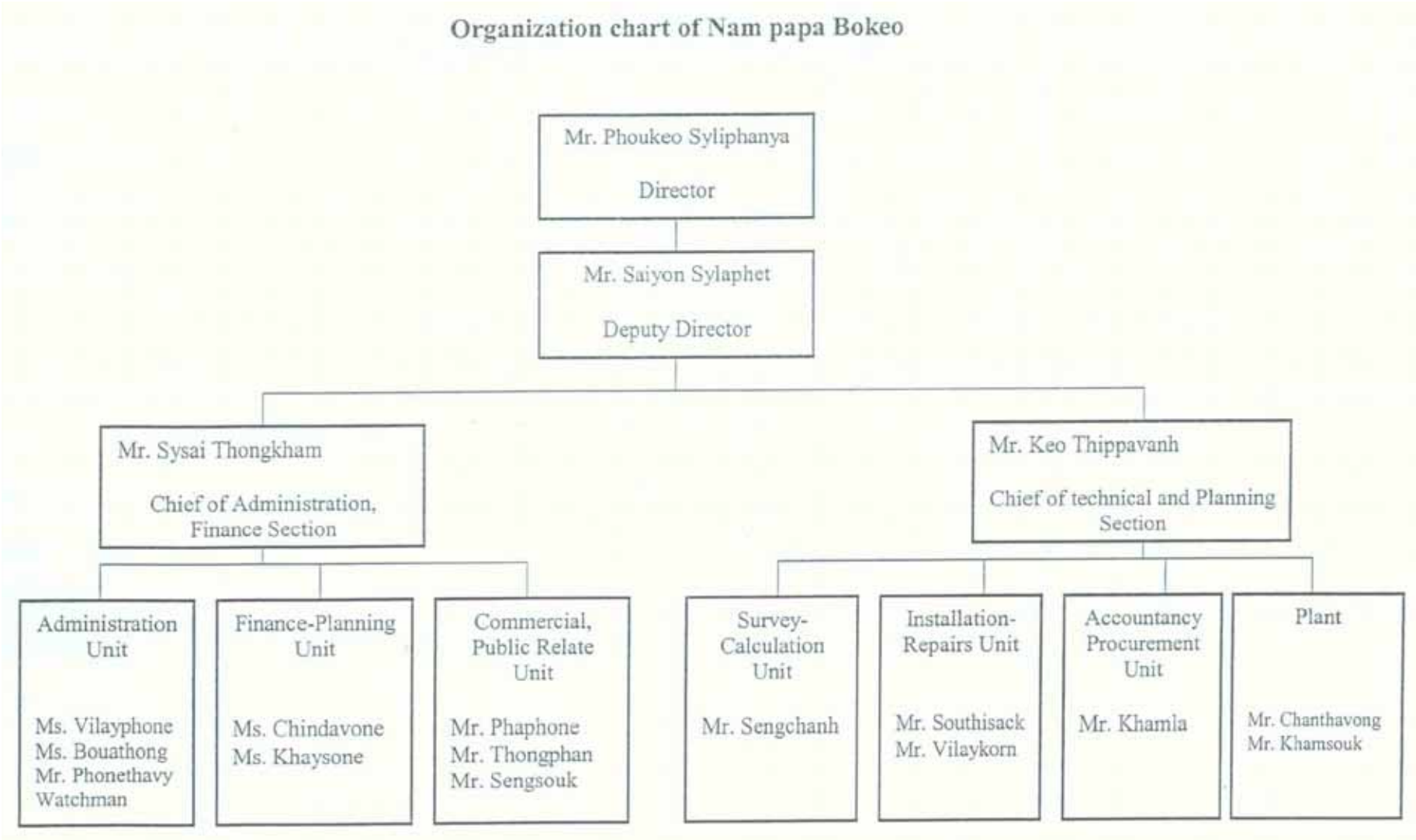



ORGANIZATION CHART NAM PAPA LUANGNAMTHA
Mr. Saisane
Director
Mr. Sitthie
Deputy
Mr. Saiyasone
Commercial
& Billing
Mr. Boonpheng
Financial &
Panning
Mr. Sitthikone
Personnel and
Administration
Mr. Noymee
Distribution
Mr. Syfieng
Production
Mr. Chanthone
Meter reading
And Billing
Mr. Saiyasone
Billing and
Printing
Miss. Hommaly
Accounting and
Cashier
Mr. Linthong
Planning &
Statistic
Mr. Boonleung
Administration
Personnel &
Stores
Mr. Leak
Connection
Mr. Boonma
Survey - BoQ
Mr. Boonmy
Repair &
Leak
Mr. Khamla
Treatment Plant
& Laboratory

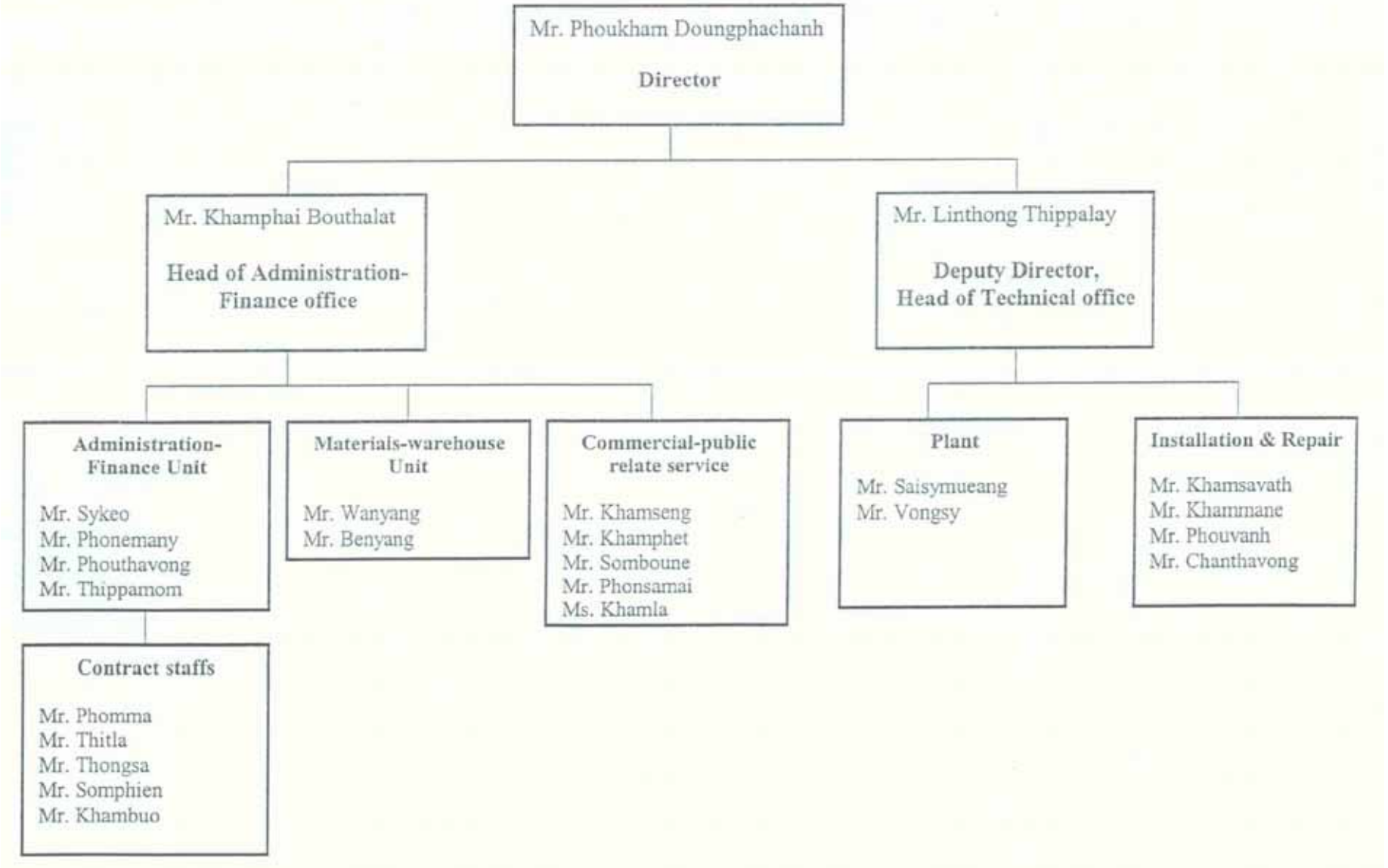
Organization chart of Nam Pa Pa Xaiyabury

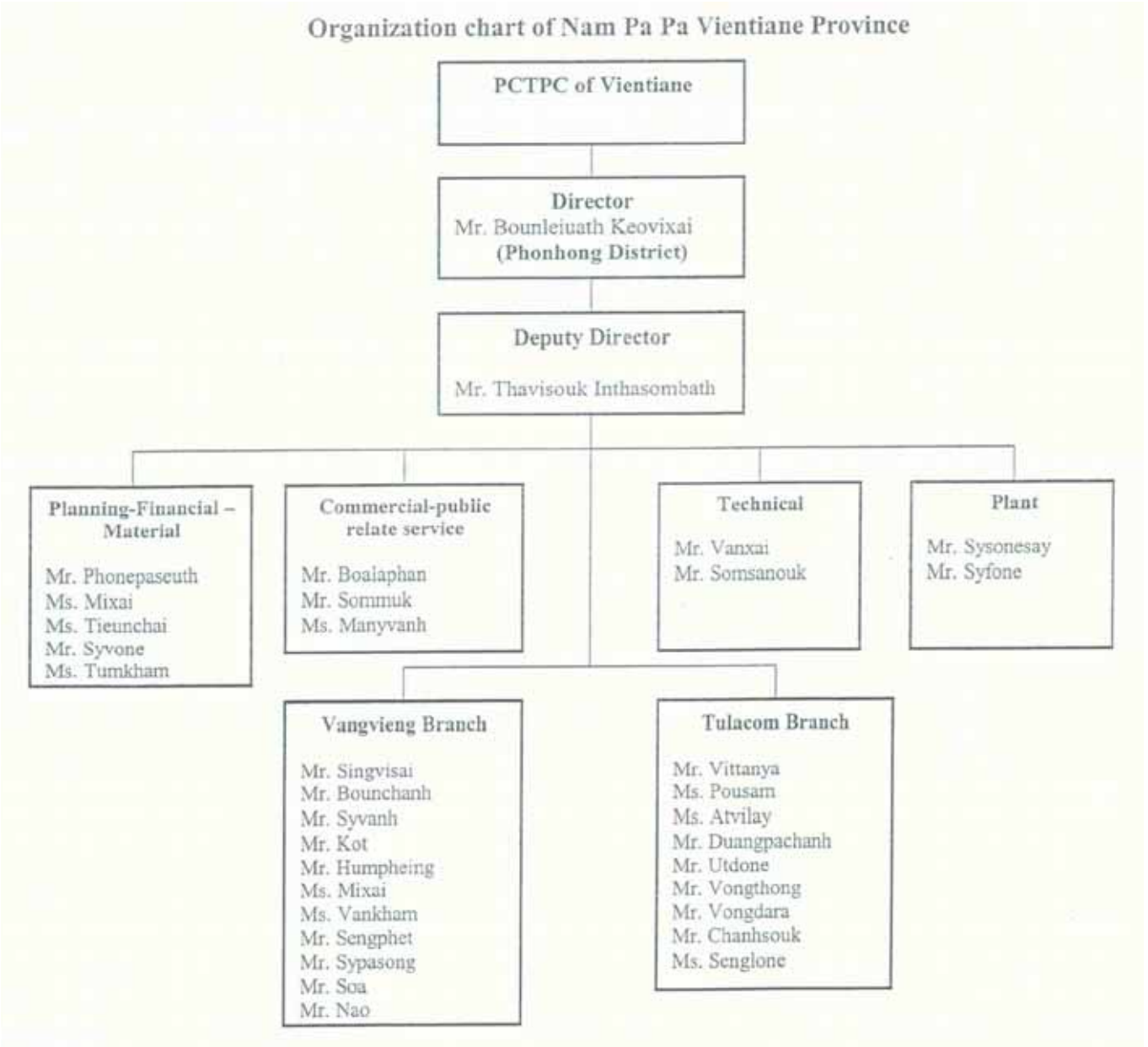


Organization chart of Nam papa Bokeo

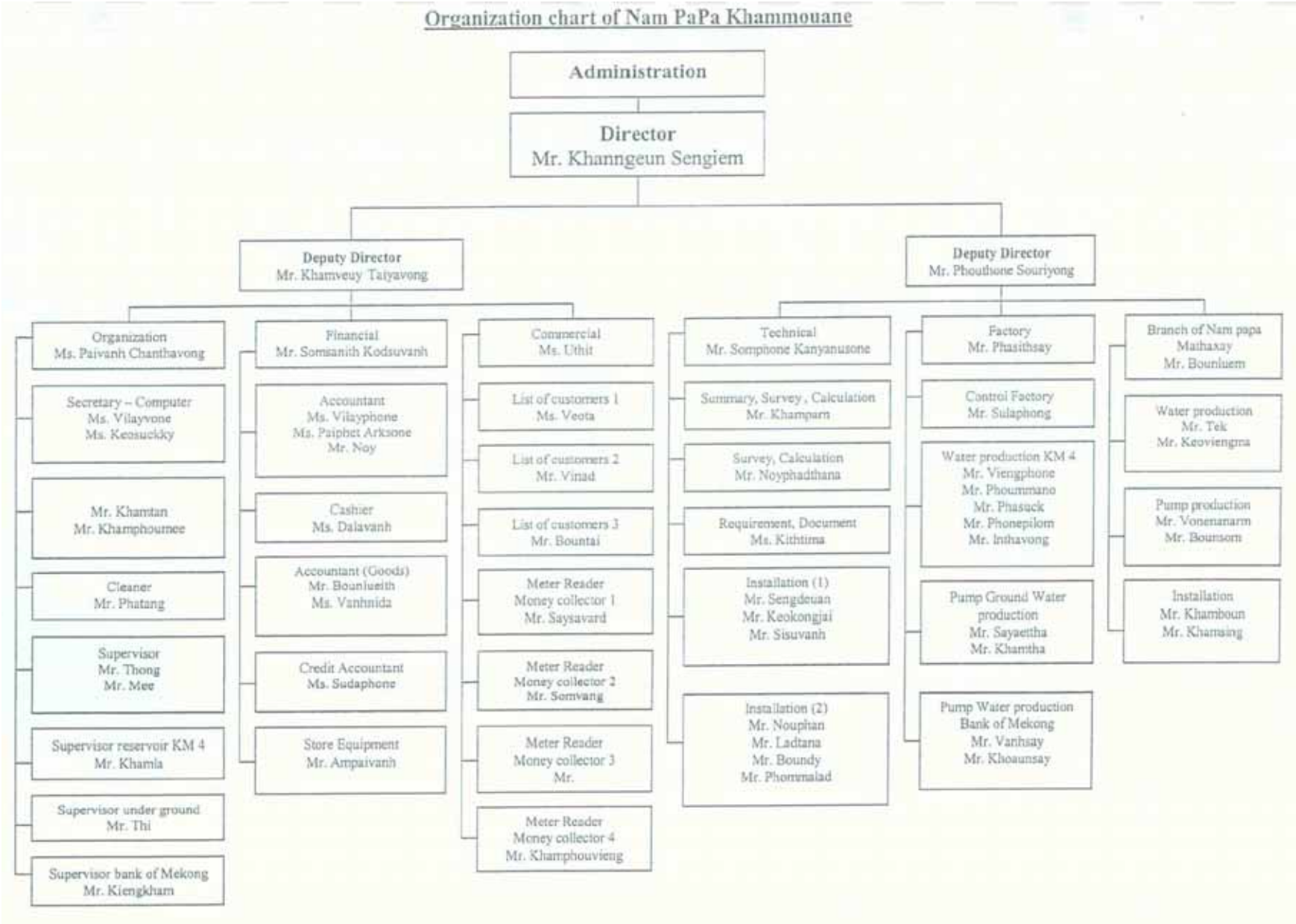


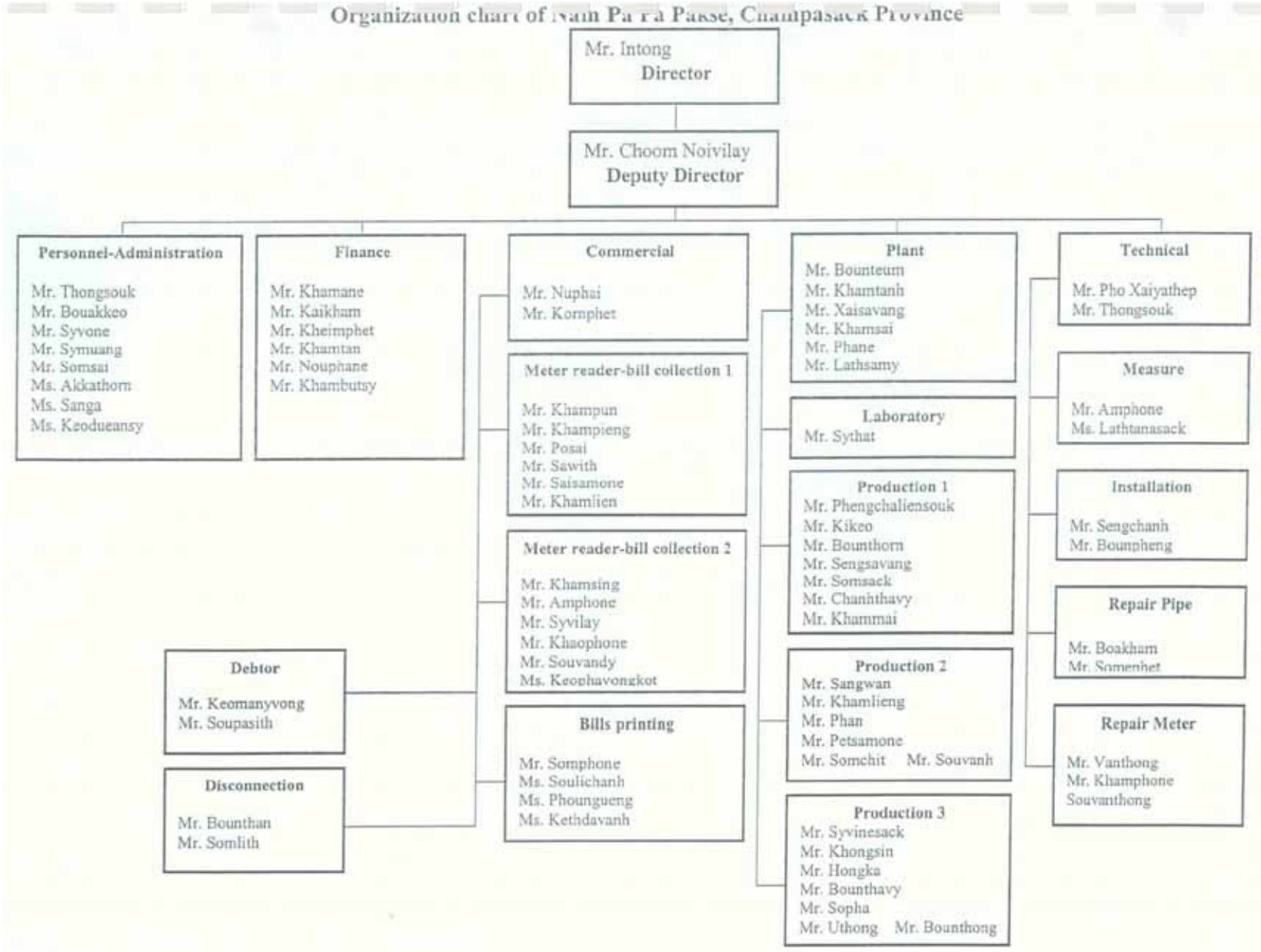
Organization chart of Nam Pa Pa Xiengkhuang



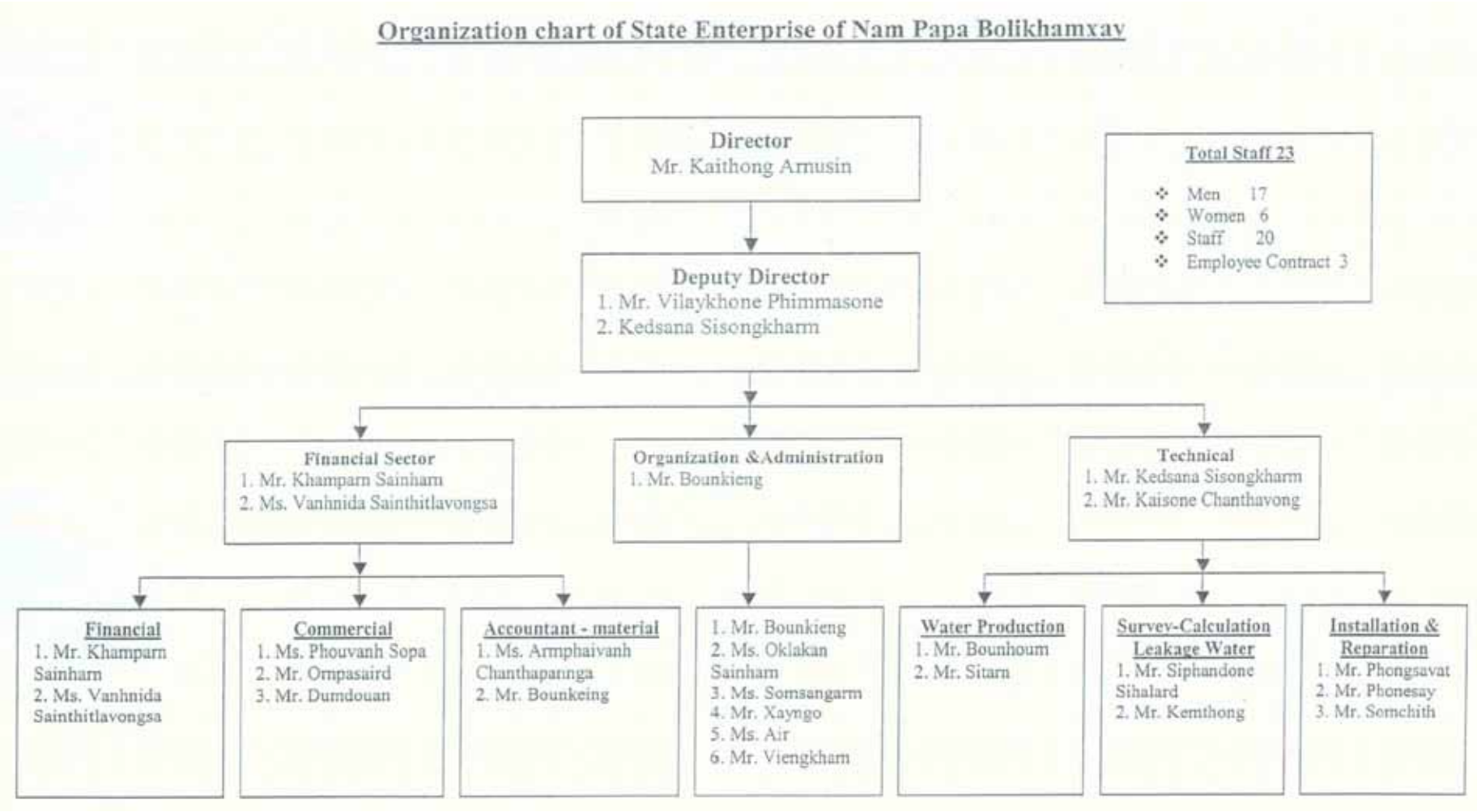

Organization chart of Nam Pa Pa Vientiane Province
PCTPC of Vientiane
Director
Mr. Bounleiuath Keovixai
(Phonhong District)
Deputy Director
Mr. Thavisouk Inthasombath
Planning-Financial – Material
Mr. Phonepaseuth
Ms. Mixai
Ms. Tieunchai
Mr. Syvone
Ms. Tumkham
Commercial-public relate service
Mr. Boalaphan
Mr. Sommuk
Ms. Manyvanh
Technical
Mr. Vanxai
Mr. Somsanouk
Plant
Mr. Sysonesay
Mr. Syfone
Vangvieng Branch
Mr. Singvisai
Mr. Bounchanh
Mr. Syvanh
Mr. Kot
Mr. Humpheing
Ms. Mixai
Ms. Vankham
Mr. Sengphet
Mr. Sypasong
Mr. Soa
Mr. Nao
Tulacom Branch
Mr. Vittanya
Ms. Pousam
Ms. Atvilay
Mr. Duangpachanh
Mr. Utdone
Mr. Vongthong
Mr. Vongdara
Mr. Chanhsouk
Ms. Senglone

Organization chart of Nam PaPa Khammouane

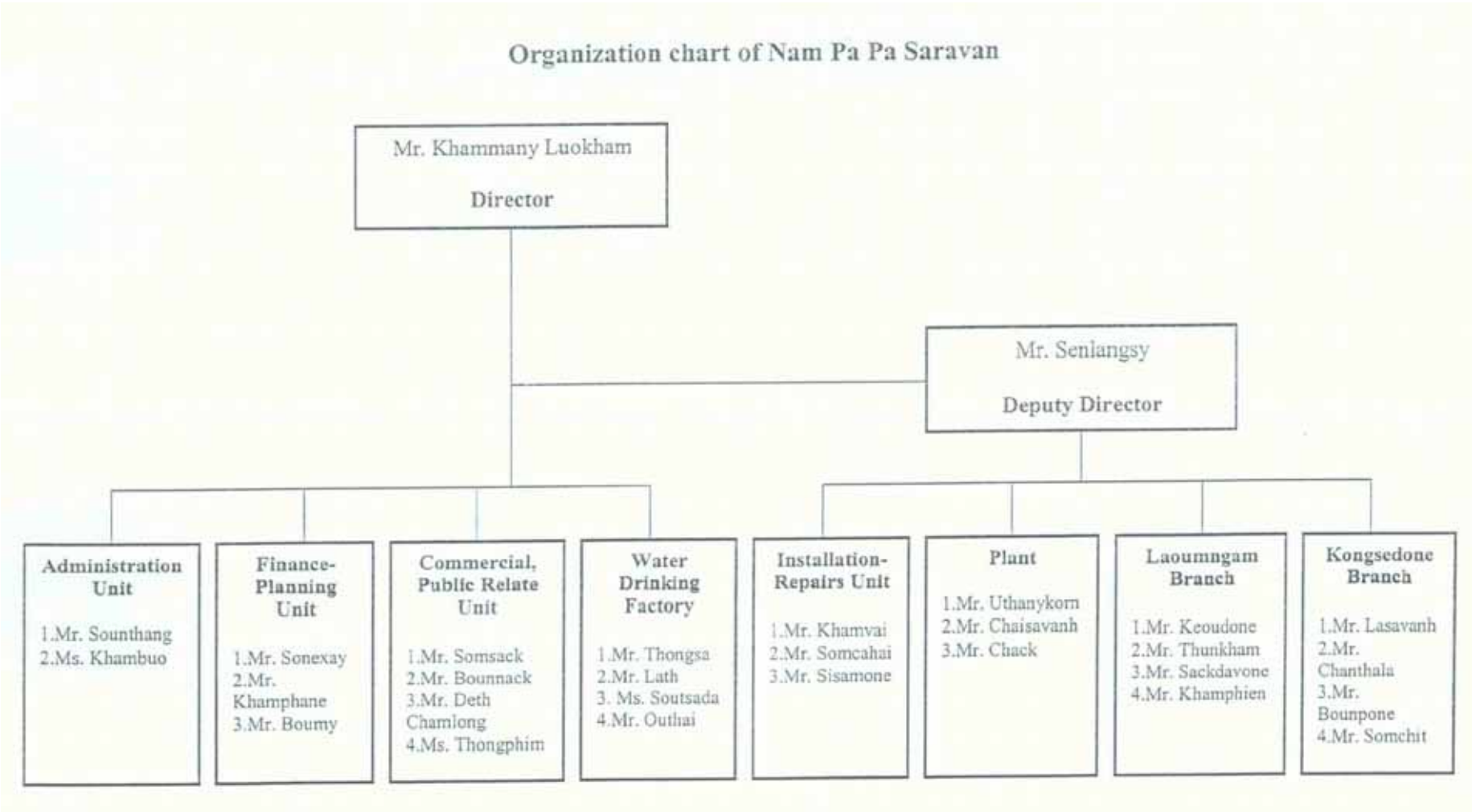



Organization chart of Nam Pa Pa Pakse, Champasack Province
Mr. Intong
Director
Mr. Choom Noivilay
Deputy Director
Personnel-Administration
Mr. Thongsouk
Mr. Bouakkeo
Mr. Syvone
Mr. Symuang
Mr. Somsai
Ms. Akkathorn
Ms. Sanga
Ms. Keodueansy
Finance
Mr. Khamane
Mr. Kaikham
Mr. Kheimphet
Mr. Khamtan
Mr. Nouphane
Mr. Khambutsy
Commercial
Mr. Nuphai
Mr. Komphet
Meter reader-bill collection 1
Mr. Khampun
Mr. Khampieng
Mr. Posai
Mr. Sawith
Mr. Saisamone
Mr. Khamlien
Meter reader-bill collection 2
Mr. Khamsing
Mr. Amphone
Mr. Syvilay
Mr. Khaophone
Mr. Souvandy
Ms. Keophavongkot
Bills printing
Mr. Somphone
Ms. Soulichanh
Ms. Phoungueng
Ms. Kethdavanh
Debtor
Mr. Keomanyvong
Mr. Soupasith
Disconnection
Mr. Bounthan
Mr. Somlith
Plant
Mr. Bounteum
Mr. Khamtanh
Mr. Xaisavang
Mr. Khamsai
Mr. Phane
Mr. Lathsamy
Laboratory
Mr. Sythat
Production 1
Mr. Phengchaliensouk
Mr. Kikeo
Mr. Bounthorn
Mr. Sengsavang
Mr. Somsack
Mr. Chanhthavy
Mr. Khammai
Production 2
Mr. Sangwan
Mr. Khamlieng
Mr. Phan
Mr. Petsamone
Mr. Somchit Mr. Souvanh
Production 3
Mr. Syvinesack
Mr. Khongsin
Mr. Hongka
Mr. Bounthavy
Mr. Sopha
Mr. Uthong Mr. Bounthong
Technical
Mr. Pho Xaiyathep
Mr. Thongsouk
Measure
Mr. Amphone
Ms. Lathtanasack
Installation
Mr. Sengchanh
Mr. Boumpheng
Repair Pipe
Mr. Boakham
Mr. Somenhet
Repair Meter
Mr. Vanthong
Mr. Khamphone
Souvanthong

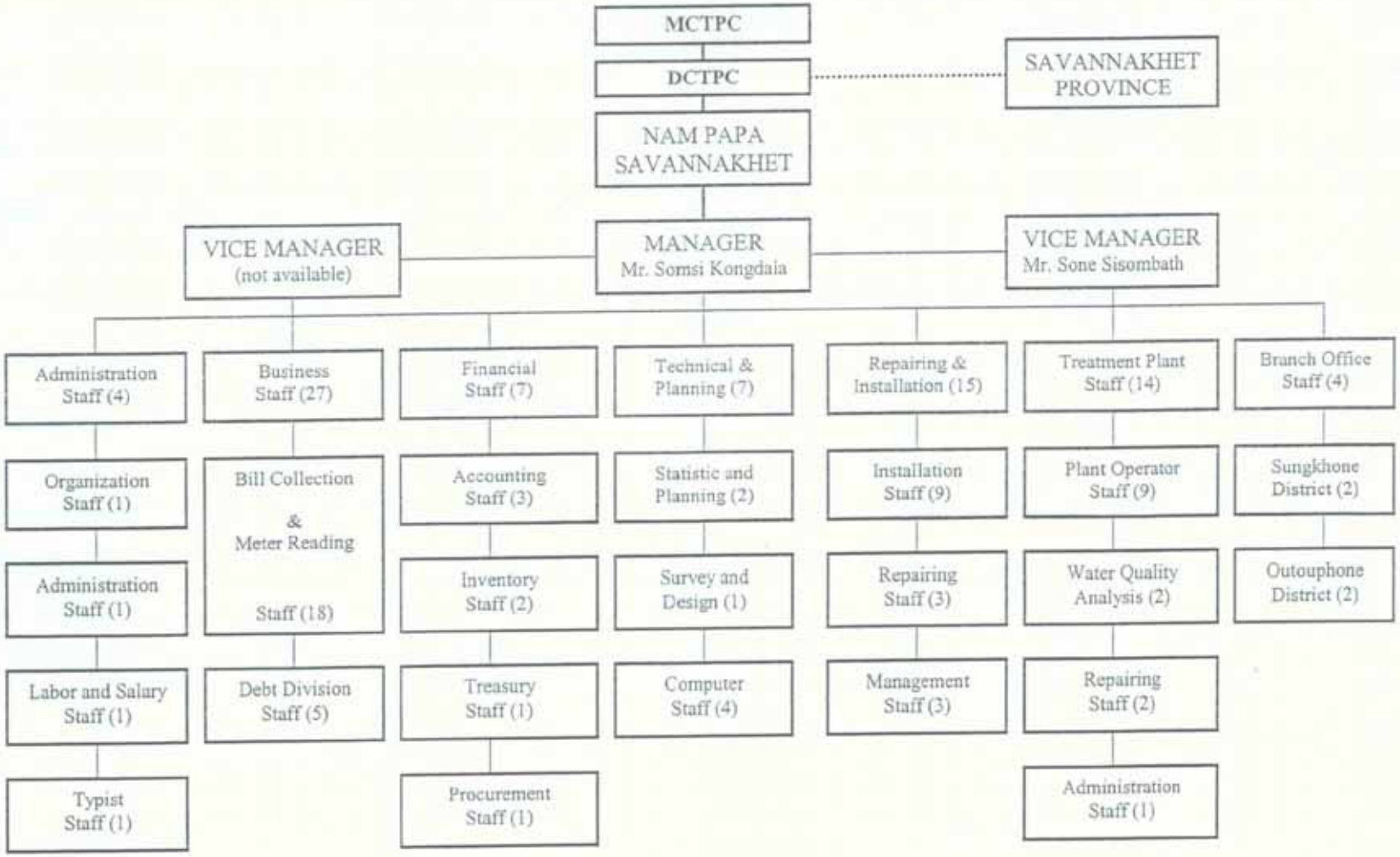
Organization chart of State Enterprise of Nam Papa Bolikhamxay



Organization chart of Nam Pa Pa Saravan

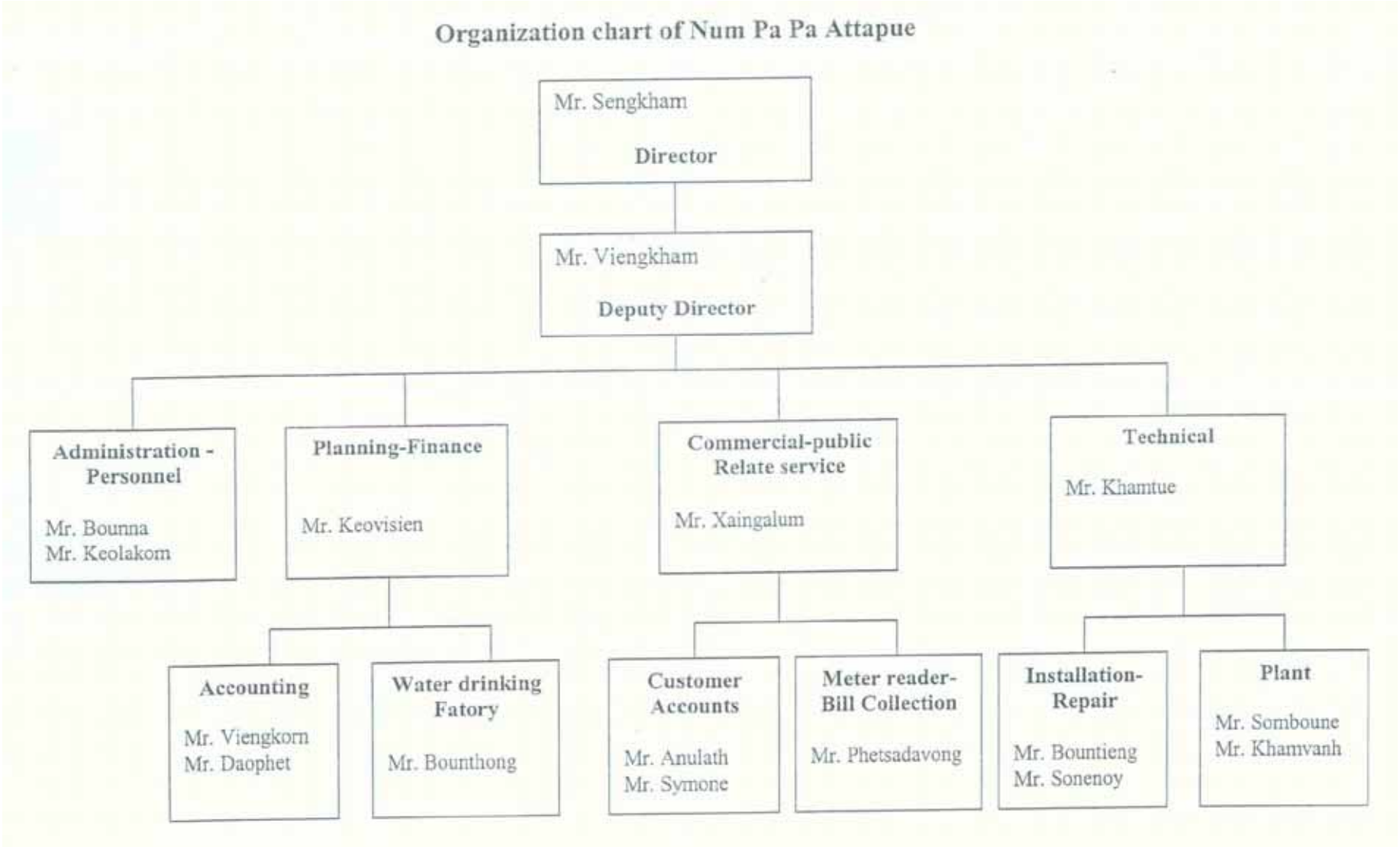


Organization Chart of Nam papa Savannakhet Province

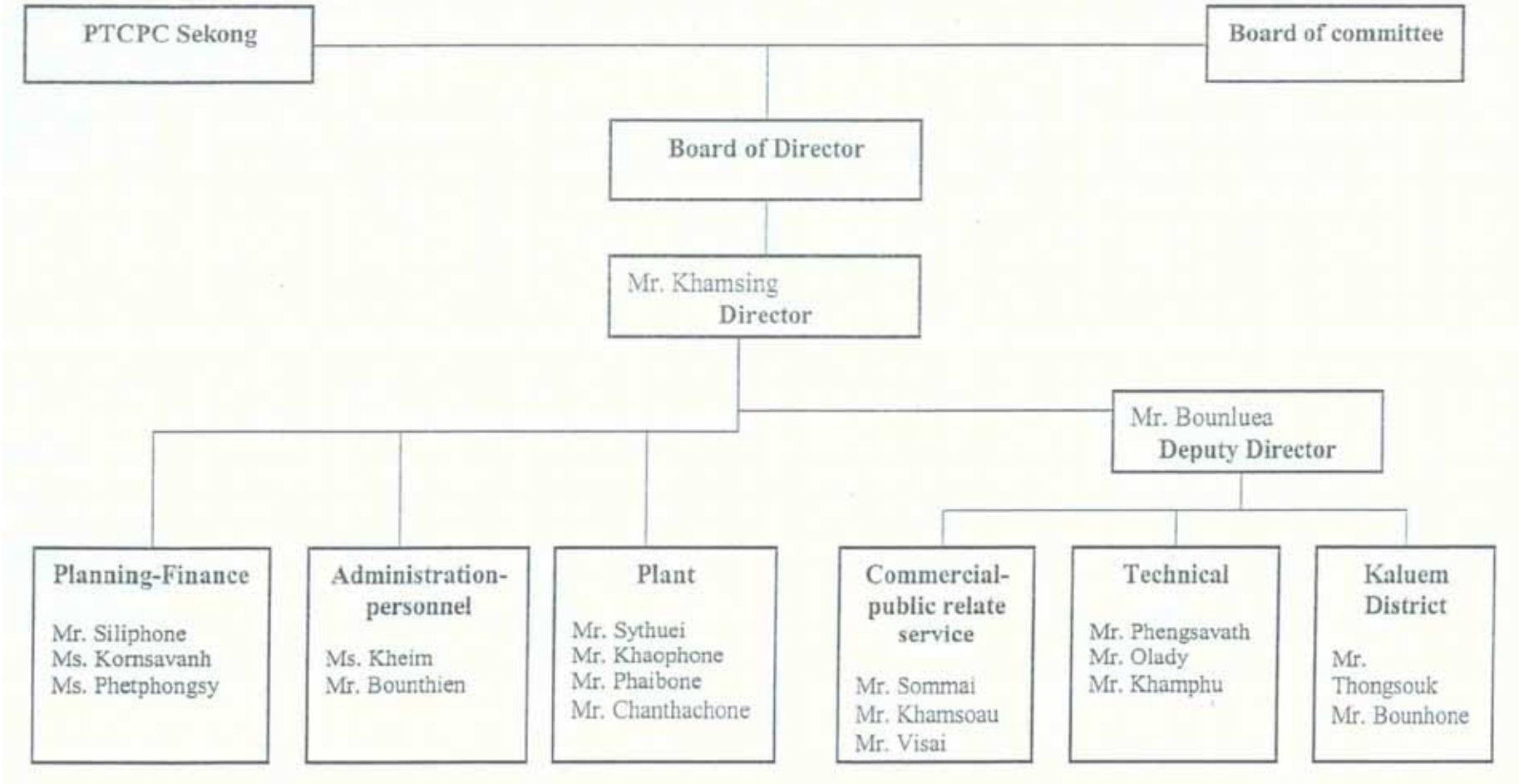


MCTPC: Ministry of Communication, Transportation, Post, Construction
DCTPC: Department of Communication, Transportation, Post, Construction

Organization chart of Num Pa Pa Attapue



ORGANIZATIO CHART OF NAM PAPA SEKONG



Appendix 8:

Sections of WASA, Responsibilities and Tasks

Management and Development of Water Supply Sector
(non official translated from Lao version)

DIVISION OF AGENCY RESPONSIBILITIES

Division of responsibility between agencies set down in the Prime Ministerial Decree No. 37/PM is as follows:

Ministry of Communication, Transport, Post and Construction (MCTPC) has the overall function of facilitation and coordination of the "development process" for both urban and rural water supply and wastewater management systems throughout the country, and promotion and mobilization of all available resources toward achieving the set goals and objectives.

Department of Housing and Urban Planning (DHUP) is responsible for assisting the Minister of MCTPC in administration of the water supply sector through: setting short, medium and long term strategies on water supply development; planning of staff training on planning and management of water supply systems; and studying regulations, standards, technical specifications, and performance indicators of water supply systems operation, in collaboration with the Water Supply Authority (WASA).

Water Supply Authority (WASA) is responsible for: assisting the Minister MCTPC in technical issues of the Water Supply Sector, including redevelopment of the MCTPC strategic plan on water supply and wastewater management in urban and rural areas throughout the country; setting norms, regulations, technical standards and technico-economic specifications on water supply and wastewater management systems; and directing on behalf of the MCTPC the management and monitoring implementation of the water supply sector.

Ministry of Public Health (MPH) is responsible for the facilitation, coordination and direction of all rural water supply, and urban and rural environmental hygiene activities throughout Lao PDR.

National Center of Environmental Health and Water Supply (NEW) has the responsibility for management of technical aspects in promoting rural water supply, and urban and rural environmental hygiene throughout the country.

Ministry of Finance carries out the function of: investment support and financial arrangements for all funds utilized in the development of water supply and wastewater management systems and environmental hygiene; and financial support in the short to medium-term to Nam Papa State Enterprises (NPSEs) where commercial targets cannot be readily achieved.

Water Resource Coordination Committee (WRCC) is responsible for coordination of planning, management, monitoring, water and water resource protection in order to secure the sustainable development and use of water and water resources.

Provincial Governments are now responsible for:

- coordination, facilitation, and investment support in the development of water supply and wastewater systems, and environmental hygiene;
- collaboration with the provincial Departments of Communication, Transport, Post and Construction (DCTPC) in finding out suitable solutions to assist low income households which cannot afford the cost of sanitary facilities;
- setting provincial water supply sector by-laws;
- direction of provincial water supply and sanitation sector project implementation;
- collaboration with WASA, through WRCC, develop proposals for water resource development;

- institutional arrangements for the implementation and management of centralized wastewater management systems as for water supply when these systems become economically and financially viable;
- provincial rural water supply, and urban and rural environmental hygiene.

Nam Papa State-owned Enterprises (NPSEs) are responsible for:

- management and operation of all water supply and wastewater management systems and development of raw water in urban and rural areas within their respective boundaries; operations shall be on commercial principles and in accordance with three-year rolling corporate plans; and
- compliance of the management of sanitary facilities within the sanitation regulation.

NPSEs which cannot readily achieve commercial targets, shall receive financial and technical support from the central government as well as from the concerned provincial government.

Communities: All communities throughout the country shall be responsible for protection of water supply and wastewater management systems, and environmental hygiene within the area in which they live.

Appendix 2: Summary of the Division of Responsibilities for Sector Administration (Prime Ministerial Decision No. 37/PM)

Responsibility	MCTPC	DHLP	WASA	MoH	NEW	MoF	WRCC	Provincial government	NPSE
Facilitate and coordinate development process for water supply and wastewater management systems in urban areas throughout the country	✓							✓	
Facilitate and coordinate development process for water supply and wastewater management systems in rural areas throughout the country	✓			✓				✓	
Setting out strategies on water supply development	✓	✓							
Training plans on planning and management of water supply systems		✓	✓						
Technical issues, redevelopment and detailed planning on water supply and wastewater systems in urban areas throughout the country	✓		✓						
Technical issues, redevelopment and detailed planning on water supply and wastewater systems in rural areas throughout the country	✓		✓		✓				
Setting regulations, technical standards and technico-economical specifications on water supply and wastewater management systems	✓		✓						
Management and monitoring of implementation of water supply sector policy			✓						
Investment support, financial arrangement for all funds utilized in the development of water supply and wastewater management systems and environmental hygiene						✓		✓	
Coordination of planning, management, monitoring, water and water resource protection							✓	✓	
Setting up of by-laws								✓	
O & M of water supply and wastewater management systems and development of new water in urban and rural areas in respective provinces									✓
Compliance with sanitary regulations									✓

MCTPC: Ministry of Communication, Transport, Post and Construction, DHUP: Department of Housing and Urban Planning, WASA: Water Supply Authority, MoH: Ministry of Health, NEW: National Center of Environmental Health and Water Supply, MoF: Ministry of Finance, WRCC: Water Resource Coordination Committee, NPSE: Nam Papa State-owned Enterprises

Lao People's Democratic Republic
Peace Independence Democracy Unity Prosperity

Ministry of Communications, Transport, Posts and Construction — No 1728 /MCTPC

Ministerial Decision
On the Organization and the Activities of Water Supply Authority

Pursuant to the Prime Ministerial Decree No 66/PM dated 20 May 1999 on the Organization and the Activities of Ministry of Communications, Transport, Posts and Construction,
Pursuant to the proposal of the Department of Organization and Personnel, Ministry of Communications, Transport, Posts and Construction and to the approval of the Organization Committee of the Central Party.

The Minister issues this Decision:

Section I
Position and Role

Article 1: Position of Water Supply Authority

1.1 Water Supply Authority (WASA) is a technical organization of Ministry of Communications, Transport, Posts and Construction (MCTPC) to provide assistance to the Minister of MCTPC on studies of technique and technologies to be introduced in the development of water supply and wastewater management issues.

Section II
Duties and Rights

Article 2: Duties of WASA

2.1 Redevelop the strategic plan of the MCTPC into detailed program, action plan, and projects regarding development of water supply and wastewater management systems in both urban and rural areas countrywide; Directing and leading its implementation for practical accomplishment and high quality.

2.2 Prepare draft technical specifications and standards on water supply and wastewater management systems.

2.3 Seek funds from local and external sources for studies of technique and technologies of water supply and wastewater management systems as approved by MCTPC.

SEEN ORIGINAL & CERTIFIED
PAPHAO CONSULTANT & TRANSLATION CO.
VIENTIANE PREFECTURE, LAO PDR

1

2.4 Project, manage and use efficiently budget, which is approved by the government.

2.5 Follow-up and monitor implementations of decrees, by-laws, regulations, norms, technical specifications and standards by technical units, water supply and wastewater management systems projects, and Water Supply entities.

2.6 Prepare report on appraisal and analysis of implementations of plan and use of budget regarding water supply and wastewater management systems.

2.7 Prepare network and expanding direction of water supply and wastewater management systems.

2.8 Manage and collect data and statistic information to be used in the preparation of network and expanding direction of water supply and wastewater management systems.

2.9 Prepare plans for training, seminars, formations, deployment, management and application of benefit policy to its staff.

2.10 Actively develop and promote innovation using progress of technique and new technology in its Authority.

Propose to establish or cancel technical units being under its jurisdiction.

Article 3: Rights of WASA

3.1 Propose improvement, establishment or cancellation of organizational structure and work positions under its jurisdiction, if not conformable.

Propose improvement, modification or cancellation of note for information and by-laws which is not conformable to its actual functional works, and issuing note for information on technical issues to be implemented by units under its jurisdiction.

3.3 Propose appointment, promotion, congratulation, removal, penalty and dismissal of, and reorganize staff under its jurisdiction subject to common decision of the Department of Organization and Personnel.

3.4 Contact and coordinate with every organization of the Party and state as well as international and public organizations in order to implement together policy, decrees and orders of the government regarding water supply and wastewater management systems.

3.5 Supervise activities of technical units and projects being directly under its jurisdiction; coordinate with departments of Communications, Transport, Posts and Construction of provinces, prefecture of Vientiane and Special Region in supervising technical activities in accordance with its functional sector.

3.6 Contact, negotiate and sign contracts, protocols or agreements with domestic, foreign and international organizations subject to approval of the Minister.

3.7 Use staff, budget, vehicles, machinery and equipment as handed over by the MCTPC.

3.8 disseminate success on technique, technologies, sciences and new innovations in its sector.

3.9 Invite individuals concerned within the MCTPC for a meeting to discuss different issues of its sector.

Section III
Staffing and Organizational Structure of WASA

SEEN ORIGINAL & CERTIFIED
PATTAD CONSULTANT & TRANSLATION CO.
VIENTIANE PREFECTURE, LAO PDR

Article 4: Staffing Composition

4.1 WASA is composed of a General Director which is appointed or dismissed by the Prime Minister subject to proposal of the Organizational Committee of the Central Party and pursuant to a common agreement with the Minister of MCTPC. The General Director of WASA assumes direct responsibility to the Minister for success and set-back in performing his duties.

The General Director is authorized to sign every document of the WASA, in case it is impossible for him to do it or he is on duties far away, he should transfer power provisionally to one of Deputy General Directors to act for him.

4.2 WASA is also composed of a number of Deputy General Directors, which are appointed or dismissed by the Minister of MCTPC subject to the proposal of the Department of Organization and Personnel and pursuant to the common agreement with the General Director of WASA. Deputy General Directors are accountable for providing assistance to the General Director in directing and leading general activities of the WASA, running any specific activities as assigned by the General Director.

4.3 WASA is, in addition, composed of Heads and Deputy Heads of Divisions, and a number of technical staff as works require.

Article 5: Organizational Structure

WASA is composed of the following Divisions

5.1 Organization and Administration Division

5.2 Project Management Division

5.3 Technical and Appraisal Division

Article 6: Duties of each Division

6.1 The Organization and Administration Division is accountable for providing assistance to the Authority for administration, protocol, management, organization and staffing matters.

6.2 The Project Management Division sets works' program; manages, follows up, supports and monitors implementation of water supply and sanitation projects in conformity with the design approved; sets plans, budget and cooperation; collects statistic information and prepares reports to the Authority.

6.3 The Technical and Appraisal Division collects statistic information, drafts regulation, by-laws, technical specifications and standards as well as follows up, monitors, analyzes and financially, economically, socially and environmentally appraises water supply and wastewater management systems projects.

Section IV
Working Systems and Methodology

Article 7: WASA adopts the following working principles:

7.1 WASA applies the regime of sole chairmanship on the basis of the principle of centralized democracy and in accordance with the system of administrative level division, group leadership, individual responsibility, clear-cut assignment of tasks

SEEN ORIGINAL & CERTIFIED
FAITHFUL CONSULTANT & TRANSLATION CO.
VIENTIANE PREFECTURE LAO PDR

among group members at each level and hand-over reasonable right and power in solving problems within the responsibility's limit of each level and each person.

7.2 WASA acts and performs referring to the directive policy and strategic plan of the Ministry and general policy of the Central Party and Government regarding water supply and wastewater management systems.

7.3 WASA prepares sector medium term and annual plans under its jurisdiction in accordance with the strategic plan specified in article 2 clause 2.1 above. Plans and action program is the starting point of all activities performance in its sector. Every project shall be studied, selected, surveyed, designed and discussed in details every step and shall be approved by the Minister before including in the work program.

7.4 WASA manages, follows up, monitors and supports its sector regarding the implementation of work program, plans and every project under its jurisdiction.

7.5 WASA shall organize strictly inspection regime, meetings feed-back and reports such as weekly meetings with the participation of Heads of Divisions and Project Managers.

7.6 The WASA adopts measures of running the activities at grassroots level for the active movement and practical results.

Section V
Final Provisions

Article 8: WASA has its own seal for official use

Article 9: WASA and other parties concerned shall be informed and strictly comply with this Decision which replaces other decisions or regulations not conformable with it.

Article 10: This Decision shall become effective from the signing date

Vientiane, 26 May 2000
Minister,

Phao Bounnaphol

SEEN ORIGINAL & CERTIFIED
PA PHAO CONSULTANT & INVESTIGATION CO.,
VIENTIANE PREFECTURE, LAO PDR

VIENTIANE MUNICIPALITY

付　属　資　料

1．実施協議議事録（R/D）

2．水道技術訓練センター（NWTTI）への事前調査団報告書

1. Record of Discussions (R/D)

RECORD OF DISCUSSIONS BETWEEN
JAPAN INTERNATIONAL COOPERATION AGENCY AND
AUTHORITIES CONCERNED OF
THE GOVERNMENT OF LAO PEOPLE'S DEMOCRATIC REPUBLIC
ON JAPANESE TECHNICAL COOPERATION
FOR
THE PROJECT FOR CAPACITY DEVELOPMENT OF
URBAN WATER SUPPLY AUTHORITIES IN LAO PDR

In response to the request of the Government of Lao People's Democratic Republic (hereinafter referred to as Lao PDR), the Government of Japan has decided to cooperate Japan-Lao Technical Cooperation Project on Capacity Development of Urban Water Supply Authorities in Lao PDR (hereinafter referred to as the Project).

Accordingly, Japan International Cooperation Agency (hereinafter referred to as JICA), the official agency responsible for the implementation of the technical cooperation programme of the Government of Japan, will cooperate with the authorities concerned of the Lao PDR for the Project.

JICA and the Lao authorities concerned had a series of discussions on the framework of the Project. As a result of the discussions, JICA and Water Supply Authority agreed to recommend their respective governments the matters referred to in the document attached hereto.

Vientiane, August 22, 2003

Mr. Hidetaka NISHIWAKI
Resident Representative
Japan International Cooperation Agency
Laos Office

Dr. Somphone DETHOUDOM
Director General
Water Supply Authority
Ministry of Communication,
Transport, Post and Construction
Lao People's Democratic Republic

THE ATTACHED DOCUMENT

I. COOPERATION BETWEEN BOTH GOVERNMENTS

1. The Government of the Lao PDR will implement the Project on Capacity Development of Urban Water Supply Authorities in Lao PDR (hereinafter referred to as the Project) in cooperation with the Government of Japan.

2. The Project will be implemented in accordance with the Master Plan, which is given in ANNEX I.

II. MEASURES TO BE TAKEN BY THE GOVERNMENT OF JAPAN

In accordance with the laws and regulations in force in Japan, the Government of Japan will take, at its own expense, the following measures through Japan International Cooperation Agency (hereinafter referred to as JICA) according to the normal procedures under the Colombo Plan technical cooperation scheme.

1. DISPATCH OF JAPANESE EXPERTS AND THAI LECTURERS
The Government of Japan will dispatch the Japanese experts and the Thai lecturers to implement the Project as listed in ANNEX II.

2. PROVISION OF MACHINERY AND EQUIPMENT
The Government of Japan will provide such machinery, equipment and other materials (hereinafter referred to as the Equipment) necessary for the implementation of the Project as listed in Annex III.
The Equipment will become the Property of the Government of the Lao PDR upon being delivered C.I.F. (cost, insurance and freight) to the Lao authorities concerned at the airports and/or borders.

3. TRAINING OF LAO PERSONNEL IN JAPAN
The Government of Japan will receive Lao personnel connected with the Project for technical training in Japan if necessary.

4. TRAINING OF LAO PERSONNEL IN THAILAND
The Government of Japan will send Lao personnel connected with the Project for technical training in Thailand as listed in ANNEX VIII.

III. MEASURES TO BE TAKEN BY THE GOVERNMENT OF THE LAO PDR

1. The Government of the Lao PDR will take necessary measures to ensure that the self-reliant operation of the Project will be sustained during and after the period of Japanese technical

cooperation, through the full and active involvement in the Project of all related authorities, beneficiary groups and institutions.

2. The Government of the Lao PDR will ensure that the technologies and knowledge acquired by the Lao nationals as a result of Japanese technical cooperation will contribute to the economic and social development of the Lao PDR.

3. The Government of the Lao PDR will grant in the Lao PDR privileges, exemptions and benefits as listed in ANNEX IV no less favorable than those granted to experts of third countries or international organizations performing similar missions to the Japanese experts and the Thai lecturers referred to in II-1 above and their families.

4. The Government of the Lao PDR will ensure that the Equipment referred to in II-2 above will be utilized effectively for the implementation of the Project in consultation with the Japanese experts and Thai lecturers referred to in ANNEX II.

5. The Government of the Lao PDR will take necessary measures to ensure that the knowledge and experience acquired by the Lao personnel through technical training in Japan or in Thailand will be utilized effectively in the implementation of the Project.

6. In accordance with the laws and regulations in force in the Lao PDR, the Government of the Lao PDR, will take necessary measures to provide at its own expense for the Project:

   (1) Services of the Lao counterpart personnel and administrative personnel as listed in Annex V;

   (2) Land, building and facilities as listed in ANNEX VI;

   (3) Supply or replacement of machinery, equipment, instruments, vehicles, tools, spare parts and any other materials necessary for the implementation of the Project other than the Equipment provided through JICA under II-2 above;

7. In accordance with the laws and regulations in force in the Lao PDR, the Government of the Lao PDR, will take necessary measures to meet:

   (1) Expense necessary for the transportation within the Lao PDR, of the Equipment referred to in II-2 above as well as for the installation, operation and maintenance therefore;

   (2) Customs duties, internal taxes and any other charges, imposed in the Lao PDR on the Equipment referred to in II-2 above; and

   (3) Running expenses necessary for the implementation of the Project.

IV. ADMINISTRATION OF THE PROJECT

1. Director General of Water Supply Authority(hereinafter referred to as WASA), Ministry of Communication, Transport, Post and Construction as the Project Director will bear overall responsibility for the administration and implementation of the Project.

2. Deputy Director General of WASA, as the Project Manager, assigned by the Project Director, will be responsible for the managerial and technical matters of the Project.

3. The Japanese chief advisor will provide necessary recommendations and advice to the Project Director and the Project Manager on any matters pertaining to the implementation of the Project.

4. The Japanese experts and the Thai lecturers will provide necessary technical guidance and advice to the Lao counterpart personnel on technical matters pertaining to the implementation of the Project.

5. For the effective and successful management of the Project a Joint Coordinating Committee will be established whose functions and composition are described in ANNEX VII.

V. JOINT EVALUATION

Evaluation of the Project will be conducted jointly by the two Governments through JICA and the Lao authorities concerned during the last six (6) months of the cooperation term in order to examine the level of achievement.

VI. CLAIMS AGAINST JAPANESE EXPERTS AND THAI LECTURERS

The Government of the Lao PDR undertakes to bear claims, if any arise, against the Japanese experts and the Thai lecturers engaged in technical cooperation for the Project resulting from, occurring in the course of, or otherwise connected with the discharge of their official functions in the Lao PDR, except for those arising from the willful misconduct or gross negligence of the Japanese experts and Thai lecturers.

VII. MUTUAL CONSULTATION

There will be mutual consultation between the two Governments on any major issues arising from, or in connection with, this Attached Document.

VIII. MEASURES TO PROMOTE UNDERSTANDING AND SUPPORT FOR THE PROJECT

For the purpose of promoting for the project among the people of the Lao PDR, the Government of the Lao PDR will take appropriate measures to make the Project widely known to the people of the Lao PDR.

IX. TERM OF COOPERATION

The duration of the technical cooperation for the Project under this Attached Document will be three (3) years from September 1st, 2003.

LIST OF ANNEX

ANNEX I Master Plan
ANNEX II List of Japanese Experts and Thai Lecturers
ANNEX III List of Machinery and Equipment
ANNEX IV Privileges, Exemption and Benefits for Japanese Experts and Thai lecturers
ANNEX V List of Lao Counterpart and Administrative Personnel
ANNEX VI List of Land, Buildings and Facilities
ANNEX VII Joint Coordinating Committee
ANNEX VIII List of Training in Thailand

ANNEX I Master Plan

1. **Super Goal**
People in urban areas can access safe water stably.

2. **Overall Goal**
Capacity of urban water supply(UWS) authorities will be enhanced in sustainable ways.

3. **Project Purpose**
Means of service performance of the staff of UWS authorities in Lao PDR are improved in the field of water pipe laying and maintenance, plant operation and maintenance, and water quality control.

4. **Outputs**
1. Appropriate UWS training system is elaborated and Trainers are trained.
2. Training textbooks and materials are developed.
3. UWS engineers are upgraded in each technology subjects.
4. Manuals for routine works are developed.
5. The routine work skills of UWS technicians are upgraded.
6. Management skill of administrator and manager in Provincial Nam Papa(PNP) is upgraded.

5. **Activities**
1.1 To review the existing training needs assessment.
1.2 To prepare the training programmes in Thailand.
1.3 To conduct the training programme on training management in Thailand.
1.4 To make a plan of UWS training programme.
1.5 To select twenty (20) trainers from nation wide.
1.6 To conduct the training programme on the plant and piping work for the trainers in Thailand.
1.7 To dispatch a trainee to Japan as a counterpart training programme.
1.8 To prepare training curriculum for In-country Training Programme(ICTP).
1.9 To conduct the ICTP for trainers.
1.10 To evaluate, review and improve the ICTP for trainers.

2.1 To organize a working group on training textbook.
2.2 To review and improve existing textbooks prepared by Nam Papa Vientiane(NPV) trainers.
2.3 To compile and print the textbook of each field.

3.1 To prepare the ICTP for engineer in each field.
3.2 To prepare the ICTP for 115 engineers from Water Supply Authority(WASA), NPV and PNP in Vientiane, Luangprabang and Pakse.
3.3 To evaluate, review and improve the ICTP for engineers.
3.4 To select twenty (20) assistant trainer from ICTP for engineers.

3.5 To prepare the training programme on the plant and piping work for assistant trainers in Thailand.
3.6 To conduct the training programme on the plant and piping work for assistant trainers in Thailand.

4.1 To organize a working group of manuals for routine works.
4.2 To collect technical information and prepare the materials.
4.3 To edit the manuals for routine works in English and Lao.

5.1 To prepare the ICTP for 360 technicians of PNP and their branches.
5.2 To conduct the ICTP in central region by using manuals.
5.3 To conduct the ICTP in southern region by using manuals.
5.4 To conduct the ICTP in northern region by using manuals.
5.5 To evaluate, review and improve the ICTP for technicians.

6.1 To prepare the ICTP for administrators and managers.
6.2 To conduct the ICTP for 40 administrators and 120 managers from NPV and PNP.
6.3 To conduct the training programme on water supply management for the management staff in Thailand.
6.4 To keep the records on routine operation in each PNP and summarize records into statistics in WASA.
6.5 To formulate Water Supply and Financial Plan until 2020.

ANNEX II List of Japanese Experts and Thai Lecturers

1. Long-term expert
   (1) Expert on Water Supply Planning

2. Short-term experts
   (1) Lectures on Water Supply Engineering at the In-Country Training Programme.
   (2) Lectures on Waterworks Management at the In-Country Training Programme.
   (3) Others

3. Thai lecturers
   (1) Technical Transfer on Training Curriculum
   (2) Technical Transfer on Making the Training Textbooks

ANNEX III List of Machinery and Equipment

1. The necessary equipment for the transfer of technology by the Japanese experts and Thai lecturers will be provided.
2. Other materials and equipment mutually agreed upon as necessary will be provided.

Notes:

Contents, specifications and quantity of the above-mentioned equipment will be decided through mutual consultations within the allocated budget of the Japanese fiscal years.

ANNEX IV Privileges, Exemption and Benefits for Japanese Experts and Thai Lecturers

1. The Government of the Lao PDR will grant exemption from income tax and other charges of any kind imposed on or in connection with allowances remitted from abroad.

2. The Government of the Lao PDR will grant exemption from customs duties with respect to importation of personal effects by the Japanese experts/their families and Thai lecturers, as well as importation of machinery and equipment to their activities.

ANNEX V List of Lao Counterpart and Administrative Personnel

1. Project Executive Committee
   (1) Project Director: Director General of Water Supply Authority(WASA)
   (2) Project Manager: Deputy Director General of WASA
   (3) Counterparts
   The Lao side will assign a sufficient number of highly skilled counterpart officials with good command of English to ensure effective operation of the Project.

2. Administrative Personnel
   (1) Secretaries
   (2) Driver
   (3) Other staff necessary for the implementation of the Project

Note:
Actual assignment of the above personnel will depend on the progress of the Project.

ANNEX VI List of Land, Buildings and Facilities

The following will be prepared by the Government of the Lao PDR for the implementation Project.

1. Necessary piece of land and buildings and facilities
2. Office Space for Japanese experts and Thai lecturers
3. Other facilities mutually agreed upon as required

ANNEX VII Joint Coordinating Committee

1. Function

The Joint Coordinating Committee (JCC) will meet at least once a year and whenever the need arises. The functions of JCC are as follows;

(1) To supervise the annual plan of the Project in line with the Plan of Operation that will be formulated based on the Record of Discussions.

(2) To review the overall progress of the Project, and to evaluate the achievement of the objectives.

(3) To find out proper ways and means for the solution of major issues arising from or in connection with the Project.

2. Composition

(1) Chair person; Director General of Department of Housing and Urban Planning (DHUP), Ministry of Communication, Transport, Post and Construction (MCTPC)
Vice-chair person; Director General of Water Supply Authority (WASA), MCTPC

(2) Members

A) Lao side

- Deputy Director General of WASA
- Representative of the Department of Personnel, MCTPC
- Representative of the DHUP
- General Manager of Nam Papa Vientiane (NPV)
- Person(s) admitted by the chairperson

B) Japanese side

- Representative of JICA Laos Office
- Long-term expert
- Person(s) admitted by the chairperson

Note: Official(s) of the Embassy of Japan may attend JCC meetings as observer(s).

ANNEX VIII List of Training in Thailand

No	Time	Number	Duration	Name of training
1	October 2003	4 persons	one week	Training Management 1
2	October 2003	4 persons	one week	Training Management 2
3	November-December, 2003	10 persons	4 weeks	Training of Trainers (for the plant work)
4	November-December, 2003	10 persons	4 weeks	Training of Trainers (for the piping work)
5	October 2004	10 persons	4 weeks	Training of Assistant Trainers (for the plant work)
6	November 2004	10 persons	4 weeks	Training of Assistant Trainers (for the piping work)
7	October 2005	10 persons	4 weeks	Training for water supply management
8	November 2005	10 persons	4 weeks	Training for water supply management

2. Minutes of Meetings (M/M)

Project on Capacity Building of Water Supply Engineers in the Lao PDR
Report of Preparatory Study Team to Thailand

1. **Duration:** From April 8, 2003 to April 9, 2003

2. **Study Team Members:**

Mr. Yasuhiro KAWASHIMA (Team Leader)
JICA expert to Water Supply Authority, Ministry of Communication, Transport, Post and Construction, Lao PDR

Mr. Shunsuke SAKUDO (Project Management)
Assistant Resident Representative of JICA Laos office

3. **Purpose of the Mission to Thailand:**

JICA has implemented technical cooperation project with NWTTI in Thailand since 1985 till 1999, and achieved upgrading of institutional capacity of Thailand in the field of training for water supply engineers.

In 2003, JICA plans to launch technical cooperation project on capacity development of water supply engineers in the Lao PDR. Regarding to the component of this new project, JICA considers it appropriate and effective to utilize the advanced facility and human resources of NWTTI for the training of water supply engineers in Lao PDR.

In this context, this study team will confirm the possibility of sending Lao trainees to NWTTI and inviting lecturers from NWTTI to Lao PDR, and to find out problems to be solved with regard to collaborate with government agency of Thailand for technical assistance to Lao PDR.

4. **Schedule**

Date	Time	Shedule	Remarks
Apr. 8	16:30	VTN to BKK(QV415)	
	17:50	Arrive at BKK	
Apr. 9	9:30	Meeting with JICA Thailand Office	Mr. Takashima, DRR
	10:00	Meeting with NWTTI	Mr. Prasit, Director
	13:00	Research on training facilities	
	18:00	BKK to VTN(QV429)	

5. Attendants of the meetings

(1) JICA Thailand Office

Mr. Takashima Hiroaki, Dupty Resident Representative

Mr. Iwai Atsumu, Staff

Mr. Ohashi Yuichi, Staff

Ms. Ishikawa Sachiko,

(2) NWTTI, Metropolitan Waterworks Authority

Mr. Prasit Padungpatayawong, Director, Human Resource Development Department, Metropolitan Waterworks Authority

Ms. Porntip Chantdawong, Staff, Human Resource Development Department, Metropolitan Waterworks Authority

Report of Discussion with NWTTI

1. Purpose of the discussion

In the new project on water supply engineers, whose duration will be from June, 2003 to June, 2005, JICA Laos office would like to set up training course at NWTTI (National Waterworks Technology Training Institute) in Thailand and dispatch experts from NWTTI.

Purpose of the visit to NWTTI is to ask the possibility for NWTTI to cooperate with us to provide training course and experts to Lao PDR. And if it is possible, we would like to grope for simple way to send trainees to NWTTI and to dispatch experts from NWTTI so that both of us will not be bothered by complicated procedures for international agreement and so on. One of the ideas is that, JICA Laos Office makes an agreement or contract directly with NWTTI for implementation of group training course and dispatch of experts with appropriate amount of fees.

In addition, we need to clarify the detail of the training including the subject, duration, cost, accommodation and so on.

In this context, we discussed the possibility to conduct training course and dispatch experts at NWTTI in Thailand.

2. Possibility of training course at NWTTI

Mr. Prasit Padungsatayawong, Director, Human Resource Development Department, expressed that they are very welcome to cooperate with JICA Laos Office to hold training course for waterworkers in Lao PDR.

NWTTI prefer to make an agreement or contract on the implementation of training courses directly with JICA Lao Office, not through Thai government (DTEC) . And since they are independent agency, they have legitimacy to accept Training fee from JICA.

3. Availability of facility and lectures of NWTTI

JICA Laos Office has sent a questionnaire and asked the availability of facility and staffs necessary to conduct training course. In response to our request, Mr. Prasit answered that they can implement all the requested courses as shown in

Table 1.

Table1 Tentative Training plan at NWTI in Thailand

	Time	Number	Objective	Participant	Remarks
1	September 2003	10 person	Trainer's Training	Manager level	Some persons can not understand English.
2	October 2003	10 person	Trainer's Training	Manager level	Some persons can not understand English.
3	May 2004	10 person	Assistant trainer's training	Chief engineer	Most person can not understand English
4	June 2004	10 person	Assistant trainer's training	Chief engineer	Most person can not understand English
5	Not identified				

They also prepared proposal of tentative schedule and estimated cost of the first training course which suppose to be held on September 2003. (See attached sheets)

4. **Subjects of Trainings**

Right now, 7000 persons per year are trained in NWTI, and they have ability to conduct training on all the subjects concerning waterworks, including management and administration.

Duration of the training program is flexible up to the topic of each training. They can conduct training course both in English and Thai, and hand-out of the lectures can be prepared both in English and Thai.

5. **Availability of other services**

(1) Accommodation: Available (1000B for a day). But because of the bad access to the facility, it is better to use hotels in urban area.

(2) Meal: They have a cafeteria for lunch (20B for a lunch). Breakfast and supper should be prepared by JICA.

(3) Transportation: Available. It can be used to move between hotel and NWTI, and also moves during the training course. The cost will be included in the training fee.

(4) Insurance for trainees: Not available. JICA needs to prepare for it.

(5) Way of payment: NWTTI suggested us to pay all the cost 2 week in advance to the training course.

6. Procedures to be taken

(1) At first, request from JICA Laos office with tentative schedule and list of trainees should be submitted as early as possible. There is no specific request form.

(2) Then, NWTTI will send a letter of acceptance with arranged schedule and list of trainees.

(3) Then, to sign a contract for the training, and pay all the fees two weeks in advance to the training course.

7. Dispatch of trainers from NWTTI to Lao PDR

(1) Mr. Prasit Padungsatayawong, Director, Human Resource Development Department, replied that they also well come to dispatch experts (lecturers) to Lao PDR. Procedure to be taken to dispatch them will be same as that of trainings conducted at NWTTI.

(2) They can provide experts(trainers) on any subject. Detail of the cost for the dispatch should be discussed later.

8. Concerning cooperation with JICA Cambodia office

We also discussed that, JICA Cambodia office will launch new project on water supply system, and they also request to cooperate with NWTTI for training courses and dispatch of experts. NWTTI accepted the request, and replied that the contents and procedure of the cooperation will be same as that of Lao PDR.

Nevertheless, JICA Thailand office suggested that careful consideration is needed because of the complicated public sentiment between Thailand and Cambodia.