第6章　本格調査の内容

6－1　本格調査の目的

(1) 同国内陸高原地帯に位置するハナン、シンギダルーラル、マニョニ及びイグンガの4郡の村落を対象に、安全な生活用水等を安定的に供給するための地下水開発計画（既存施設のリハビリ計画、運営・維持管理計画、衛生改善計画を含む）を策定する。

(2) 本件調査を通じて、タ側カウンターパートに計画策定及び運転・維持管理に係る手法と技能について技術移転を行う。

6－2　基本方針と留意点

(1) 最適な村落給水施設の選択

現在、調査対象地域には、次の給水施設が設置されており、本格調査においては、調査対象村落それぞれの条件（自然・社会状況、村落レベルでの維持管理、住民の費用負担能力、意識の高さ、衛生環境等）を十分調査の上、最適な村落給水施設を選択する必要がある。

・湧水取水、自然流下方式による配水（ハナン郡のみ）、公共水栓
・管井戸（ディーゼルエンジン、ボアホールポンプ）、コンクリートタンク、配水管、公共水栓
・管井戸、風車、コンクリートタンク、配水管、公共水栓
・管井戸、手動ポンプ（深井戸用）
・手掘井戸、手動ポンプ（浅井戸用）
・手掘井戸
・チャコ（ミニダム）

以下に各施設選択に当たっての留意点等を述べる。

自然流下方式は水理・水質、地形、村落の形態等の条件が満たされれば、維持管理が容易で、コストも低いことから、比較的人口の多い村落には適合した施設であろう。ハナン郡のハナン山中腹には8カ所の湧水源が存在しており、同地区の開発計画の策定に際しては、第一にこの水源を利用した自然流下方式を考慮すべきであろう。

管井戸にディーゼルエンジン、ボアホールポンプを設置し、数キロメートルの配管、公共水栓を備えた施設は、人口2、3千人の村を対象に70年代後半、社会主義政権下に導入されている。当時の政権下では、水料金は無料で、燃料も政府から支給されていたとのことであるが、政府財源が逼迫するのに伴い、現在では多くの施設が機能していない状況にある。本格調査のパイロットスタディにおいて、現在機能していないこれらの

施設のいくつかをリハビリし、再稼働することにより、様々な観点からこの施設の地域への適合性を再検討することとする。パイロットスタディとしては少なくとも次の項目を実施することとする。①水管理組合の再活性化　②ポンプ運転手の指名と日常の運転・維持管理、簡単な修理の講習　③燃料の定期的購入とその運搬方法の確立④水料金の徴収及びその方法の確立　⑤現金出納・決済の方法と出納簿の管理訓練⑥大きな修理が必要なときの体制作り　⑦維持管理費用の算定　⑧住民の負担能力の確認（詳細な年間収入調査）　⑨受益住民に対する安全な水・衛生に関する啓蒙活動等

風車を設置した管井戸は、1970年代後半から1980年代初頭にかけて、オーストラリアの協力により導入された。現在も数十台の施設が稼働しているものの、すでに設置後十数年を経過しており、今後、何らかの処置が必要となろう。本格調査では、それぞれの施設の稼働状況を診断し、リハビリにより再活性化させるもの、他の施設に転用するもの、新規開発が必要となるものなどに分類し、適切な処置を提言する。

手動ポンプ付き管井戸（深井戸）は、水理地質条件さえ満たされれば、村落レベルで簡単な修理が可能で、維持管理が楽なこと、維持管理費用が安く、衛生的に安全な水の供給が可能であることなどから、村落給水には最も適した施設であろう。したがって、本格調査における開発計画策定に際しては、自然・社会的条件が許す限り手動ポンプ付き管井戸の採用を第一に考慮すべきである。また、同ポンプの機種選定については、以下の例を参考にしつつ、本格調査を通じてタンザニア国全体での動向を調査の上、検討し、決定することとする。①シンギダ州ではアフリデヴを標準ポンプと指定しているが、その理由は明らかではない　②我が国の無償資金協力により実施が予定されている、同国カゲラ州での村落給水プロジェクトでは、UNICEFが同地域ですでに導入しているインディア・マークIIを設置することとしている　③現状ではアフリデヴもインディア・マークIIも同国では現地生産されていない　④本件調査対象地域では、アフリデヴは本格的に導入されておらず、モロゴロ州で現地生産されているSWN81（村落レベルでの修理が不可能、簡単に故障しやすく各地で不評）、グラウンドフォス等が既存井戸の深井戸用手動ポンプとして確認された。

手掘井戸は、この地域の花崗岩、片麻岩等の基盤岩が分布するところでは、一般的に普及しており、比較的裕福な家庭では個人所有の井戸を持つ場合もある。これは基盤岩の風化帯の土壌化した部分に存在する、深さ２～５m程度の浅層地下水を取水するものである。NGOの協力によるものは、直径1.5～２mのコンクリートリングが埋めてあり、深さは最大６～７mで、上部はコンクリートの蓋をし、浅井戸用ポンプ(NIRA or TANIRAのダイレクトアクションポンプ）が設置されている。事前調査時に行った水質検査では、これらの浅井戸のすべてから大腸菌が検出され、原因としては、浅層地

下水そのものの汚染、もしくは、浅井戸の側壁部分から地表の汚染された排水の混入が考えられる。NGOは、工事費の安さから現在でも村落給水計画の主流としてこのような浅井戸建設を計画している。本格調査においては、浅井戸は水の安全性に問題があり、その建設工事は現地の村人を雇用して実施されるため、工期があてにならず工費の見積りも難しいなど、我が国のやり方にはなじまず、取り入れるべきではないと考えられる。しかし、NGOのやり方を否定するわけにはいかず、すでに相当数の浅井戸が普及しているため、本格調査においては浅井戸の水は直接飲料とはせずに洗濯等の雑用水として、あるいは家畜用として利用すべきこと、人為的汚染を最小限に抑えること、仮に飲用に供する場合でも煮沸することなど、衛生教育等を通じ住民に浸透させることとする。

チャコ（ミニダム）は浅い谷状地形を土盛りしてせき止め、雨水を地表に貯留するものである。対象地域のような半乾燥地帯では、家畜の飲料用として、あるいは雨水の地下浸透を促進する意味でも有効である。本格調査においては、主に家畜用として取り入れることとする。

また、タ側からの強い要望もあり、給水施設の付帯施設として、家畜用の水飲み場、洗濯場などを必要に応じて設置することが必要であろう。村落インベントリー調査結果によっては、家畜の多いところでは常に考慮する必要があろう。

(2) 住民の費用負担能力調査

村落給水施設の恒久的維持管理を考える際、安全な水を得る対価として維持管理費用に見合う額を、受益住民から公平かつ定期的に徴収することを、第一に考慮しなければならない。また、住民がどの程度の費用負担能力があるかを推定するには、彼らの年間の収入と支出の割合を正確に調査する必要がある。アフリカの村落地域では、ほとんどの住民が自給的な有畜農業（あるいは自給的牧畜業）に従事している。村落ごとにある程度の貧富の差もみられるし、同一村落内においてもそれぞれの家族ごと、作物の収量にかなりの差異が認められる。また、それぞれの年の天候にも作物の収量は大きく左右される。しかし、いずれにせよこれらの村人が現金収入を得る手段は、自給的に消費される以外の余剰穀物の換金、野菜や果物等の換金作物、山羊、ニワトリ等の家畜の売却、臨時の使役による労賃等に限られている。現金収入に乏しい村落住民から、わずかな額とはいえ定期的に所定の維持管理費用を、全受益者から徴収するのは、非常に難しい。本格調査において、インベントリー調査の時間は非常に限られているため、パイロットスクディを実施する村落を対象として、いくつかの家族を抽出し、これらの家族毎の年間収入と支出の詳細な調査を実施し、住民の費用負担能力を推定することが望ましい。同時に村落内には維持管理費用に見合う額、すなわち受益者のいわば分担金を支

払う能力のない家族がいることも、他の地域の例から考えられる。このような村落内の貧困層を計画から除外するのではなく、労働で対価を代替するなどの救済策を、水管理委員、村の有力者等と時間をかけて話し合う必要があろう。また、住民の費用負担能力の調査は、彼らの現在の経済レベルに適合した給水施設の導入をはかる際の判断基準としても重要である。

(3) 水管理委員会の構成とその活性化

対象地域においては、多くの村落ですでに水管理委員会が形成されており、施設の維持管理のために、ある程度の費用の積み立てもなされている。しかし、委員会の現状はおざなりなもので、その活動も活発とはいい難い。特に委員の間で委員長と会計以外の役割分担がなされておらず、特定の役割を担うための訓練も行われていない。また、対象地域の村落規模は1,000～3,000人とかなり大きな村が多いにもかかわらず、委員会は村ごとにひとつ結成されているにすぎない。このような大きな村では、点水源のみを考えれば、複数箇所の給水施設が必要となってくる。それぞれの施設を適切に維持管理するには、施設ごとに水管理委員会を設けるか、あるいは特定の施設の維持管理に責任を持つ委員を任命するなどしなければ、必ずいくつかの施設は壊れたまま放置されることとなる。したがって、本格調査においては、様々な観点から村落水委員会のあり方を再検討し、その活性化を計るため、委員がそれぞれの役割を遂行するための訓練計画を策定する必要があろう。

(4) 水質検査と衛生教育

本格調査においては、水質検査は地下水の流動・系統を調べるためより、むしろその水がポータブルであるかどうかに主眼を置くべきである。特に今回は既存水源が人為的にどの程度汚染されているかを調査するため、大腸菌の定量分析を特別の設備を必要としない簡易な方法を取り入れて実施してみたい。既存水源とともに、家庭内に水を汲み置く際のかめ、あるいはバケツなどからサンプルを採取し、水源から人間の身体に入るまでの過程での汚染状況をも調査したい。そしてこれらの分析結果を参考にして、住民に対する衛生教育を実施する。衛生教育は水管理委員会の委員の中から、村落衛生委員（女性）を任命し、同委員を対象として水と病気との関係、健康を保つための家庭内の衛生改善などを、ワークショップ等を通して実践するための計画を策定する。また、一般の住民へ衛生思想の浸透を計るため、いくつかのポスターを作製し、村落に配布する計画を策定する。パイロットスキームを実施する村落では、これらの衛生教育の一部を実験的に実施する。

6－3　調査対象地域

本調査の調査対象地域は、タ国内陸高原地帯に位置するハナン、シンギダルーラル、マニョニ及びイグンガの4郡とする。

調査対象村落は以下のとおり約285村落とする。

・ハナン郡

タ側が既存マスタープランにより絞り込んだ約33村

・シンギダルーラル郡

マスタープランがないことから全村落対象とするが、Tanzania Christian Refugees Services (TCRS)の計画対象となっている3～5村落を除く約130村

・マニョニ郡

マスタープランがないことから全村落対象とするが、UNICEFの計画対象となっている2～3村落を除く約72村

・イグンガ郡

NGOであるCARITASの計画対象である23村を除き、タ側が既存マスタープラン等により設定した優先順位で絞り込んだ約50村

6－4　調査項目及び内容

フェーズ1：基礎調査

(1) 既存資料、データの収集・整理及び分析

(2) 衛生画像解析

(3) 航空写真判読

(4) モデル村落の現地踏査

(5) 組織・法制度及び財務状況に関する調査

(6) 既存給水プロジェクトの評価

(7) 村落詳細調査、物理探査、試掘調査及びパイロットスタディの実施計画策定

(8) 初期環境調査

フェーズ2：村落詳細調査、物理探査、試掘調査、パイロットスタディ

(1) 村落詳細調査（地形・地質・水文・水理地質調査、既存給水施設の現況調査、水質調査、村落実態調査）

(2) 物理探査

(3) 試掘調査

(4) パイロットスタディの実施

(5) パイロットスタディのモニタリング・評価

フェーズ３：地下水開発計画策定

(1) 地下水賦存状況の評価

(2) 水需要量予測

(3) 計画の基本方針策定、計画諸元の設定

(4) 住民教育教材の作成

(5) 村落の類型化

(6) 環境調査

(7) 水源開発計画策定

(8) 給水施設計画策定

(9) 既存施設のリハビリ計画策定

(10) 資機材調達計画策定

(11) 運営・維持管理計画策定（組織整備計画、法制度整備計画、人材育成計画、衛生教育計画）

(12) モニタリング計画の策定

(13) 概算事業費積算、資金調達計画

(14) 衛生改善計画の提案

(15) 開発優先順位づけ

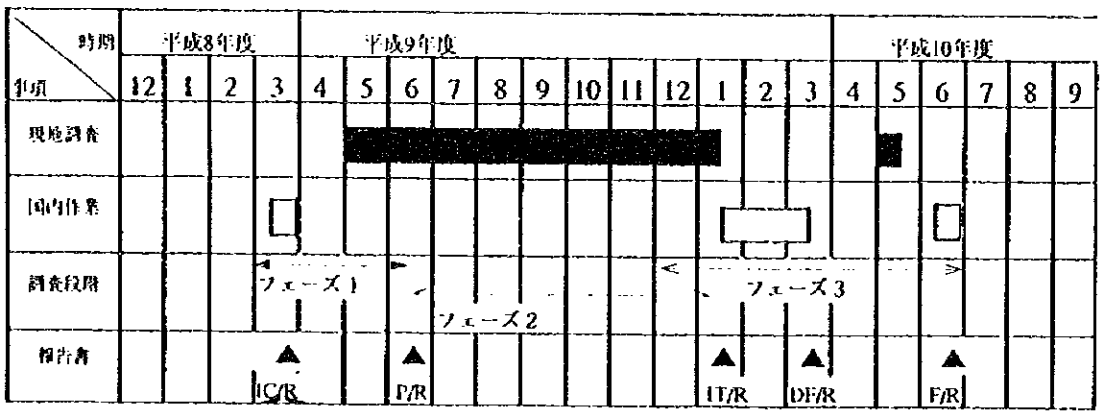
(16) 事業実施計画の策定

(17) 事業評価（技術、財務、経済、社会、組織、環境）

(18) 技術移転セミナーの実施

6－5 調査工程

調査工程は、原則として平成９年３月下旬に開始し、全体で16カ月程度とする。



6－6　調査実施体制

カウンターパート機関は水省であり、調査対象4郡を統括するとともに、関連他省庁との調整を担う。また、本格調査では、現地実作業の効率的かつ効果的な遂行を目的として、下記の関係機関で構成されるプロジェクトワーキングコミッティを設置し、水省はその統括役を担う。

(1) 水省 (Ministry of Water)

(2) アルーシャ州水道事務所
(Regional Water Engineer in Arusha Region)

(3) シンギダ州水道事務所
(Regional Water Engineer in Singida Region)

(4) タボラ州水道事務所
(Regional Water Engineer in Tabora Region)

(5) ハナン郡水道事務所
(District Water Engineer in Hanang District)

(6) シンギダルーラル郡水道事務所
(District Water Engineer in Singida rural District)

(7) マニョニ郡水道事務所
(District Water Engineer in Manyoni District)

(8) イグンガ郡水道事務所
(District Water Engineer in Igunga District)

プロジェクトワーキングコミッティを構成する関係機関の組織図を図6－6－1～図6－6－3に示す。

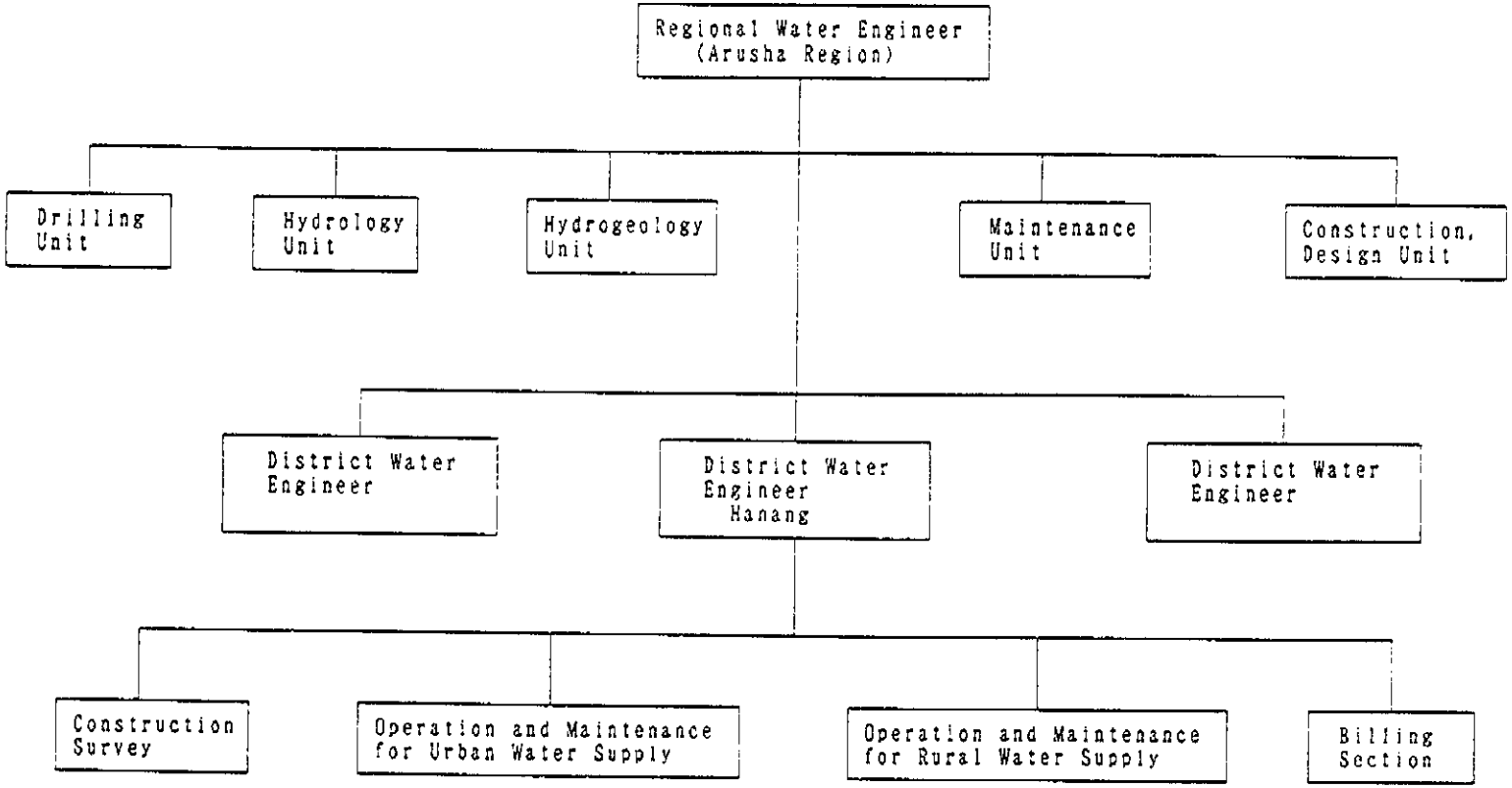


図 6－6－1　アルーシャ州水道事務所及びハナン郡水道事務所組織図

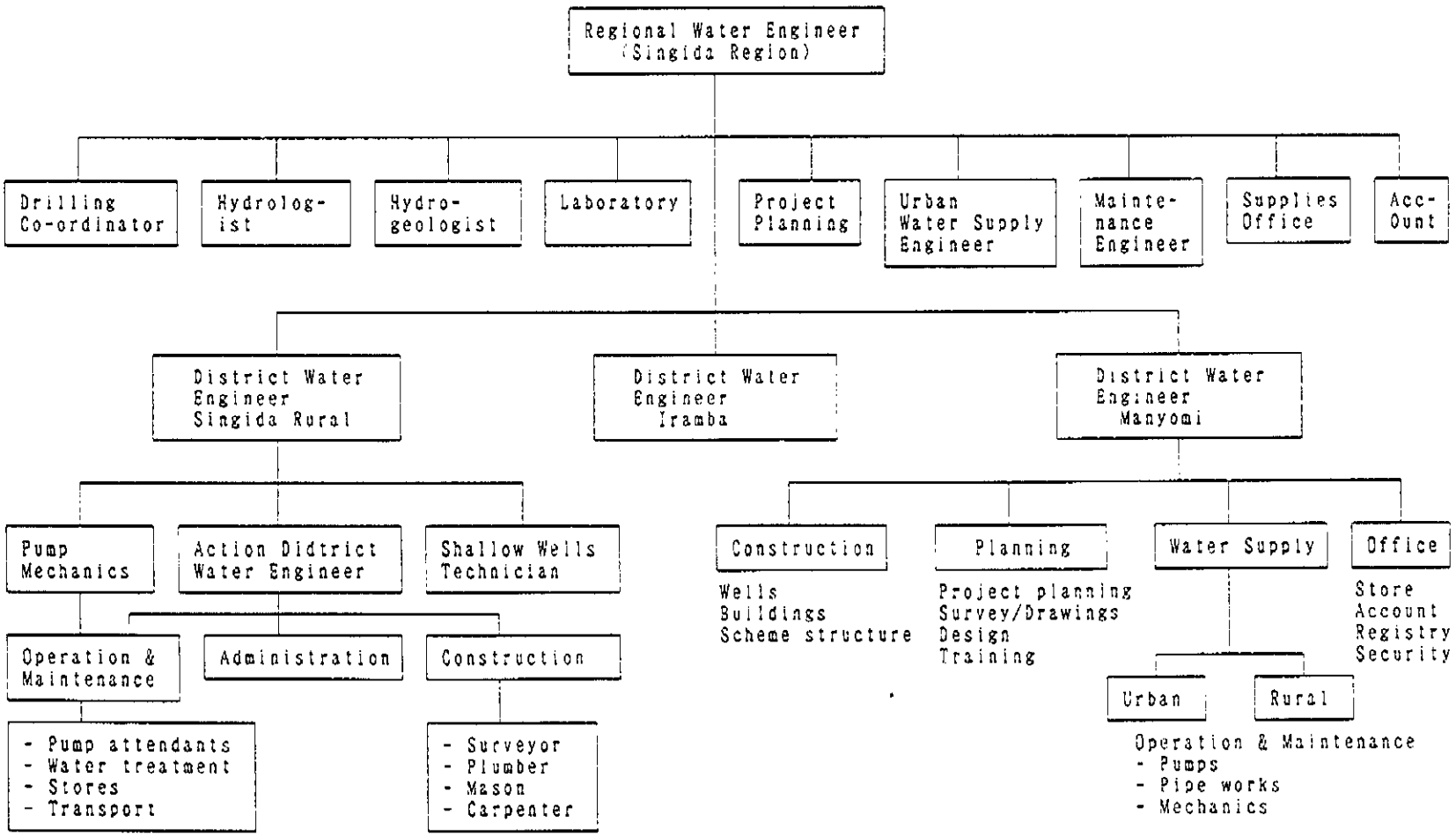


図 6－6－2　シンギダ州水道事務所、シンギダルーラル郡水道事務所及び
マニョニ郡水道事務所組織図

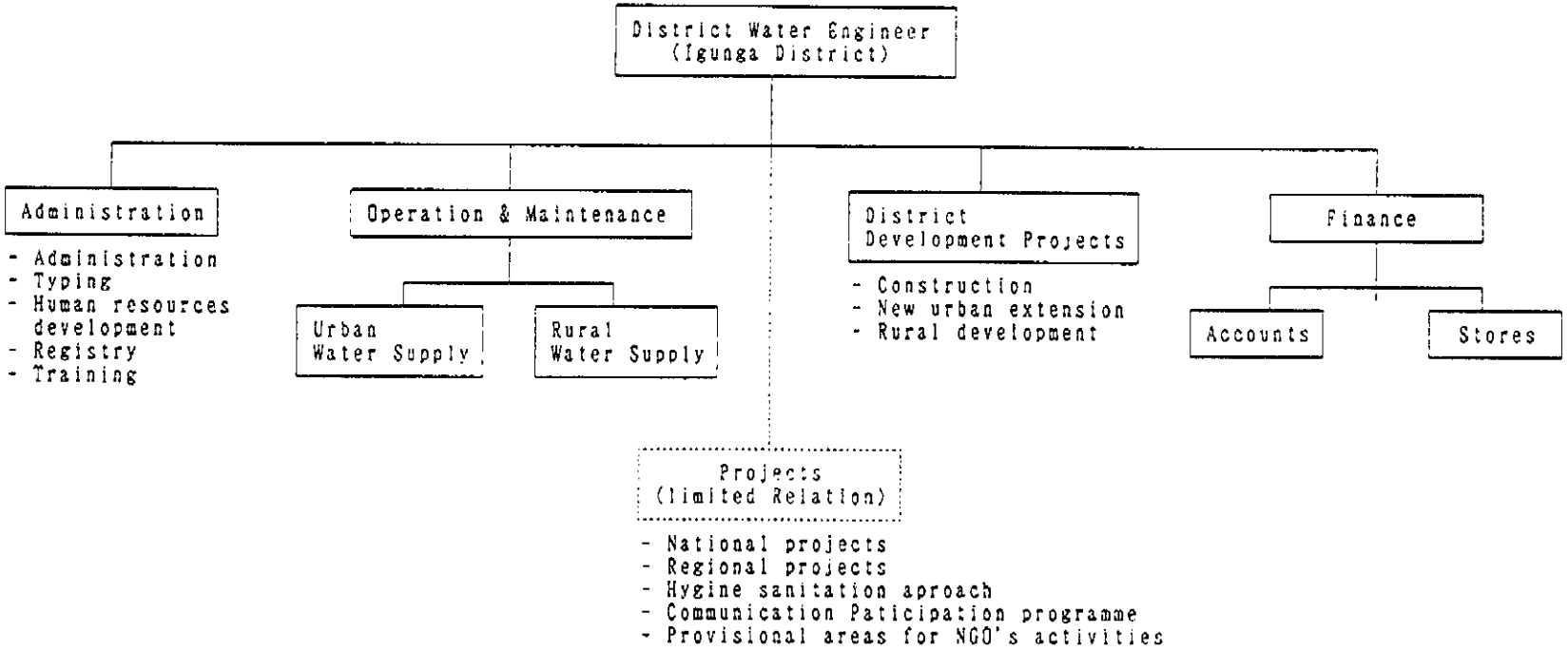


図 6－6－3　イグンガ郡水道事務所組織図

6－7　要員配置計画

本件調査には、概ね以下のような分野をカバーする要員が必要である。

①総括／地下水開発

②水文地質／環境

③村落給水計画

④運営・維持管理計画／住民組織形成

⑤社会分析／WID

⑥衛生教育

⑦物理探査

⑧掘削指導・監督

⑨経済／財務

6－8　ローカルコンサルタント・コントラクター

タ国では国家政策にもとづき政府機関が主体的に水資源開発事業を実施してきたため、水資源開発事業に関わるコントラクター、コンサルタントは数多くはない。

調査対象地域であるシンギダ周辺では、井戸掘削業者及びコンサルタントはいなかった。そのため、ダルエスサラームを中心に井戸掘削業者及びコンサルタントの状況調査を行った。水資源開発技術及び開発資機材を所有する外資系企業との合弁または水省経験者による会社設立などの傾向がみられる。

6－8－1　井戸掘削業者

タ国では現在、カゲラ州における難民救済のための水資源開発プロジェクトなどいくつかの水資源開発プロジェクトが進行しており、信頼性のある業者は多くの仕事を抱えている。このため、掘削機を確保できかつ信頼性のある業者を選定するには、タ国外業者を含めて幅広い検討が必要である。以下にダルエスサラームで調査または連絡できた井戸掘削業者の状況を示す。

(1) Paclloyd－Drilco Ltd. (Joint Venture)

所　在：ダルエスサラーム

代表者：Mr. F.J.W. Jansen

Drilco Ltd.（本社：イギリス）とPaclloyd Ltd.（本社：パナマ）と外資系会社同志の合弁企業である。両社の代表者は以前から同じであった。

掘削機を5台所有し、2台はカゲラで作業中、1台は故障、現段階では下記の

2台が使用可能である。

・MUSTANG A30 Hydraulic Drill Rig (Craelius)　1台

・Holemaster Drill (Failing)　1台（大深度リグ）

電気検層、揚水試験も実施できる。欧米系技術者により主要な部署が管理されていた。

(2) Dynamic Drillers Limited

所　在：ダルエスサラーム

代表者：Mr. Leonce K. Rwebangira

ベルギーの会社 " Peters BVBA"JVを組み、カゲラでプロジェクトを実施している。新規に購入した1組の掘削機材はカゲラで作業中であり、ベルギー本社から派遣された掘削技師により運転されている。また、井戸掘削機材類は6カ月以内にベルギーからタンザニアへ入荷できる体制をとっている。

カゲラで作業中の掘削機材は、本調査にも十分対応できるとのことである。全社員数は26名で、主要な所有機材を下記に示す。

・Truck-mounted Drilling Rig（φ200㎜×250m）　1台

・Air Compressor, Ingersoland　350PSL　1台

・揚水試験機材　1式

(3) Tanganyika Aqua Drilling Company Limited

所　在：ダルエスサラーム

代表者：Mr. Simon S. Mambali

水省経験者で設立された会社である。同系会社に、水資源開発コンサルタント会社 "Hydro Works Technic Co., Ltd." がある。

全社員数は12名で、実質的には掘削機を所有していないが、掘削機材の確保及び井戸掘削技術者の確保はできるとのことである。確保可能な掘削機はSCHRAMMDTHである。

(4) Foraky, Ruwanda Branch

所　在：キガリ、ルワンダ

代表者：Mr. Carpenter Patrick

ベルギーに本社をもつ会社である。ルワンダ事務所を基地にして、ルワンダ、タンザニアで地下水開発及び鉱物調査に活躍している。現地には4台のリグを所

有している。ルワンダからは、道路により掘削機材等の輸送が可能であるとのこと。

(5) AQUATECH Limited, Consulting Engineers & Contractor

所　在：モシ、アルーシャ州

代表者：Mr. A.J. Van Aarst

ケニアの掘削会社 "Vortex Drilling Ltd." とJVを組んで、アルーシャ州を中心に活躍している。

6－8－2　コンサルタント

(1) M－CONSULT Ltd.

所　在：ダルエスサラーム

代表者：Mr. Mohamed Rafik Meghiji

総合コンサルタントであり、地質、水理地質、都市計画、社会・経済調査、測量、建築、一般土木と多岐にわたる分野の技術者を有し、全社員数は50名である。

業務経歴は、水省、労働省、通信省、運輸省など官庁業務を多く受託してきており会社能力は高い。従来、欧州系コンサルタントと共同で業務を実施した経験がある。そうした影響で社会・経済分野にも強く、村落実態調査についてもタンザニア国内で実績があり、本格調査時の村落実態調査を十分に遂行できるコンサルタントである。

(2) MMK Project Service Ltd.

所　在：ダルエスサラーム

代表者：Mr. M.M. Khalfao

総合コンサルタントであり、地質、水理地質、都市計画、社会・経済調査と多岐にわたる分野の技術者を有している。

業務経歴は、水省、労働省をはじめ、UNDP、ADF（アフリカ開発銀行）などの国際機関の業務も受託してきており会社能力は高い。欧州系コンサルタントと共同業務を実施した経験をもとに社会・経済調査能力も高く、村落実態調査についてもタンザニア国内で実績がある。本格調査時の村落実態調査を十分に遂行できるコンサルタントである。

(3) GEOMAPS AFRICA Ltd.

所　在：ダルエスサラーム

代表者：Mr. Joseph Lamashila Tairo

ダルエスサラームに本社を置く測量、航測図化を主分野とする。ケニアに本部を置くGEOMAPS AFRICAグループであり、タンザニアには社員を多く抱えていないが、大きな仕事の場合にはケニアと連携して業務を行う。

本格調査では、今のところ測量調査の計画はないが、将来の給水設備関連計画等において、測量調査、地形図作成業務を委託できるコンサルタントである。

(4) Hydro Works Technic Co., Ltd.

所　在：ダルエスサラーム

代表者：Mr. N.K. Msimbira / Mr. S.S. Mambali

水省経験者及び現役専門家10名が登録する水資源開発コンサルタントである。タンザニアにおける水資源開発、給水事業に係る豊富な経験と専門的技術を有するコンサルタントといえる。現地掘削会社"Tanganyika Aqua Drilling CompanyLimited"と同系会社である。

(5) Env－Consultant (Tanzania) Limited

所　在：ダルエスサラーム

代表者：Mr. Nedelle Y.A.P. Mbwette

鉱物探査、環境コンサルタントである。

(6) Howard Humphreys (Tanzania) Ltd.

所　在：ダルエスサラーム

代表者：Mr. M.E. Agius

都市、地方給水コンサルティングを行い、全社員数は21名である。イギリスの"Howard Humphreys and Partners Ltd."を親会社として、タンザニアでの水資源開発・給水事業調査のほか、社会基盤事業調査に数多くの調査実績がある。信頼できるコンサルタントのひとつである。

6－9　調査用資機材及び調達計画

調達が必要となる調査用資機材は、概ね以下のとおりである。なお、試掘調査、パイロットスタディに必要な資機材は再委託業者が用意するのが適当であると考えられる。

（本邦調達）

1）パソコン

ディスプレイ、スタビライザー2台、プリンタ、ソフトウエア（テキスト、データベース作成）を含む

2）電気伝導度計　ポータブル

3）pH計　　ポータブル

4）分析用ガラス器具

5）分析用試薬（大腸菌群ほか）

6）ポータブルGPS

7）ポケット実体鏡

8）反射実体鏡

9）キャンプセット

10）航空写真用材料（印画紙、現像液、定着液）

11）パックテスト　フッ素イオン

硝酸イオン＋亜硝酸イオン

アンモニウムイオン

12）大腸菌簡易分析用試験紙

13）ウォーキートーキー

14）ランドサット衛星画像

15）恒温器ポータブル（大腸菌）AC115V/DC12V

16）大腸菌ウォーターサンプラー

17）携帯用地下水位計　深度200m、着水感知式

18）短波無線機　基地局1、車載2

19）VHF無線機　基地局1、車載4、携帯4

20）電気探査装置

21）インマルサットシステム

22）電磁探査装置

（現地調達）

1）航空写真

2）小型ディーゼル発電機　10KVA　110－220V

3）複写機 A－3サイズ、拡大縮小可

4）車輌　4WDステーションワゴン

試掘調査調達計画

(1) 現地の地下水調査・開発機材の現状

従来、タンザニア国での地方地下水調査開発は、社会主義政策のもとで政府機関が主体となって実施してきた。政府機関としての水省が保有する調査・掘削機材は一様に製造年代が古いため老朽化故障しているものが多く、補修及び部品の確保が困難な状況になっている。また、1980年代以降水資源開発予算の削減に伴い、地下水開発実績も減少している。水省及び関係各州の掘削機保有状況は第4章4－7で述べたとおりである。

タンザニア国では政府機関が主体的に水資源開発事業を実施してきたため、水資源開発事業に係るローカルコントラクター、コンサルタントは十分に成長していない。しかし近年、外資系企業の参入及び外資系企業と現地企業との共同体による参入が顕著になり、カゲラ州難民救済給水プロジェクトでもこうした傾向がみられる。また、水省経験者による会社設立などの傾向がみられる（本章6－8　ローカルコンサルタント・コントラクター、参照)。

(2) 試掘調査計画

政府、水省が保有する井戸掘削資機材は老朽化、故障が著しく大量の部品補給及び補修を必要とし、さらに付属機材及び掘削工具類の補給を必要とする状況にある。一方、掘削機の製造年代が古いため部品、予備品の確保が難しい状況にある。

現地井戸掘削業者は、試掘、検層、揚水試験を実施する能力を有していることから、試掘井調査は現地業者への再委託により実施する。

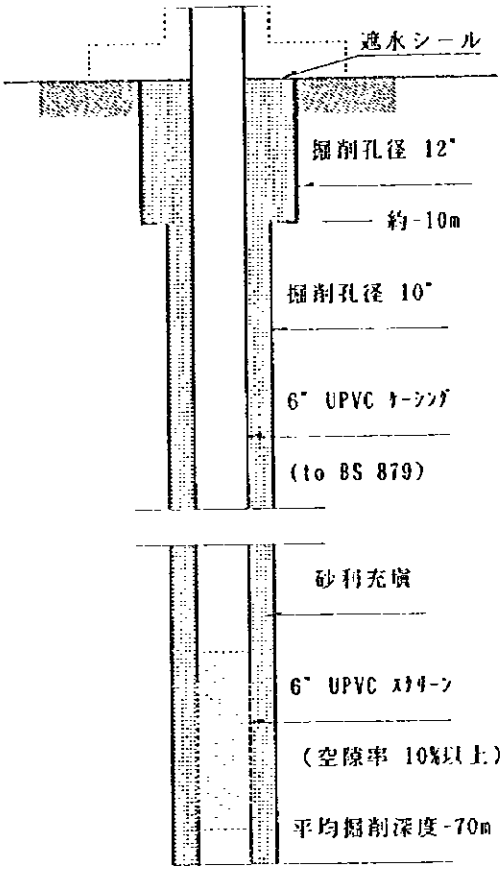
試掘井計画内容は次のとおりである。

対　象	平均深度(m)	本数	総深度(m)
タイプⅠ（手動ポンプ井戸）	70	3	210
タイプⅡ（動力ポンプ井戸）	150	7	1,050
（　合　計　）		10	1,260

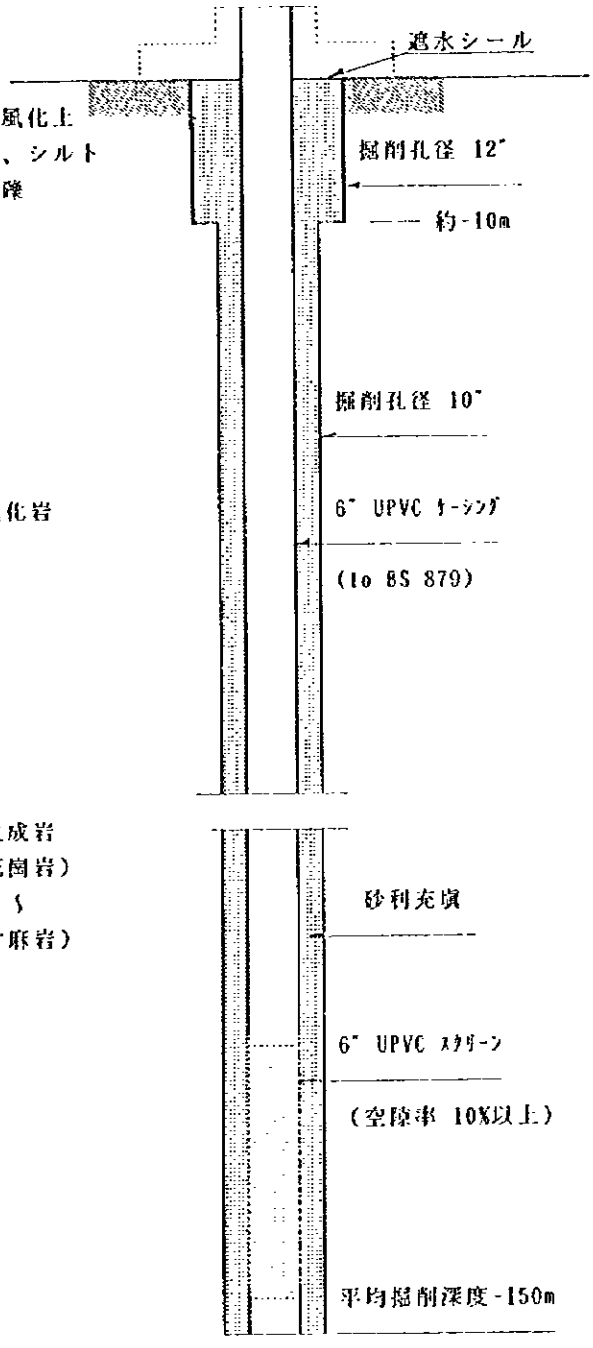
水理地質条件の変化により井戸掘削深度が異なること及び火山性砕屑物の成層などの特殊な地質条件による掘削方式の変化が予想されることから、DTH併用ロータリー式掘削機を調達する必要がある。

試掘井計画図

〔試掘井タイプ－Ⅰ：3本〕
（手動ポンプ井戸）



〔試掘井タイプ－Ⅱ：7本〕
（動力ポンプ井戸）



添　付　資　料

1．要請書 (Terms of Reference)
2．S/W (Scope of Work)
3．M/M (Minutes of Meeting)
4．質問書
5．主要面談者リスト
6．調査対象村落別の人口一覧表
7．ローカルコンサルタント・コントラクターリスト
8．収集資料リスト

1．要請書 (Terms of Reference)

JAMHURI YA MUUNGANO WA TANZANIA

WIZARA YA MAJI

Telegrams "MAJI".
Telephone 117153-9
In reply please quote
Ref. No.MDS23/49/28

SOKOINE DRIVE/MKWEPU,
P.O. Box 9153,
DAR ES SALAAM.

5/9/1996

Principal Secretary
Planning Commission
DAR ES SALAAM.

Principal Secretary
Ministry of Finance
P.O. Box 9111
DAR ES SALAAM.

RE: REQUEST FOR JAPANESE GRANT TO FINANCE
GROUNDWATER DEVELOPMENT STUDY PROJECT

Please refer to our previous proposal on the same subject submitted toyour office vide letter Ref. No.23/49/27 of 25th June, 1996 This proposal has been withdrawn and replaced by the one attached to this letter.

The present proposal has been modified by replacing Kondoa by Manyoni district. It came to our knowledge that Kondoa district has WATER AID and Belgium Government assistance in the Water Sector and thus this change has been made toavoid dublication of donor efforts.

The districts in this new proposal in order of priority are: Hanang in Arusha region, Manyoni and Singida rural in Singida and Igunga in Tabora.

Please forward this proposal with your recommendations to the Embassy of Japan for further action.

Robert R. Swere
ACTING PRINCIPAL SECRETARY

c.c. Embassy of Japan
P.O. Box 2577
DAR ES SALAAM - (Attn. Mr. Y. Shigemessa)

GROUND WATER RESOURCES DEVELOPMENT PROJECT

Introduction:

The development of water supply for domestic use in Tanzania dates back to 1946, but it was 1971 when a Ministry responsible for water was established with obligation to supply adequate, clean and safe water to the people.

In line with this, a long term planning programme was formulated, (1971-1991) whose main goal was provision of clean, potable water to all, with emphasis on rural population, within a walking distance not exceeding 400 metres from the homestead. Due to various problems such as insufficient financial allocation, lack of clear policy, etc the programme target was never achieved and has been extended year 2002.

To facilitate the attainment of the set goal the Government initiated preparation of Regional Water Master Plans (RWMPs) as a pre-requisite to implementation of the twenty year national programme. The plans were therefore expected to provide overall guidelines for water development in the regions, for domestic, livestock, commercial, irrigation, hydropower and industrial uses. It is worth to mention here that during the master plans ground water investigations were carried out and as such many bore holes and shallow wells were drilled in selected areas. However, these studies were not exhaustive. At present about 4000 boreholes have been drilled in different parts of the country both for investigation and exploitation.

Preparation of RWMPs started in 1973. The RWMPs were mostly prepared by assistance from friendly foreign Governments through financial and technical cooperation. Seventeen out of twenty regions have so far been covered (this includes Arusha region whose master plan is being finalised) Dodoma, Singida, and Morogoro regions have no RWMP.

The implementation of these master plans was not fully realised due to financial scarcity and clear policy. Efforts are being made to mobilise local resources and external assistance to implement the programme.

Institutional Aspects

The Ministry of Water is responsible for technical, monitoring, controlling, training and policy matters related to water supply and sanitation in the country.

At regional level, due to recent administrative changes, the sector is proposed to be under Resident Water Development Officer(REWDO) who is administratively and technically answerable to the Ministry. Main responsibiiity would be: advisory to the regional administration for water and sewage related matters; to evaluate, control, and monitor water resources and sewage related matters.

The district water affairs are under District Water Engineer, (DWE), under the Local Government Authority, in this case, the District Council. The DWE is administratively answerable to District Executive Director (DED) and technically answerable to REWDO.

At village level the sector is under the village government acting through the village water committee. The village water committee is technically related to DWE.

Other Ministries involve in the sector include:

- Prime Ministers' Office;
- Ministry of Health and
- Ministry of Community Development, Women Affair and Children.

The Proposed Project

Proposed project is ground water development project. This project will specifically rehabilitate existing usable bore holes and water supply schemes and develop new bore holes/wells and new water supply schemes. The project will be implemented in the following areas arranged in order of priority: Hanang district in Arusha region, Manyoni and Singida Rural districts in Singida Region and Igunga district in Tabora region.

This regions have been selected basing on following reasons: climatic conditions in that they are arid; have few donor supported projects and low rural water supply coverage i.e. 32.3% for Arusha region, 41.2% for Singida, and 32.1% for Tabora.

GROUNDWATER RESOURCES DEVELOPMENT PROPOSAL APPLICATION FORMAT

1. **Project Digest**

1.1 Project Title:

Groundwater Resources Development

1.2 Location:

The project is in Tanzania Mainland: Hanang District in Arusha region, Manyoni and Singida rural district in Singida region, and Igunga district in Tabora region.

1.3 Implementing Agency:

Ministry of Water

1.4 Justification of the Project:

1.4.1 The sector main obligation is to supply water for domestic and municipal uses to rural and urban centres. The national sectoral development policy is aimed at supplying adequate, clean, and safe water to all at walkable distance not exceeding 400 meters from homestead. The Sector is also responsible for implementing sanitation projects in cooperation with other sectors involved in sanitation. Sector performance by end of 1995 shows that about 46.3% of the rural and 68.5% for urban population was being served with safe water.

1.4.2 The performance of the existing water supply systems are below 50% for many reasons, mainly associated with financial and operation and maintenance logistics. However, following recent policy changes, this has been addressed by allowing formation of community based management of water supply schemes such as stakeholders/users form local organisations e.g. village water committees for villages etc. which manage operation and maintenance of water supply in the locality and these organisations are also responsible for setting tariffs and collecting revenue which they use to run the services on revolving fund basis.

1.4.3 This project on ground water development is in line with sector responsible and the national development programme of strengthening social services in the country.

1.5 Problems to be solved in the sector are mainly:

- inadequacy of the existing water supply schemes and sources;
- Inadequate tools, equipment and plants;
- Shortage of skilled manpower;
- Financial constraints;
- Inadequate institutional set-up and
- Rehabilitation requirements

2 Outline of the Project:

2.1 The sector policy aims at community based management projects/schemes and stresses the use of appropriate and affordable technology, involvement of beneficiaries (i.e community participation) and gender issues at all stages of project, and handing over to the beneficiaries the completed projects for operation and maintenance.

This project is divided into two stages study and implementation. Implementation is expected to follow immediately after the study. The study stage is considered in this document.

2.2 This is a project on ground water resources development study. main activities involved are essentially:

- Data collection;
- Data analysis;
- Environmental impact assessment;
- Project identification;
- Prepare preliminary design and cost estimates;
- Draw drilling programme;
- Draw implementation schedule;
- Prepare institutional set-up for implementing the project;
- Prepare project justification (financial and economic analysis).

3. The main objective of the project are:

3.1 To supply adequate, clean and safe water to the people of these areas by rehabilitating existing wells and boreholes as well as developing new wells and boreholes.

3.2 To improve health and standard of living of the people through assessment and improvement of present water quality and distribution system.

4. The objectives of the study:

To assess the existing situation, develop new water sources carryout rehabilitation requirements and design new water supply projects.

5. Study Area:

5.1 The areas proposed for the study are arid, and ground water remains the only dependable source. Due to unavailability of reliable surface water sources at affordable cost, water supply coverage is still low in the proposed project area.

5.2 Lack of safe water supply to the people have brought about health problems and contributed to low standard of living as considerable time is spent on search of water for domestic use and hence the desire for the study to promote new water supply projects.

5.3 The national target is to supply water to all people at walkable distance not exceeding 400 metres. This endeavour requires heavy investment which can not be met by the government at the moment and therefore realization of this project will positively contribute to the national target.

5.4 The study areas have very low average annual rainfall between 500mm and 1000mm and very high evaporation rate estimated annual mean is at 2000mm in many places in the project area. Deforestation, land erosion and other environmental degradation is very severe in some areas.

The people of the area are agriculturists and pastoralist, they mainly herd cattle and goats. Crops commonly grown are maize for food, wheat for food and cash and cotton for cash.

5.5 The current situation of water supply in the districts is below satisfactory level. People walk up to 10 km in search of water for their domestic use and livestock watering especially during the dry season; between the months of May and November. Much time of women and children is spent on fetching water. The available water in most cases is polluted. This bring about frequent incidences of water borne diseases and endermic.

The population expected to benefit from this project is estimated to be about 1,270,000 people.

6. Scope of the Study:

6.1 The study shall assess the existing exploitable wells and bore holes, those presently in use for rehabilitation requirement. Identify new water sources with emphasis on new bore holes for the present and future water supply. The study shall, essentially, identify and select feasible projects to be implemented during the implementation phase.

6.2 The study is expected to start in the fiscal year 1996/97. The duration of the study is one calendar year.

6.3 Expected major out-puts of the study are: water supply projects for implementation.

7. Other Relevant Information.

7.1 Regional water inventory plan for Singida was completed in 1978 by financial assistance from the Government of Australia. This inventory plan was partly implemented by assistance from the same Government. RWMP for Tabora was completed 1980 and was financed by the World Bank. Implementation was very little due to same problems as for Singida. RWMP for Arusha is being finalised. These reports will be useful starting points during the study.

7.2 Tanzania Christian Relief Services (a religions organisation) is currently implementing rural water supply projects in some parts of Singida region and no donor for rural water supply for Arusha and Tabora regions at the moment.

8. Facilities and Information for the Study Team.

8.1 Assignment of counterpart personnel of the implementing agency, for the study will be made according to requirements in all categories including professionals.

8.2 Available data, information, documents, maps etc related to the study include Water Master Plan and other reports for the region will be availed to the study team. Maps may be purchased from the Survey and Mapping Division of the Ministry of Lands, Housing and Urban Development; hydrological and hydrogeological data from the Ministry of Water; climatical and weather data from Ministry of Transport and Communication.

8.3 Security in the study areas is high and all safety measures will be exercised in case needed.

9. Global Issues.

- Environmental components of the project have to be assessed prior.

- Women are main beneficiaries (gender issues shall also be addressed).

- Some project components may require special consideration for women and children.

- Anticipated impact on women is obvious, much time will be available for other domestic and meaningful economic activities once water supply service is availed to them.

- Poverty reduction expected as more time will be spent in farms and other economic activities for more productivity.

- No constraints are caused to the low income people.

10 Undertaking of the Government of the Recipient Country in order to facilitate the smooth and efficient conduct of the study will all be observed.

11. Project Beneficiaries:

The people living in project areas; who are both agriculturists and livestock keepers

12. Desirable time of commencement of the project is 1996/97 fiscal year

13. Expected funding sources:

Internally from Government of Tanzania and external assistance from Government of Japan.

2. S/W (Scope of Work)

SCOPE OF WORK

FOR

THE STUDY

ON

GROUNDWATER DEVELOPMENT

FOR

HANANG, SINGIDA RURAL, MANYONI AND IGUNGA DISTRICT

IN

THE UNITED REPUBLIC OF TANZANIA

AGREED UPON BETWEEN

THE MINISTRY OF WATER

AND

THE JAPAN INTERNATIONAL COOPERATION AGENCY

DAR ES SALAAM, November 8, 1996

Prof. Idris Mtulia
PrincipalSecretary,
Ministry of Water

Dr. Maruo Yuji
Leader of the Preparatory Study Team,
Japan International Cooperation Agency

Mr. Emmanuel Masanja
Commissioner for External Finance
and Debt Management,
Ministry of Finance

I. INTRODUCTION

In response to the official request of the United Republic of Tanzania (hereinafter referred to as "the Government of Tanzania"), the Government of Japan has decided to conduct the Study on Groundwater Development for Hanang, Singida Rural, Manyoni and Igunga District in the United Republic of Tanzania (hereinafter referred to as "the Study") in accordance with the relevant laws and regulations in force in Japan.

Accordingly, the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programs of the Government of Japan, will undertake the Study in close cooperation with the authorities concerned of the Government of Tanzania.

The present document sets forth the Scope of Work for the Study.

II. OBJECTIVES OF THE STUDY

The objectives of the Study are:

(1) to formulate groundwater development plans for rural water supplies including rehabilitation plan of the existing facilities, operation and maintenance plan, and sanitation improvement plan

(2) to transfer technology on planning, operation & management methods and skills to counterpart personnel in the course of the Study.

III. STUDY AREA

The Study will cover Hanang district in Arusha region, Manyoni and Singida rural district in Singida region, and Igunga district in Tabora region.

IV. SCOPE OF THE STUDY

Phase I : Preliminary Analysis and Field Survey

1. Collection, review and analysis of related data and information
   a. social and economic conditions
   b. aerial photos
   c. topographical and hydrogeological maps
   d. meteorological, hydrological, geological data
   e. existing well data and existing water supply services
   f. data on rural living conditions
   g. on-going and planned projects relevant to the Study
   h. laws, regulations and policies on water resource development and water supply services
   i. environmental conditions
   j. other relevant data and information

2. Survey on actual conditions in villages

a. topographical and geological investigation
b. hydrological and hydrogeological investigation
c. condition of water use
d. condition of existing water supply facilities
e. water quality analysis
f. public health and hygiene condition
g. social and economic aspects

3. Inventry of existing water points

4. Selection of villages for the pilot study

5. Plannig for pilot study

6. Conduct Initial Environmental Examination

Phase II : Pilot Study

1. Geophysical survey in the villages selected for pilot study

2. Test drilling, electric logging, pumping test, water quality analysis and instalation of model facilities

3. Pilot study for people's participation in planning, construction, operation and maintenance of water supply facilities and sanitary education

4. Monitoring of the Pilot Study
a. observation of changes in custom and behavior related to water use and hygiene
b. monitoring of operation and maintenance condition
c. evaluation of the pilot study and feedback for the development plan

Phase III : Planning and Evaluation

1. Formulation of basic strategy

2. Formulation of water supply plan

3. Planning for institutional reinforcement in operation and maintenance plan

4. Planning for improvement of sanitary condition

5. Cost Estimation

6. Evaluation
a. financial plan and evaluation

b. institutionalandtechnicalevaluation
c. socio-economicevaluation
d. environmentalimpactassessment
e. WIDevaluation

7. Formulation of implementation program and prioritization

V. SCHEDULE OF THE STUDY

The Study will be conducted in accordance with the tentative schedule attached in Appendix. The schedule is tentative and subject to change on the agreement of both parties when such necessity arises during the course of the Study.

VI. REPORTS

JICA will prepare and submit the following reports in English to the Government of Tanzania.

1. Inception Report:

Twenty (20) copies at the commencement of the first work in Tanzania.

2. Progress Report :

Twenty (20) copies at about three month after the commencement of first work in Tanzania.

3. Interim Report:

Twenty (20) copies at the end of first work in Tanzania.

4. Draft Final Report:

Twenty (20) copies at the second work in Tanzania.
The Government of Tanzania shall submit its comments within one (1) month after the receipt of the Draft Final Report.

5. Final Report:

Forty (40) copies within two (2) months after the receipt of the comments on the Draft Final Report.

VII. UNDERTAKINGS OF THE GOVERNMENT OF TANZANIA

1. To facilitate the smooth conduct of the Study, the Government of Tanzania will take the following necessary measures:

(1) To secure the safety of the Japanese study team (hereinafter referred to as "the Team").

(2) To permit the members of the Team to enter, leave and sojourn in Tanzania for the duration of their assignment therein, and exempt them from foreign registration requirements and consular fees,

(3) To exempt the members of the Team from taxes, duties, fees and any other charges on equipment, machinery and other materials brought into Tanzania for the conduct of the Study,

(4) To exempt the members of the Team from income tax and charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Team for their services in connection with the implementation of the Study,

(5) To provide necessary facilities to the Team for remittance as well as utilization of the funds introduced into Tanzania from Japan in connection with the implementation of the Study.

(6) To secure permission for the Team to enter into private properties or restricted areas for the implementation of the Study,

(7) To secure permission for the Team to take all data and documents (including photographs and maps) related to the Study out of Tanzania to Japan, and

(8) To provide medical services as needed, expenses for which will be chargeable to the members of the Team.

2. The Government of Tanzania shall bear claims, if any arise, against the members of the Team resulting from, occuring in the course of, or otherwise connected with, the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or willful misconduct on the part of the member of the Team.

3. For the smooth implementation of the Study, the Ministry of Water shall act as a counterpart agency to the Japanese Study Team and also as a coordinating body in relation with other governmental and non-governmental organizations concerned.

4. The Ministry of water shall, at its own expense, provide the Team with the following, in cooperation with other organizations concerned:

(1) available data and information related to the Study
(2) counterpart personnel
(3) suitable office space with necessary equipment in respective district
(4) credentials or identification cards
(5) an appropriate number of vehicles with drivers.

Ⅷ. UNDERTAKINGS OF JICA

For the implementation of the Study, JICA shall take the following measures:

1. to dispatch, at its own expense, study teams to Tanzania,

2. to pursue technology transfer to counterpart personnel in the course of the Study.

Ⅸ. CONSULTATION

JICA and the Ministry of Water shall consult with each other in respect of any matter that may arise from or in connection with the Study.

3. M/M (Minutes of Meeting)

MINUTES OF MEETINGS
ON
THE SCOPE OF WORK
FOR
THE STUDY
ON
GROUNDWATER DEVELOPMENT
FOR
HANANG, SINGIDA RURAL, MANYONI AND IGUNGA DISTRICT
IN
THE UNITED REPUBLIC OF TANZANIA

AGREED UPON BETWEEN

THE MINISTRY OF WATER
AND
THE JAPAN INTERNATIONAL COOPERATION AGENCY

DAR ES SALAAM, November 8, 1996

Prof. Idris Mtulia
Principal Secretary,
Ministry of Water

Dr. Maruo Yuji
Leader of the Preparatory Study Team
Japan International Cooperation Agency

Mr. Emmanuel Masanja
Commissioner for External Finance
and Debt Management,
Ministry of Finance

Based on the formal request of the United Republic of Tanzania (hereinafter referred to as "the Government of Tanzania"), the Government of Japan, through the Japan International Cooperation Agency (hereinafter referred to as "JICA"), has agreed to conduct the Study on Groundwater Development for Hanang, Singida Rural, Manyoni and Igunga District in the United Republic of Tanzania (hereinafter referred to as "the Study").

The JICA preparatory study team ,headed by Dr. MARUO Yuji, visited Tanzania from October 28th to November 15th, 1996, where they held a series of meetings with Ministry of Water and other authorities concerned of the Government of Tanzania. The attendants list is shown in the Appendix-1.

During the visit, both sides agreed to the Scope of Work for the Study, which defines the terms and conditions of this bilateral cooperation. The Minutes of Meetings has been prepared for the better understanding of the Scope of Work agreed upon between the Tanzanian representatives and the JICA preparatory study team on November 8, 1996, summarizing main points of the discussions made in the course of the preparation of the Scope of Work.

1. Development Study by JICA

The Tanzanian side understood of the scheme of Development Study which was explained by the JICA preparatory study team.The Tanzanian side also expressed their concern about implementation of the development plan formulated as a result of this study. Considering austerity budgetary condition of the government of Tanzania, Tanzanian side addressed that they were expecting the project to be implemented by Japanese assistance. The JICA preparatory study team said that they were not authorized to discuss anything about Japan's grant assistance, and they could only advise the Tanzanian side to submit formal proposal of implementation to Government of Japan upon the completion of the Study.

2. Project Working Committee

Both sides agreed to establish a Project Working Committee for the smooth and effective execution of the Study. Ministry of Water will act as a coordinating body to conduct the Project Working Committee. It will be comprised of the representatives from following organizations or staff;

The committee will meet to discuss on the reports submitted by the Study Team, and adhoc basis when necessity arises.

Ministry of Water
Regional Water Engineer in Arusha region
Regional Water Engineer in Singida region
Regional Water Engineer in Tabora region
District Water Engineer in Hanang district
District Water Engineer in Singida rural district
District Water Engineer in Manyoni district
District Water Engineer in Igunga district

1

3. Technology Transfer

The JICA preparatory study team explained that technology transfer would be realized through following three means:

- on the job training to the counterpart personnel in the course of the Study
- counterpart training in Japan
- workshops at an appropriate occasions during the Study

The Tanzanian side understood these means.

(1)Counterpart Training

The Tanzanian side requested counterpart training in Japan. The JICA preparatory study team agreed to convey this request to JICA H.Q. for consideration.

(2)Workshop

The Tanzanian side requested to perform the workshops at an appropriate occasions during the Study. The JICA preparatory study team agreed to convey this request to JICA H.Q. for consideration.

4. Target Villages

There are a large number of villages which are sparsely located in the vast extent of land. Motorable roads are very limited and they are all dirt and seasonal. Taking those conditions into consideration, maximum number of target villages should be not more than 300 for effective and fruitful execution of village inventory work during the limited period of time.

In the meanwhile master plan studies have already been done in Arusha and Tabora regions. To avoid duplication of work Hanang District selected 33 villages as target for the Study based on the master plan. As for Tabora district there are altogether 97 villages, out of which CARITAS has already elaborated development plan of rural water supply in 23 villages. Based on the master plan study 50 villages out of 74 remaining villages are to be selected as target for the Study.

On the other hand no master plan study has been conducted so far, and NGO's or other donor's activities are limited to minimum level in Singida region. Therefore entire villages in Singida and Manyoni districts are decided to be the target for the Study except for several villages in Manyoni district on which UNICEF has already made development plan. Although this does not mean to formulate a master plan for the two districts within the Study.

Nineteen villages in Singida urban district which were requested to add by Singida region are not to be included in target villages.

5. Types of Rural Water Supply Facility

In the Study area following types of water supply facilities are identified:

- Gravity scheme
- Borehole with handpump
- Borehole with piped scheme (diesel engine and borehole pump)
- Borehole with windmill
- Dug well with handpump
- Dug well
- Charco (small dam)

Among those facilities borehole with piped schemes were introduced to the villages with about two to three thousand population during the previous regime, and most of them are out of operation in the moment. During the Study it's applicability must be carefully scrutinized from various aspects such as hydrogeological condition, readiness of village water committee, villager's affordability to cover running cost e.t.c.

The JICA preparatory study team expressed their basic idea that while development plans to improve rural water supply condition in the Study area are formulated, a scheme of borehole with handpump should be applied as the first option as far as the natural condition allows considering provision of hygienically safe water, easy and village level operation and maintenance of the facility and relatively low operation and maintenance cost.

In connection to the rural water supply facility the Tanzanian side repeatedly emphasized that a certain facility and water source for watering livestock should be considered near those water points where substantial number of livestock are raised.

6. Pilot Study

Geophysical exploration and test drillings will be conducted at selected two sites in the respective district to confirm the groundwater potential. As the geological configuration is more complicated in Hanang district compared to other districts, more than two test borings should be carried out to confirm groundwater availability in the district.

If these test wells are proved to yield sufficient amount of water, adequate types of facilities would be installed to convert them into production well.

When sufficient amount of water for installing facility is assured, mobilization of beneficiaries might be realized through health and sanitation education, various training for members of village water committee e.t.c.

Rehabilitation works of certain existing water supply facilities at selected sites will also be carried out to scrutinize the applicability of these types of facilities to the present natural and socio-economic situation of the village.

7. Reports

(1)The Tanzanian side agreed to make it open to the public in order to achieve maximum use of the Study results.

(2)The Tanzanian side requested the Japanese side that the Study Team should submit brief bi-monthly progress reports in addition to those mentioned in Scope of Works.

8. Undertakings of the Government of Tanzania

(1)The Tanzanian side will assign the adequate number of counterpart personnel which may be consisted mainly of respective Regional or District Water Engineer office's staff during the Study.

(2)The Tanzanian side will assist the Study Team in securing necessary office space (good for 10 persons) together with necessary office furniture, the

readily usable power/water supply. However, due to financial constraints, the Tanzanian side requested JICA to shoulder expenses to be incurred in renting and using facilities and services, such as office rental, office furniture, bills of power and water, and other office running cost.

(3)The Tanzanian side requested the Japanese side to provide adequate number of vehicles with drivers for the Study due to the limited budget. The Tanzanian side also requested the Japanese side to meet cost for data and information which are not available with the Ministry of Water or it's department. The JICA preparatory study team recognized this situation and promised to convey this request to JICA H.Q. for consideration.

(4)The Tanzanian side assured that respective authority would inform the people of the target villages through village chairman about the Study scheme before the commencement of the Study.

Appendix-1 Attendants List

(Tanzanian side)

Ministry of Water

Prof. Idris Mtulia	PrincipalSecretry
Mr. Christopher Sayi	AssistantCommissioner
Mr. Donatus Ishengoma	Head of Construction Section
Mr. Laurent M. Sechu	Head of Design Section
Mr. Jupiter Siwa	Counterpart for the Preparatory Study Team

Igunga District in Tabora Region

Mrs. Katiti Martha	RegionalAdministrativeSecretary
Mr. M. E. Kuzenza	ActingRegional WaterEngineer
Mr. Peter Mavto	Acting Regional PlanningOfficer
Mr. S. F. Sangija	Regional Hydrogeologist
Mr.Rajab S. Samatha	ActingDistrictAdministrativeSecretary
Mr.Shaaban A. Ntarambe	ActingDistrictExecutiveDirector
Mr. Rutta Merchades	DistrictWaterEngineer

Hananng District in Arusha Region

Mr. Jeremiah T. Akonaay	RegionalWaterEngineer
Mr. Gabriel G. Songay	DistrictCommissioner
Mr. Cyprian H. M. Minja	DistrictExecutiveEngineer
Mr. George C. Mfuko	DistrictWaterEngineer
Mr. Michael J. Ndesika	ActingDistrictPlanning Officer
Mr. Nicholaus J.Nyaki	WaterTechnician

Singida Rural District in Singida Region

Mr. Emmanuel P. Mazala	ActingRegionalAdministrativeSecretary
Mr. Richard M.C. Msengi	RegionalWaterEngineer
Mr. Akas A. Shao	Acting Regional Planning Officer
Mr. Peter H. Killewo	PlanningEngineer
Mr. Joel C. Mwaihojo	DistrictWaterEngineer

Manyoni District in Singida Region

Mr. T.Z. Kingu	DistrictCommissioner
Mr. A.K. Ombori	DistrictExecutiveDirector
Mr. A. Ara Kusenha	DistrictWaterEngineer
Mr. M.A. Swedi	WaterTechnician

(Japanese side)

JICA Tanzania Office

Mr. Moronaga Hiroyuki	Assitant Resident Representative
Mr. Sungusia Debora	Assitant Director

JICA Preparatory Study Team

Dr. Maruo Yuji	Leader/Groundwater Development Planning; Specialist on Water Resources, JICA
Mr. Sasadate koichi	Study Planning; Staff, Second Development Study Division, Social Development Study Department, JICA
Mr. Kamiya Mitsuaki	Hydrogeology/Environment
Mr. Odagaki Masao	Boring Planning
Mr. Fujiyama Taketoshi	Facility Planning

4. 質 問 書

THE STUDY
ON
GROUNDWATER DEVELOPMENT
FOR
HANANG, SINGIDA, RURAL, MANYONI AND IGUNGA DISTRICTS
IN
THE UNITED REPUBLIC OF TANZANIA

QUESTIONNAIRE

October, 1996

JAPAN INTERNATIONAL COOPERATION AGENCY

1-1.Organization concerning the Implementation of Preparatory Study

Item	Fill in Blank	Data Exist. Yes or No	Agencies where Data can be seen	Remarks
1.Ministry concerned with the Study				
1-1.Ministry of Water				
1)Organization Chart		Yes	Ministry of Water	
2)Number of Personnel (Manager, Engineer, Technician, Others)		〃	〃	
3)Annual Budget		〃	〃	
4)Role for Ground Water Development		〃	〃	
1-2.Ministry of Health				
1)Organization Chart		Yes	Ministry of Health	
2)Number of Personnel (Manager, Engineer, Technician and Others)		〃	〃	
3)Annual Budget		〃	〃	
4)Role for Ground Water Development		〃	〃	
1-3.Planning Commission				
1)Organization Chart		Yes	Planning Commission	
2)Number of Personnel (Manager, Engineer, Technician and Others)		〃	〃	
3)Annual Budget		〃	〃	
4)Role for Ground Water Development		〃	〃	
1-4.Water Affairs Division				
1)Organization Chart		Yes	Ministry of Water	
2)Number of Personnel (Manager, Engineer, Technician and Others)		〃	〃	
3)Annual Budget		〃	〃	
4)Role for Ground Water Development		〃	〃	

1-2.Organization concerning the Implementation of Preparatory Study

Item	Fill in Blank	Data Exist. Yes or No	Agencies where Data can be seen	Remarks
1-5.Water Resources Institute				
1)Organization Chart		Yes	Ministry of Water	
2)Number of Personnel (Manager, Engineer, Technician and Others)		〃	〃	
3)Annual Budget		〃	〃	
4)Role for Ground Water Development		〃	〃	
1-6.National Urban Water Authority				
1)Organization Chart		Yes	National Urban Water Authority	
2)Number of Personnel (Manager, Engineer, Technician and Others)		〃	〃	
3)Annual Budget		〃	〃	
4)Role for Ground Water Development		〃	〃	
2.National Development Plan				
2-1.National Development Plan				
1)Project Title		Yes	Planning Commission, Hanang District Planning Office	
2)Objectives and Outline of the Project		〃	〃	
3)Total Project Cost		〃	〃	
4)Information of Ground Water Development		〃	〃	
3.Foreign Assistance concerned to Water Supply and / or Ground Water Development				
3-1.Information of Projects		Yes	Ministry of Water, Regional Water Engineer's Office and District Water Engineer's Office	
1)Project Title		〃	〃	
2)Name of Country / Organization		〃	〃	

1-3.Organization concerning the Implementation of Preparatory Study

Item	Fill in Blank	Data Exist. Yes or No	Agencies where Data can be seen	Remarks
3)Objectives and Outline of the Projects		Yes	Ministry of Water, Regional Water Engineer's Office and District Water Engineer's Office	
4)Organization in charge of execution of the Projects		〃		
5)Funds		〃		
6)Loans or Grants		〃		
4.Rural district and/or NGO concerned to Water Supply and/or Ground Water Development				
4-1.Information of the Project		Yes	District Water Engineer's Office	
1)Project Title		〃		
2)Rural District and/or in charge of execution of the Project		〃		
3)Objectives and Outline of the Projects		〃		
4)Investment Budget				
5.Water Law				
5-1.Law and Regulations	THE WATER LAW (1974)	Yes	Principal Water Office (Water Right Section) in Ubungo, Singida Regional Water Engineer's Office	
1)Water Right		Yes	〃	
2)Other Water Law and Regulations		Yes	〃	
5-2.Water Quality				
1)Criteria of Water Quality	Tanzanian Temporary Standard			

1-4.Organization concerning the Implementation of Preparatory Study

Item	Fill in Blank	Data Exist. Yes or No	Agencies where Data can be seen	Remarks
6.Criteria of Design for Civil Engineering	British Standard			
7.Criteria of Drilling	British Standard			
8.Criteria of Electricity	British Standard			

2-1. Socio-Economic

Item	Fill in Blank	Data Exist. Yes or No	Agencies where Data can be seen	Remarks
1.General				
1-1.Census and Statistical Data in past 5 Years		Yes	Bureau of Statistics	
1)Occupational Population				
2)Number of Households				
3)Sector Production (Agriculture etc.)				
4)Gross National Products				
5)Balance of Payments				
6)International Trade				
7)Consumer Price Index				
8)Inflation Rate				
9)Exchange Rate				
1-2.Population Density Maps		Yes	Mapping Division	
1-3.Administration Maps		Yes	Mapping Division	

3-1. Current Status of Village

Item	Data Exts. Yes or No	Agencies where Data can be seen	Remarks
1.Current Status of Village			
1-1.Hanang District in Arusha Region			See Arusha Water Master Plan
1)Population of Arusha Region in past 5 Years	Yes	District Planning Office and Bureau of Statistics	〃
2)Population of Hanang in past 5 Years	Yes	District Planning Office and Bureau of Statistics	〃
3)Number of Person per Family in past 5 Years	No		
4)Daily Average Consumption in past 5 Years (m^3/day)	No		
5)Daily Consumption per person (l/person day)			
6)Future Demand (m^3/day)	Yes	Regional Water Engineer's Office	
7)Data of Water Quality	Yes	Regional Water Engineer's Office	
8)Water Tariff	Yes	District Water Engineer's Office	
9)Collecting System of Water Tariff (The Method of Collection, Personnel Management etc.)	Yes	District Water Engineer's Office	
10)Organization of Habitants concerning Water Supply			
11)Plan of Activities concerning Water Supply			
12)Land Use	Yes	Regional Urban Planning	
13)Factory			
14)Culture and Customers			
15)Existing Water Facilities Yes or No	Yes	District Water Engineer's Office	
16)Endemic and Epidemic Disease (The Type and Rate of Disease)	Yes	District Health Office	

3-2. Current Status of Village

Item	Data Exist. Yes or No	Agencies where Data can be seen	Remarks
1-2.Singida Rural District in Singida Region			
1)Population of Singida Region in past 5 Years	Yes	Regional Statistical Office and Bureau of Statistics	
2)Population of Singida Rural in past 5 Years	Yes	Regional Statistical Office and Bureau of Statistics	
3)Number of Person per Family in past 5 Years	Yes	Regional Water Engineer's Office and Bureau of Statistics	
4)Daily Average Consumption in past 5 Years (m^3/day)	Yes	District Water Engineer's Office	Average 30m^3/day
5)Daily Consumption per person (l/person day)	Yes	District Water Engineer's Office	Average 30 l/person * day
6)Future Demand (m^3/day)	Yes	District Water Engineer's Office	Average 60 l/person * day
7)Data of Water Quality	Yes	Regional Water Engineer's Office & Regional Water Laboratory	
8)Water Tariff			10 sh for 20 l in Rural
9)Collecting System of Water Tariff (The Method of Collection, Personnel Management etc.)	Yes	Water Village Committees	
10)Organization of Habitants concerning Water Supply			Village Government
11)Plan of Activities concerning Water Supply			
12)Land Use			
13)Factory			
14)Culture and Customers			
15)Existing Water Facilities Yes or No	Yes	District Water Engineer's Office	
16)Endemic and Epidemic Disease (The Type and Rate of Disease)	Yes	District Medical Officer and Ministry of Health	
17)Boundary Maps (Administration Map)	Yes	Ministry of Lands	

3-3. Current Status of Village

Item	Data Exist. Yes or No	Agencies where Data can be seen	Remarks
1-3.Manyoni District in Singida Region			
1)Population of Singida Region in past 5 Years	Yes	Bureau of Statistics and District Water Engineer's Office	
2)Population of Manyoni in past 5 Years	Yes	〃	
3)Number of Person per Family in past 5 Years	Yes	〃	
4)Daily Average Consumption in past 5 Years (m^3/day)			
5)Daily Consumption per person (l/person･day)			
6)Future Demand (m^3/day)			
7)Data of Water Quality			
8)Water Tariff			
9)Collecting System of Water Tariff (The Method of Collection, Personnel Management etc.)			
10)Organization of Habitants concerning Water Supply			
11)Plan of Activities concerning Water Supply	Yes	Water Department	
12)Land Use			
13)Factory			
14)Culture and Customers			
15)Existing Water Facilities Yes or No			
16)Endemic and Epidemic Disease (The Type and Rate of Disease)			
17)Boundary Maps (Administration Map)	Yes	Ministry of Lands	

3-4. Current Status of Village

Item	Data Exist. Yes or No	Agencies where Data can be seen	Remarks
1-4.Igunga District in Tabora Region			See The Master Plan
1)Population of Tabora Region in past 5 Years	Yes	District Water Engineer's Office Bureau of Statistics	
2)Population of Igunga in past 5 Years	Yes	〃	
3)Number of per Family in past 5 Years	Yes	〃	
4)Daily Average Consumption in past 5 Years (m^3/day)	Yes	Regional Water Engineer's Office	Mwamapub - Bulenya W / S and Pilot Feasibility Study August 1992
5)Daily Consumption per person (l/person・day)			5 l/person・day
6)Future Demand(m^3/day)			6,293 m^3/d .Population 251,724 (1997)
7)Data of Water Quality	Yes	Library in Ministry of Water	Norconsult Report 1992
8)Water Tariff	No		
9)Collecting System of Water Tariff (The Method of Collection, Personnel Management etc.)	No		
10)Organization of Habitants concerning Water Supply	Yes	District Water Engineer's Office	Village Water Committee
11)Plan of Activities concerning Water Supply			
12)Land Use	Yes	Tabora Land Use Planning	
13)Factory	Yes		
14)Culture and Customers	Yes		
15)Existing Water Facilities Yes or No	Yes	District Water Engineer's Office	The Water Master Plan of 1978
16)Endemic and Epidemic Disease (The Type and Rate of Disease)	Yes		IFAD Report, Regional & District Report
17)Boundary Maps (Administration Map)	Yes	Ministry of Lands	

4-1. Current Status of the Facilities for Ground Water

Item	Fill in Blank	Data Exist. Yes or No	Agencies where Data can be seen	Remarks
1.Hanang District in Arusha Region				
1-1.Information of the Wells				
1)Location and Number of Existing Wells	19	Yes	District Water Engineer's Office	
2)Well Inventory (Intake Amount, Depth, Working Water Level, Dynamic Water Level, Geological Section etc.)		Yes	Regional Water Engineer's Office	
3)Documentation of Well Structure		Yes	Regional Water Engineer's Office	
1-2.Information of Pumps				
1)Type of Pumps	Mono Pump	Yes	District Water Engineer's Office	Lister ST-3 Engine
2)Number of Pumps in stock				
3)Number of Working Pumps	1	Yes	District Water Engineer's Office	
2.Singida Rural District in Singida Region				
2-1.Information of the Wells		Yes	District Water Engineer's Office	
1)Location and Number of Existing Wells	Total 422 wells	Yes	District Water Engineer's Office	324 Wells in Operation
2)Well Inventory (Intake Amount, Depth, Working Water Level, Dynamic Water Level, Geological Section etc.)		Yes	Regional Water Engineer's Office	
3)Documentation of Well Structure		Yes	Regional Water Engineer's Office & Regional Water Engineer's Office	
2-2.Information of Pumps				
1)Type of Pumps	Mono Borehole Pumps	Yes	District Water Engineer's Office	
2)Number of Pumps in stock	Nil	Yes	District Water Engineer's Office	
3)Number of Working Pumps	10 Pumps have been working	Yes	District Water Engineer's Office	
3.Manyoni District in Singida Region				
3-1.Information of the Wells		Yes	Water Department	

4-2. Current Status of the Facilities for Ground Water

Item	Fill in Blank	Data Exist. Yes or No	Agencies where Data can be seen	Remarks
1)Location and Number of Existing Wells		Yes	Water Department District / Region	
2)Well Inventory (Intake Amount, Depth, Working Water Level, Dynamic Water Level, Geological Section etc.)		Yes	Water Department District / Region	Casing Size and Material
3)Documentation of Well Structure		Yes	Water Department , Singida Regional Office	Borehole Logging Data
3-2.Information of Pumps		Yes	Water Department	
1)Type of Pumps	Mono Pump and Lister Engine, Windmill Pumps		District Water Engineer's Office	Refer to Inventory of Villages
2)Number of Pumps in stock		Yes	〃	
3)Number of Working Pumps		Yes	〃	
4.Igunga District in Tabora Region				
4-1.Information of the Wells				
1)Location and Number of Existing Wells				
2)Well Inventory (Intake Amount, Depth, Working Water Level, Dynamic Water Level, Geological Section etc.)		Yes	Regional Water Engineer's Office	It will be sent to Mr.Siwa
3)Documentation of Well Structure		Yes	Dodoma Ministry of Water	It will be sent to Mr.Siwa
4-2.Information of Pumps				
1)Type of Pumps		Yes	Nkinga Hospital and District Water Engineer's Office	Mono Pump and Submersible Pump
2)Number of Pumps in stock	Nil			
3)Number of Working Pumps	1	Yes	Nkinga Hospital and District Water Engineer's Office	

5-1. Current Condition of Maintenance

Item	Fill in Blank	Data Exist. Yes or No	Agencies where Data can be seen	Remarks
1.Hanang District in Arusha Region				
1-1.Management				
1)Executing Organization	District Water Engineer's Office (District Council)			
2)Organization Chart		Yes	District Water Engineer's Office	
3)Personnel	11			
4)Technical Skill				
5)Annual Budget	7000000Ths			
6)Technical Cooperation by National or Region, Yes or No	Yes			
7)Cooperation in Funds by National or Region, Yes or No	Yes			
8)Training System by National or Region, Yes or No	Yes			
1-2.Maintenance				
1)Records of Maintenance		Yes		
2)Garage, Yes or No	No			
3)Present Condition of Stocked Parts and the Way of its Procurement		No		
4)Inventory of Maintenance Cars		No		
5)Current Status of Repair		No		
1-3.Water Quality Control				
1)Possibility of Water Quality Analysis	Regional Water Engineer's Office			
2)Information of Water Quality Analysis and Measurements		Yes	Regional Water Engineer's Office & Water Laboratory in Ubungo	
3)Stocked Equipment for Water Quality Analysis		Yes	Regional Water Engineer's Office & Water Laboratory in Ubungo	

5-2. Current Condition of Maintenance

Item	Fill in Blank	Data Exist. Yes or No	Agencies where Data can be seen	Remarks
2.Singida Rural District in Singida Region				
2-1.Management				
1)Executing Organization	District Water Engineer's Office			
2)Organization Chart		Yes	District Water Engineer's Office	
3)Personnel		Yes	District Water Engineer's Office	
4)Technical Skill		Yes	District Water Engineer's Office	
5)Annual Budget		Yes	District Water Engineer's Office	
6)Technical Cooperation by National or Region, Yes or No		Yes	District Water Engineer's Office & Regional Water Engineer's Office	
7)Cooperation in Funds by National or Region, Yes or No		Yes	District Water Engineer's Office & Regional Water Engineer's Office	
8)Training System by National or Region, Yes or No		Yes	District Water Engineer's Office & Regional Water Engineer's Office	
2-2.Maintenance				
1)Records of Maintenance		Yes	District Water Engineer's Office	
2)Garage, Yes or No		Yes	Regional Water Engineer's Office	
3)Present Condition of Stocked Parts and the Way of its Procurement		No		No Store
4)Inventory of Maintenance Cars		No		No Store
5)Current Status of Repair		No		Refer to TCRS Work Shop
2-3.Water Quality Control				
1)Possibility of Water Quality Analysis		Yes	Regional Water Laboratory	
2)Information of Water Quality Analysis and Measurements		Yes	Regional Water Laboratory	
3)Stocked Equipment for Water Quality Analysis		No		

5-3. Current Condition of Maintenance

Item	Fill in Blank	Data Exist. Yes or No	Agencies where Data can be seen	Remarks
3.Manyoni District in Singida Region				
3-1.Management				
1)Executing Organization				
2)Organization Chart		Yes	Water Department	
3)Personnel	approx. 27	Yes	Water Department	
4)Technical Skill		Yes	Water Department	
5)Annual Budget	See Remarks	Yes	District Executive Director	9,228,000/year for Rural in 94-95 12,000,000/year for Rural in 95-96 9,000,000 /year for Urban
6)Technical Cooperation by National or Region, Yes or No		No		
7)Cooperation in Funds by National or Region, Yes or No		No		
8)Training System by National or Region, Yes or No		Yes	Regional Water Engineer's Office	
3-2.Maintenance				
1)Records of Maintenance		Yes	Water Department	
2)Garage, Yes or No		Yes	Water Department	
3)Present Condition of Stocked Parts and the Way of its Procurement		No		
4)Inventory of Maintenance Cars	Nil			
5)Current Status of Repair				
3-3.Water Quality Control				
1)Possibility of Water Quality Analysis		Yes	Regional Water Engineer's Office	
2)Information of Water Quality Analysis and Measurements		Yes	Regional Water Engineer's Office	
3)Stocked Equipment for Water Quality Analysis		Yes	Regional Water Engineer's Office	
4.Igunga District in Tabora Region				
4-1.Management				

5-4. Current Condition of Maintenance

Item	Fill in Blank	Data Exist. Yes or No	Agencies where Data can be seen	Remarks
1)Executing Organization	Central Government and District Council			
2)Organization Chart		Yes	District Water Engineer's Office	Noconsult Report 1992
3)Personnel		Yes	District Water Engineer's Office	
4)Technical Skill		Yes	District Water Engineer's Office and Regional Water Engineer's Office	
5)Annual Budget	evelopment Budget			
6)Technical Cooperation by National or Region, Yes or No	Yes, by Region			
7)Cooperation in Funds by National or Region, Yes or No	Yes, by Region			
8)Training System by National or Region, Yes or No	Yes, by Region		Training Officer / Director of Administration Ministry of Water	
4-2.Maintenance				
1)Records of Maintenance		Yes	District Water Engineer's Office	Checking Chart
2)Garage, Yes or No	No			
3)Present Condition of Stocked Parts and the Way of its Procurement	No stock			
4)Inventory of Maintenance Cars	No			
5)Current Status of Repair	Nil			
4-3.Water Quality Control				
1)Possibility of Water Quality Analysis	Yes			Sinyanga, Mwanza & Dar es Laboratory
2)Information of Water Quality Analysis and Measurements		Yes	District Water Engineer's Office and Regional Water Engineer's Office	Water Analysis Report File
3)Stocked Equipment for Water Quality Analysis	No			

6-1. Maps and Technical Data

Item	Data Exits. Yes or No	Agencies where Data can be seen	Remarks
1.Maps and Photograph			
1-1.Topographical Maps	Yes	Mapping Division	
1)S=1/50,000			
2)S=1/100,000			
3)S=1/200,000			
4)S=1/500,000			
5)S=1/1,000,000			
1-2.Geological Maps	Yes	Mapping Division	
1)S=1/50,000			
2)S=1/100,000			
3)S=1/200,000			
4)S=1/500,000			
5)S=1/1,000,000			
1-3.Hydrogeological Maps	Yes	Mapping Division	
1)S=1/50,000			
2)S=1/100,000			
3)S=1/200,000			
4)S=1/500,000			
5)S=1/1,000,000			
1-4.Land Use Maps	Yes	Regional Urban Planning	
1)S=1/50,000			
2)S=1/100,000			
3)S=1/200,000			
4)S=1/500,000			
5)S=1/1,000,000			
1-5.Vegetation Maps			

6-2. Maps and Technical Data

Item	Data Exist. Yes or No	Agencies where Data can be seen	Remarks
1)S=1/50,000			
2)S=1/100,000			
3)S=1/200,000			
4)S=1/500,000			
5)S=1/1,000,000			
1-6.Aerial Photographs	Yes	Mapping Division	
1)S=1/20,000			
2)S=1/40,000			
1-7.Landsat			
1)Landsat			
2.Geological Data			
2-1.Existing Report of Geological Study	Yes	Tabora and Arusha Regional Water Engineer's Office	See Water Master Plan
2-2.Geophysical Survey	〃	〃	〃
3.Meteorological Data			
3-1.Meteorological Data and Others	Yes	Hydrology Section Water Research Department in Ubungo, Singida Regional Water Engineer's Office and Meteorology Department	
1)Observation Data showing Monthly Mean (Regarding: Rainfall, Temperature, Humidity, Evaporation)			
2)Iso-hyetal Maps showing Annual Mean			
3)Iso-Evaporation Contour Maps showing Annual Mean			
4)Location Maps of Meteorological Station			
3-2.Hydrogeological and Hydrological Data	Yes	Hydrology Section Water Research Department in Ubungo	
1)Run-off Data			

6-3. Maps and Technical Data

Item	Data Exist Yes or No	Agencies where Data can be seen	Remarks
2)Location of Observation			
3-3.Projects of Dam Construction			
1)Possibility of Execution, Yes or No			

7. Environment Study

Item	Data Exist. Yes or No	Agencies where Data can be seen	Remarks
1.Executing Governmental Organization	Yes	Environment Division and Environment Council in Vice President Office	
1-1.Executing Organization for Environment			
1-2.Regulations related to Environment			
1-3.Check List (See attached)			

8-1. To Hanang District Water Engineer's Office concerning Drilling Equipment

Please describe the following well drilling equipment which are presently owned and / or controlled by yourself.

1) Type
2) Capacity
3) Year Procured
4) Operating Years
5) Operation Hours per Annum
6) Operation Cost
7) Present Operating Conditions
8) Availability to this Study

Item	Obtained	Required	Confirmed	Remarks
1.Well Drilling Equipment				
1) Electric and Electromagnetic Prospecting Equipment	1	1		One is not available (needed for other district
2) Well Drilling Rigs	4		1	One can be used for this development study
3) Mud Pumping, Mixing, Foaming and Accessory Equipment			1	
4) Drilling and Mechanical Tools			1	
5) Air Compressors				
6) Transporting Trucks			1	
7) Transfer Vehicles		1		
8) Radio Communication Equipment		1		
9) Diesel Generators		1		
10) Submersible Water Pumps				
11) Borehole Logging Equipment		1		
12) Equipment for Water Lifting Test (Recording Water Level Detectors, Water Flow Meters etc.)		1		
13) Water Analysis Test Equipment		1		
14) Electric Welders, Pipe Cutting Machines and Other Required Equipment		1		

8-2. To Hanang District Water Engineer's Office concerning Drilling Equipment

Item	Obtained	Required	Confirmed	Remarks
2. Operation and Maintenance Conditions of the above mentioned Equipment				
1) Possibility of Present Operation and Availability to this Study		1		
2) Necessity for Repairing and Overhaul		1		
3) Provision and Stock Control of Spare Parts		1		
3. Repairing Facilities and Warehouse Management of Parts and Tools		1		
4. Technical Personnel for Ground Water Development				
1) Geologist and Hydrogeologist			1	At the regional Level
2) Drilling Engineer and Assistants			1	〃
3) Other Required Personnel				

8-3. To Singida Rural District Water Engineer's Office concerning Drilling Equipment

Please describe the following well drilling equipment which are presently owned and / or controlled by yourself.

1) Type
2) Capacity
3) Year Procured
4) Operating Years
5) Operation Hours per Annum
6) Operation Cost
7) Present Operating Conditions
8) Availability to this Study

Item	Obtained	Required	Confirmed	Remarks
1.Well Drilling Equipment				
1) Electric and Electromagnetic Prospecting Equipment	1	Electric 1 Electromagnetic 1		One Existing Electric not reliable to this development study
2) Well Drilling Rigs	3		2	Two can be used for this development study
3) Mud Pumping, Mixing, Foaming and Accessory Equipment				
4) Drilling and Mechanical Tools				
5) Air Compressors	1			Broken
6) Transporting Trucks				
7) Transfer Vehicles				
8) Radio Communication Equipment				
9) Diesel Generators	No	1		
10) Submersible Water Pumps	No	1		
11) Borehole Logging Equipment	No	1		
12) Equipment for Water Lifting Test (Recording Water Level Detectors, Water Flow Meters etc.)	No			No air lifter Used the mounted air compressor
13) Water Analysis Test Equipment				
14) Electric Welders, Pipe Cutting Machines and Other Required Equipment	No			
※The ministry of water can be requested to transfer the drilling equipment and the drilling staff to Singida when there is a requirement for such technician.				

8-4. To Singida Rural District Water Engineer's Office concerning Drilling Equipment

Item	Obtained	Required	Confirmed	Remarks
2. Operation and Maintenance Conditions of the above mentioned Equipment				Less than standard level
1) Possibility of Present Operation and Availability to this Study				
2) Necessity for Repairing and Overhaul				One operating SCHRAMM: engine of drilling and compressor required for overhaul
3) Provision and Stock Control of Spare Parts				Spareparts not enough : required to be supplied
3. Repairing Facilities and Warehouse Management of Parts and Tools				Less than standard level. Not enough
4. Technical Personnel for Drilling Work				
1) Geologist and Hydrogeologist	Geologist 1			
2) Drilling Engineer and Assistants				
3) Other Required Personnel				

8-5. To Manyoni District Water Engineer's Office concerning Drilling Equipment

Please describe the following well drilling equipment which are presently owned and / or controlled by yourself.

1) Type
2) Capacity
3) Year Procured
4) Operating Years
5) Operation Hours per Annum
6) Operation Cost
7) Present Operating Conditions
8) Availability to this Study

Item	Obtained	Required	Confirmed	Remarks
1.Well Drilling Equipment				
1) Electric and Electromagnetic Prospecting Equipment				
2) Well Drilling Rigs				
3) Mud Pumping, Mixing, Foaming and Accessory Equipment				
4) Drilling and Mechanical Tools				
5) Air Compressors				
6) Transporting Trucks	2			
7) Transfer Vehicles	1			
8) Radio Communication Equipment	4			
9) Diesel Generators	2			
10) Submersible Water Pumps				
11) Borehole Logging Equipment				
12) Equipment for Water Lifting Test (Recording Water Level Detectors, Water Flow Meters etc.)				
13) Water Analysis Test Equipment				
14) Electric Welders, Pipe Cutting Machines and Other Required Equipment				

8-6. To Igunga District Water Engineer's Office concerning Drilling Equipment

Please describe the following well drilling equipment which are presently owned and / or controlled by yourself.

1) Type
2) Capacity
3) Year Procured
4) Operating Years
5) Operation Hours per Annum
6) Operation Cost
7) Present Operating Conditions
8) Availability to this Study

Item	Obtained	Required	Confirmed	Remarks
1.Well Drilling Equipment				
1) Electric and Electromagnetic Prospecting Equipment	No			To be borrowed from Dodoma
2) Well Drilling Rigs	2		No	
3) Mud Pumping, Mixing, Foaming and Accessory Equipment				
4) Drilling and Mechanical Tools				
5) Air Compressors				
6) Transporting Trucks				
7) Transfer Vehicles				
8) Radio Communication Equipment				
9) Diesel Generators	No			
10) Submersible Water Pumps	No			
11) Borehole Logging Equipment	No			
12) Equipment for Water Lifting Test (Recording Water Level Detectors, Water Flow Meters etc.)	No			
13) Water Analysis Test Equipment	No			
14) Electric Welders, Pipe Cutting Machines and Other Required Equipment				

S-7. To Igunga District Water Engineer's Office concerning Drilling Equipment

Item	Obtained	Required	Confirmed	Remarks
2. Operation and Maintenance Conditions of the above mentioned Equipment				
1) Possibility of Present Operation and Availability to this Study				
2) Necessity for Repairing and Overhaul				
3) Provision and Stock Control of Spare Parts				
3. Repairing Facilities and Warehouse Management of Parts and Tools				
4. Technical Personnel for Ground Water Development				
1) Geologist and Hydrogeologist	Hydrogeologist 1			
2) Drilling Engineer and Assistants	0			
3) Other Required Personnel	Technician 2			

5．主要面談者リスト

主要面談者リスト

水省(Ministry of Water)

Prof. Idris Mtulia	Principal Secretary
Mr. Christopher Sayi	Assistant Commissioner
Mr. Donatus Ishengoma	Head of Construction
Mr. Laurent Sechu	Head of Design Section
Mr. Jupiter Siwa	Counterpart for the Preparatory Study Team

タボラ州(Tabora Region)

Mrs. Katiti Martha	Regional Administrative Secretary
Mr. M. E. Kuzenza	Acting Regional Water Engineer
Mr. Peter Mauto	Acting Regional Planning Officer
Mr. S. F. Sangija	Regional Hydrogeologist

イグンガ郡(Igunga District)

Mr. Rajab S. Samatha	Acting District Administrative Secretary
Mr. Shaaban A. Ntarambe	Acting District Executive Director
Mr. Purra Merchades	District Water Engineer

アルーシャ州(Arusha Region)

Mr. Jeremiah T. Akonaay	Regional Water Engineer

ハナン州(Hanang District)

Mr. Gabriel G. Songay	District Commissioner
Mr. Cyprian H. M. Minja	District Executive Engineer
Mr. George C. Mfuko	District Water Engineer
Mr. Michael J. Ndesika	Acting District Planning Officer
Mr. Nicholaus J. Nyaki	Water Technician

シンギダ州(Singida Region)

Mr. Emmanuel P. Mazala	Acting Regional Administrative Secretary
Mr. Richard M. C. Msengi	Regional Water Engineer
Mr. Akas A. Shao	Acting Regional Planning Officer
Mr. Peter M. Killevo	Planning Engineer
Mr. Valenian Makusaro	Geologist
Mr. Deores Kamara	Hydrologist
Mr. Festo J. M. Saroni	Chemist
Mr. Saidi Chuse	Regional Drilling Officer
Mr. M. S. Shimba	Hydrogeologist

シンギダルーラル郡(Singida Rural District)

Mr. Joel C. Mwaihojo	District Water Engineer

マニョニ郡(Manyoni Disrict)

Mr. I. Z. Kingu	District Commissioner
Mr. A. K. Ombori	District Executive Director
Mr. A. Ara Kusenha	District Water Engineer
Mr. M. A. Swedi	Water Technician

水省-ドドマ(Ministry of Water, Dodoma)

Mr. Lister R. E. Kongola	Head of Hydrogeological Service
Mr. Methos A. Ilamulira	Assistant Chief Drilling Inspector
Mr. Christian K. Kasanga	Regional Drilling Officer

エネルギー鉱物資源省-ドドマ(Ministry of Energy and Minerals, Dodoma)

Ing. P. M. Kenyunko	Assistant Commissioner for Mineral Sources
Mr. Godfrey P. Lukanazya	Chief Cartographer
Mr. Ru Hoko Lunde	Librarian

水省-ウブンゴ(Ministry of Water, Ubungo))

Mr. David B. Songea	Drilling Superintendent
Mr. Francis Gumbo	Head of Laboratory Section (Chemist)
Mr. Fidelis Emmanuel	Hydrology Technician, Hydrology Section, Water Research D.
Mr. Felix Peter	Hydrology Technician, Hydrology Section, Water Research D.
Mr. A. B. Mnunduma	Acting Head of Computer Services, Planning Division
Mr. Brown I. M. Bumbila	Director of Water Works, National Urban Water Authority(NUWA)

副大統領府(Vice President Office)

Ms. Angelina Madete	Head of Pollution Control Section
Mr. Charles Swai	Public Health Officer

大学・公社等

Dr. Hudson Nkotagu	Professor, The University of Dar es Salaam
Mr. E. M. Saka	Principal System Engineer, Tanzania Telecommunication Company Ltd.
Mr. Muhando	Chief Telephone Contoroller, International Operation, T. T. C.
Mr. Libena	Tanzanian Communication Commission (TCC)

民間（コンサルタント等）

Mr. Mohamed Rafik Meghiji	Managining Diector	M-konsult Ltd.
Mr. M. M. Khalfan	Civil Engineer	MMK Project Services Ltd.
Mr. J. L. Tairo	Managing Director	GEOMAPS
Mr. Matteru.	Manager	Sciencescope International Ltd.
Mr. Simon S. Mambali	Director, Hydro Works Technic Co. Ltd. (or Hydro-Tech Tanzania Ltd.)	
Mr. Simon S. Mambali	Director, Tanganyika Aqua Drilling Co. Ltd.	
Mr. Zhang Wangmin	Chief Representative & Director, China Geo-Engineering Co. Tanzanian Branch	
Mr. L. K. Rwebangira	Managing Director, Dynamic Drillers Limited	
Mr. F. j. W. Jansen	Managing Director. Drilco Limited jointed with Paclloyd International inc.	
Mr. Pekka Pyykonen	General Manager, Tanira Ltd.	
Mr. Victor	Merry Water Ltd.	

日本大使館

佐々木大使、　鈴木公使

JICA

川添所長、水野副所長、諸永所員、Ms. S. Debora

6．調査対象村落別の人口一覧表

The Number of Division, Ward, Villages and Population in The Study Area

Region	District	Division	Ward	Villages	Population (1996)
Tabora	Igunga	3	18	50	142,698
Singida	Singida Rural	7	26	135	358,307
〃	Manyoni	4	21	74	151,012
Arusha	Hanang	3	17	33	62,170
Total		17	82	292	714,187

N B. The Population of Hanang is for 1992.

The List of Villages in Igunga District

No.	Division	Ward	Villages	Population (1996)	Village Water Fund	Priority Villages on Water M/P
1	MANGONGA	MWASHINKU	Matinje	4,536	O	
2			Buchenjegele	3,842	O	
3			Mondo	2,517		O
4			Mwashiku	2,279		
5		NGULU	Ngulu	2,023		
6			Imalilo	2,354		
7			Mwansung'ho	1,543		
8		CHOMACHANKOLA	Chomachankola	6,460	O	
9			Chibiso	2,499		
10			Bulangamilwa	4,061	O	
11		ZIBA	Ziba	4,923		
12			Iborogelo	4,643		
13			Bulumbela	2,274		
14		NDEMBEZI	Ndembezi	5,293	O	
15			Ntigu	1,496		
16			Kitangili	3,176		
17			Moyofuke	1,817		
18		NKINGA	Nkinga	6,321	O	
19			Ulaya	2,453	O	
20			Ugaka	2,495		
21			Mwakabuta	1,855		
22			Tkunguipina	1,392		
23	IGURUBI	IGURUBI	Igurubi	4,425	O	
24			Mwagala	1,933		
25			Kalangale	1,618		
26		KINUNGU	Kinungu	2,555		
27			Mwandihimiji	2,827		
28			Mwamapuli	2,331		
29			Mwajilunga	1,375		
30		MWAMASHIGA	Migonguwa	2,092		
31		NTOBO	Ntobo	2,720		
32			Mwamloli	2,031		
33			Mwabubele	1,885		
34		ITUNDURU	Itunduru	3,557		O
35			Kagongwa	1,307		
36			Mwabaraturu	4,768		
37	IGUNGA	IGUNGA	Mwayunge	3,112	O	
38		NYANDEKUWA	Nyandekuwa	3,166		
39			Ussongo	2,463		
40			Itale	2,170		
41		NANGA	Nanga	2,424	O	
42			Kaumbu	3,181	O	
43			Bulyang'ombe	3,327	O	
44			Igogo	1,951	O	
45		BUKOKO	Bukoko	2,445	O	O
46			Ipumbulya	2,932	O	
47		ITUMBA	Itumba	1,239	O	
48		LUGUBU	Lugubu	1,231	O	
49		SUNGWIZI	Sungwizi	2,692		O
50			Nguriti	4,689	O	
	Total			142,698	18	4

The List of Villages in Hanang District

No.	Division	Ward	Villages	Population (1992)	Village Water Fund
1	BASSOTU	BASSOTU	Mulbadaw	3,696	
2			Dang'aida	580	
3		LAGHANGA	Dajamet	774	
4			Laghanga	1,818	
5			Gawidu	1,801	
6		BASSODESH	Garawja	4,438	
7			Gaghata	1,661	
8		HIRBADAW	Hirbadaw	3,007	
9			Mwange	3,229	
10		GATANUWAS	Gatanuwas	1,471	
11			Wandele	420	
12			Gidika	1,348	
13	KATESH	MOGITU	Dumbeta	1,370	O
14		NANGWA	Dirma	2,190	
15		GISAMBALANG	Gisambalang	1,626	
16			Waranga	1,021	
17		BALANGDALALU	Murero	1,388	
18			Diloda	1,385	
19		GEHANDU	Mingenyi	2,424	
20			Ishponga	1,491	
21	ENDASAK	MEASKRON	Mara	1,976	
22		GIDAHABABIEG	Gidahababieg	2,290	
23			Endasaboghechan	2,290	
24		HIDET	Hidet	2,000	
25			Bassotughang	1,480	
26		SIROP	Sirop	1,870	
27			Matangarinu	2,280	
28		SIMBAY	Simbay	621	
29			Gidagharabuk	618	
30		MASAKTA	Masakta	3,584	
31			Lambo	2,390	
32		MASKARODA	Maskaroda	2,504	
33			Getasum	1,126	
	Total			62,170	1

The List of Villages in Singida Rural District

No.	Division	Ward	Villages	Population (1996)	Village Water Fund
1	IKUNGI	IKUNGI	Ikungi	2,646	O
2			Ighuka	3,256	O
3			Ulyampiti	2,103	O
4			Matongo	2,897	O
5			Muungano	1,444	O
6			Matare	3,198	O
7			Mahambe	1,360	O
8		ISSUNA	Issuna	3,303	O
9			Choda	1,325	O
10			Mkiwa	1,827	O
11			Nkuhi	2,199	O
12		DUNG'UNYI	Dung'unyi	2,157	O
13			Samaka	3,502	O
14			Ujaire	1,631	O
15			Kipumbuiko	2,208	O
16			Mkinya	1,662	O
17		MANG'ONYI	Mang'onyi	2,102	O
18			Tupendane	1,570	O
19			Mwau	4,039	O
20			Sambaru	1,273	O
21	IHANJA	IHANJA	Ihanja	3,814	O
22			Isseke	1,797	O
23			Nkoiree	3,006	O
24			Unyangwe	2,234	O
25			Chungu	2,996	O
26		MINYUGHE	Minyughe	2,225	O
27			Misake	2,810	O
28		MUHINTIRI	Muhintiri	2,929	O
29			Mnyange	1,838	
30			Mpetu	1,320	O
31		PUMA	Puma	2,196	O
32			Matyoku	1,691	O
33			Utaho	2,832	O
34			Isalanda	838	
35			Kituntu	2,453	O
36			Msambu	1,827	O
37			Nkuninkana	2,094	O
38			Wibia	2,238	O
39	SEPUKA	SEPUKA	Msimi	5,680	O
40			Msungwa	3,379	O
41			Kintandaa	3,794	O
42			Mnang'ana	2,972	O
43			Mtunduru	4,481	O
44		MWARU	Mwaru	2,368	O
45			Mlandala	2,516	
46			Igombwe	2,049	
47			Msosa	1,421	
48		MGUNGIRA	Mgungira	2,183	
49			Ufana	1,390	
50			Iyumbu	2,724	

The List of Villages in Singida Rural District

No.	Division	Ward	Villages	Population (1996)	Village Water Fund
51		IRISYA	Irisya	2,608	O
52			Mwasutianga	1,357	
53	MTINKO	MTINKO	Mtinko	3,910	O
54			Malolo	3,048	O
55			Mughanga	2,318	O
56			Mpambaa	2,756	O
57			Kijota	1,716	
58			Nduu	1,992	O
59			Minyenye	4,034	O
60			Ikiwu	3,803	O
61		MAKURO	Makuro	2,568	O
62			Ghalunyangu	2,454	O
63			Mpipiti	4,043	O
64			Mudida	4,928	O
65			Mpoku	3,216	O
66			Matumbo	3,090	O
67			Mkenge	2,389	O
68			Migugu	2,437	O
69		UGHANDI	UghandiA'	2,942	O
70			UghandiB'	2,501	O
71			Nkwae	1,899	O
72			Laghanida	2,849	O
73			Misinko	3,658	O
74			Ntondo	1,473	O
75			Msisi	3,513	O
76			Senene Mfuru	1,071	O
77	ILONGERO	ILONGERO	Madamigha	3,679	O
78			Mrama	4,382	O
79			Mwahango	1,851	O
80			Ilongero	3,963	O
81			Mwakiti	2,307	
82			Itanka	2,263	O
83			Sekoutuure	2,280	O
84		KINYETO	Kinyeto	3,991	O
85			Ntunduu	2,367	
86			Mkimbii	1,883	O
87			Minyaa	2,158	
88			Igauri	1,795	
89			Ntonge	2,380	
90			Mghamo	4,392	O
91		MERYA	Merya	4,590	O
92			Mvae	4,033	O
93			Makhandi	3,125	O
94			Kinyagigi	2,514	
95			Mwanyonye	3,060	
96		IKHANODA	Ikhanoda	2,409	O
97			Mjughuda	3,934	O
98			Misimihi	3,549	O
99			Mkilw	2,819	
100			Mwasauya	3,463	O

The List of Villages in Singida Rural District

No.	Division	Ward	Villages	Population (1996)	Village Water Fund
101			Mgamu	4,093	O
102		MAGHOJOA	Mipilo	4,221	O
103			Mangida	3,351	O
104			Sefunga	2,705	
105			Ghata	3,638	O
106			Msange	4,180	O
107	MGORI	MGORI	Mgori	1,640	O
108			Mkhola	2,379	O
109			Sughana	2,693	O
110			Unyampanda	1,270	
111			Mugmunga	1,195	O
112			Nduamughanga	1,356	O
113		NGIMU	Ngimu	3,995	O
114			Mwighanji	2,938	O
115			Itaja	5,249	O
116			Pohama	3,172	O
117	MUNGAA	MUNGAA	Mungaa	2,532	O
118			Minyinga	2,163	O
119			Kinku	2,517	O
120			Makiungu	2,333	O
121			Kimbwi	2,318	O
122			Unyamighumbi	2,809	
123		MISUGHAA	Misughaa	1,427	O
124			Msule	1,218	O
125			Sakaa	1,410	
126			Mnane	1,860	O
127			Nkundi	2,092	
128		SIUYU	Siuyu	2,530	O
129			Unyankanya	2,466	O
130			Mkunguakihendo	2,298	O
131		NTUNTU	Ntuntu	2,245	
132			Ntewa	3,437	O
133			Mampando	2,824	O
134			Lighwa	2,258	O
135			Mwisi	2,038	O
	Total			358,307	111

The List of Villages in Manyoni District

No.	Division	Ward	Villages	Population (1996)	Village Water Fund
1	MANYONI	MANYONI	Kipondoda	5,210	O
2			Manyoni Mjini	5,209	
3			Mwanzi	1,333	O
4			Muhalala	2,256	O
5			Mdunundu	1,703	O
6			Mitoo	893	
7			Mkwese	2,630	O
8		AGHONDI	Aghondi	1,027	
9			Mabondeni	599	
10			Njirii	751	
11			Kamenyanga	1,449	O
12		IDODYANDOLE	Idodyandole	2,250	
13			Mbugani	2,172	O
14			Kashangu	862	O
15	KILIMATINDE	MSEMEMBO	Msememba	2,658	O
16			Saranda	2,768	
17			Londoni	1,205	O
18			Hika	467	
19		KILIMATINDE	Kilimatinde	1,247	O
20			Solya	1,709	O
21			Sukamahela	3,169	O
22		MAJIRI	Majiri	2,314	O
23			Kinangali	2,912	
24			Mpandagani	1,142	
25		SASAJILA	Makasuku	1,031	
26			Chibumagwa	2,513	
27			Sasajila	1,017	
28	KINTINKU	KINTINKU	Kintinku	1,430	O
29			Lucilile	3,130	O
30			Udimaa	1,710	O
31		MAKANDA	Makanda	1,422	O
32			Mangasai	1,421	
33			Kitalalo	1,425	
34		MAWENI	Maweni	1,741	O
35			Mvumi	1,298	O
36			Ngaiti	2,347	O
37		CHIKUYU	Chikuyu	2,762	O
38			Mwiboo	2,934	
39			Mbwasa	1,866	
40			Makutupora	1,365	O
41	NKONKO	NKONKO	Nkonko	2,655	
42			Mpola	1,489	O
43			Ntumbi	2,224	O
44		SANZA	Sanza	2,634	
45			Ntope	2,545	
46			Chicheho	1,327	
47			Ikasi	1,118	O
48		ISSEKE	Isseke	971	O
49			Simbanguru	1,164	
50			Mpapa	1,837	O

The List of Villages in Manyoni District

No.	Division	Ward	Villages	Population (1996)	Village Water Fund
51			Igwamadete	2,048	
52		CHIKOLA	Chikola	2,151	
53			Chidamsulu	1,081	O
54			Winamila	889	
55		HEKA AZIMIO	Heka Azimio	3,425	
56			Chikombo	3,751	
57			Sasilo	3,734	
58		ITIGI	Itigi Mjini Majengo	8,258	
59			Doroto	1,410	O
60			Kitaraka	1,574	
61		IPANDE	Ipande	2,488	O
62			Muhanga	1,660	
63			Damwelu	1,350	O
64		SANJARANDA	Sanjaranda	2,183	
65			Gurungu	1,471	O
66			Kitopeni	2,032	O
67		RUNGWA	Mwamagembe	1,793	
68			Kintanula	410	
69			Rungwa	1,857	
70		MGANDU	Itagata	1,479	O
71			Kayui	2,899	O
72			Makale	2,074	O
73			Mgandu	4,988	O
74			Kalangali	696	O
	Total			151,012	39

7．ローカルコンサルタント・コントラクターリスト

添付－7　ローカルコントラクターリスト　　Drilling Contractor (1/2)

Item	Details	Company A	Company B	Company C
Background of Company	Name of Company	Paclloyd - Drilco Limted (Joint Venture)	Dynamic Drillers Limited (Joint ventured with PETERS)	Tanganyika Aqua Drilling Co. Ltd.
	Nationality	Drilco:British. Paclloyd:Panama	Tanzania	Tanzania
	President	Mr. F.J.W. Jansen	Mr. L.K. Lwebangira	Mr. S.S. Mambali
	Adress	Branch Office : (Mbezi Beach) P.O. Box 1301. Dar es Salaam	Libya/Mosque Street, P.O. Box 72671. Dar es Salaam. Tanzania	P.O. Box 8831. Dar es Salaam. Tanzania
	Telephone No.	Mobile 0812-780628.761177	255-51-115622 (Dir.)	255-51-666800
	Fax. No.	255-51-113688	255-51-115622	255-51- 46832
	Year Established		1985	1996
	Capital		Total Assets: 215 million TShs	
	Last Year Sales		150 million TShs.	
Personnel	Total Personnel		25 (permanent)	12
	No. of Engineer		2	4
	No. of Assis. Eng.		3	2
	No. of Technician		10	6
Experience	Experience (and Main Client)		see Company Profile	
Drilling Equipments	Drilling Rig	2 No. available of total 5 No. -MUSTANG A30 hydraulic Drill:1 -Holemaster drill : 1	1 No. available of total 1 No. (Presently working in Kagera) -Truck-mounted drilling rig: 1	Rigs available with accessary equipments and drilling tools -SCHRAMM DTH rigs : 1
	Others	-Rig compressors -Compressor for airlift -Water pumps -Electric borehole logger	-Air compressor : 1 (Ingersoland 350 PSL) -DTH 8" : 2 -Hammer Bits: 10"x 2, 8"x 8" -Generator: 8KVA, 20KVA x 1 -Truck-mounted pump test unit (Generator, Airliftor, Submersible pumps) -Trucks : 5 Nos.	-Air compressor mounted on rig -10T truck available
Lough Quotation	4" casing well	241 US$/m	532.7 US$/m	≒ 213.9 US$/m
	6" casing well	308 US$/m	424.4 US$/m	≒ 217.5 US$/m

添付－7　ローカルコントラクターリスト　　Drilling Contractor (2/2)

Item	Details	Company D	Company E	Other Companies
Background of Company	Name of Company	Foraky Rwanda branch	AQUATECH LIMITED : Consulting Engineers & Contractors	・Tan Aqua Tech Ltd. P.O.Box 72346, Dar es Salaam Tel: 051-4419
	Nationality	Belgium		
	President	Mr. Carpenter Patrick	Mr. A.J. van Aarst	
	Adress	Branch Office : BP 2400 Kigali, Rwanda	P.O. Box 172, Moshi, Tanzania	・Georg's Wells Construction Company Ltd. P.O.Box 67517, Dar es Salaam
	Telephone No.	00250-72378	255-55-50300	
	Fax. No.	00250-7462488	255-55-50300	・J & S Exploration and Mining Company Ltd. P.O.Box 72438, Dar es Salaam
	Year Established			
	Capital			
	Last Year Sales			・Trio Drill-Masters Ltd. P.O.Box 31309, Dar es Salaam
Personnel	Total Personnel			
	No. of Engineer			
	No. of Assis. Eng.			
	No. of Technician			
Experience	Experience in Tanzania (and Main Client)	'86-'89 Drilling for mining '94-'95 Drilling for water supply in Ngara and Karagwe		
Drilling Equipments	Drilling Rig	Major equipment imported from Rwanda by road		
	Others			
Lough Quotation	4" casing well/m	349 US$/m	see Table of unit rates	
	6" casing well/m	283 US$/m	see Table of unit rates ates	

添付－7　ローカルコンサルタントリスト　Local Consultants (2/2)

Item	Details	Company D	Company E	Company F
Background of Company	Name of Company	Hydro Works Technic Co. Ltd.	Env-Consult(Tanzania)Limited	Howard Humphreys(Tanzania)Ltd. (Howard Humphreys/Partnes Ltd)
	Nationality	Tanzania	Tanzania	Tanzania(Parent company in UK)
	President	Mr. N. K. Msimbira/ S. S. Mambali	Mr. Neddie Y. A. P. Mbwette	Mr. M. E. Agius
	Adress	I. P. S. Building, P. O. Box 8831 . Dar es Salaam, Tanzania	P. O. Box 31318. Dar es Salaam, Tanzania	I. P. S. Buiding, Maktaba Street P. O. Box 2555, Dar es Salaam
	Telephone No.	Mobile. 0811-326038	Mobile. 0812-780568	Mobile. 0811-324307, 324308
	Fax. No.	255-51-112752, 112753	255-51-112752, 112753, 112754	255-51-112917
	Year Established	1995		1949
	Capital			
Personnel	Total Personnel	see Company Profile		21 (see Company Profile)
	No. of Engineer	10		11
	No. of Assis. Eng.			
	No. of Technician			10
Technical Skill	Possibility to study Current Status of Village			see Company Profile
	Possibility to design Water Supply System	All engineers have worked in water sector for over 10 years		see Company Profile
Main Client	Public Firm			
	Private Firm			
Experience in past 5 years	Summary of Project	• Engineering Services for the Ground Water Development Programme for Ngara and Karagwe Districts in Kagera Region		• Sinyanga/Lindi Water Supply • Dodoma Water Operation and Maintenance • Dar es salaam Water Rehabilitation and Extension • Mwanza Water Supply Extension • Kirosa Rural Water Supply • Water Supply in Arusha/Moshi /Tanga/Morogoro/Iringa
	Consulting Fee for 5 years			On going projects to be seen in Company Profile

添付－7　ローカルコンサルタントリスト　Local Consultants (1/2)

Item	Details	Company A	Company B	Company C
Background of Company	Name of Company	M - KONSULT LTD.	MMK Project Services Ltd.	Geo Maps Afeica Ltd.
	Nationality	Tanzania	Tanzania	Tanzania
	President	Mr. Mohamed Rafik Meghiji	Mr. M.M. Khalfan	Mr. J.L. Tairo
	Adress	P.O. Box 2711, Dar es Salaam, Tanzania	P.O. Box 593, Dar es Salaam, Tanzania	Plot No.86-Kijitonyama, P.O.Box 70238, Dar es Salaam, Tanzania
	Telephone No.	255-51-38505,38506,38512	255-51-183286	255-51-74029,71749
	Fax. No.	255-51-112820,113034,66089	255-51-183730	255-51-75114
	Year Established	1981	1987	
	Capital			
Personnel	Total Personnel	50	see Company Profile	
	No. of Engineer	Approx. 10	6	
	No. of Assis. Eng.			
	No. of Technician		4	
Technical Skill	Possibility to study Current Status of Village	see the Capability Document, Nov., 1996	see Company Profile	
	Possibility to design Water Supply System	see the Capability Document, Nov., 1996	see Company Profile	
Main Client	Public Firm	Ministry of Work, Ministry of Communication, Ministry of Transportation, Ministry of Water, Etc.	Ministry of Work, Ministry of Water, DECF, JICA, Etc.	
	Private Firm	Tanzanian Electric Supply Co. Tanzanian Railway Corporation National Printing Company, Etc.	see Company Profile	
Experience in past 5 years	Summary of Project	see the Capability Document, Nov., 1996	see Company Profile	
	Consulting Fee for 5 years	see the Capability Document, Nov., 1996		

8．収集資料リスト

様式第１号（記第２関係）

（収集／作成資料）

資料リスト（□収集資料／□専門家作成資料）

平成　年　月　日作成

主管部長	文書管理課長	主管課長	情報管理課長	技術情報課長	図書館受入日

		プロジェクトID	- -	調査団番号	- - -		
地域		調査団名又は専門家氏名		調査の種類又は指導か科目		担当部課	
国名	タンザニア国	配属機関名		現地調査期間又は派遣期間	年　月　日～　年　月　日	担当者氏名	

番号	資料の名称	形態（図書・ビデオ・地図・写真等）	収集資料	専門家作成資料	JICA作成資料	テキスト	発行機関	取扱区分	図書館記入欄
2-2	TOPOGRAPHIC MAP (1:50,000) 16 sheets	地図,青焼	○				SURVEY AND MAPPING DIVISION	JR・CR( )・SC	
2-3	TOPOGRAPHIC MAP (1:50,000) 9 sheets (別添リスト参照)	地図,コピー	○				SURVEY AND MAPPING DIVISION	JR・CR( )・SC	
2-4	EXPERIMENTAL IMAGE MAP SB-36 , 1986 (TABORA) (1:1,000,000)	地図,オリジナル	○				RCSSMRS (Nairobi)	JR・CR( )・SC	
2-5	SINGIDA AND IRAMBA DISTRICTS 1965(1968) (1:250,000)	地図,オリジナル	○				SURVEY AND MAPPING DIVISION	JR・CR( )・SC	
2-6	RAMANI YA VIJIJI MKOA WA DODOMA 1977 (DODOMA DISTRICT 1:350,000)	地図,オリジナル	○				SURVEY AND MAPPING DIVISION	JR・CR( )・SC	
2-7	TABORA AND URAMBO DISTRICTS 1957(1976) (1:500,000)	地図,オリジナル	○				SURVEY AND MAPPING DIVISION	JR・CR( )・SC	
2-8	MANYONI DISTRICTS 1965 (1:300,000)	地図,オリジナル	○				SURVEY AND MAPPING DIVISION	JR・CR( )・SC	
2-9	NABERERA (TOPOGRAPHIC MAP) SB-37-1, 1970 (1:250,000)	地図,オリジナル	○				SURVEY AND MAPPING DIVISION	JR・CR( )・SC	
2-10	GEOLOGICAL MAP HANANG (1:125,000) 1966 QUARTER DEGREE SHEET 84	地図,オリジナル	○				MINERAL RESOURCES DIVISION	JR・CR( )・SC	
2-11	GEOLOGICAL MAP MWAMBITI - SOUTH (1:125,000) 1956 (DEGREE SHEET 78	地図,オリジナル	○				GEOLOGICAL SURVEY DEPARTMENT	JR・CR( )・SC	
	N.E. QUARTER)							JR・CR( )・SC	

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地域		調査団名又は専門家氏名		調査の種類又は指導か科目		担当部課	
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1	社会・経済							JR・CR(　)・SC	
1-1	TABORA REGIONAL STATISTICS ABSTRACT 1993 (1994刊)	図書オリジナル	○				PRESIDENTS OFFICE PLANNING COMMISION BUREAU OF STATISTICS	JR・CR(　)・SC	
1-2	Statistical Abstract 1994(1996刊)	図書オリジナル	○				BUREAU OF STATICS PRESIDENT'S OFFICE, PLANNING COMMISION	JR・CR(　)・SC	
1-3	NATIONAL ACCOUNTS OF TANZANIA 1976-1994 (1995刊)	図書オリジナル	○				BUREAU OF STATISTICS NATIONAL ACCOUNTS SECTION PRESIDENTS	JR・CR(　)・SC	
							PLANNING COMMISION DAR ES SALAAM	JR・CR(　)・SC	
1-4	BANK OF TANZANIA ECONOMIC BULLETIN (1995刊)	図書オリジナル	○					JR・CR(　)・SC	
1-5	HEALTH STATISTICS ABSTRACT 1996 (1996刊)	図書コピー	○				PLANNING DEPARTMENT MINISTRY OF HEALTH	JR・CR(　)・SC	
1-6	PRICES AND PRICE INDEX NUMBERS FOR TWENTY TOWNS IN MAINLAND TANZANIA 1995	図書オリジナル	○				BUREAU OF STATISTICS	JR・CR(　)・SC	
1-7	BARAZA LA MAWAZIRI 1996 （内閣組織 関係写真）	図書オリジナル	○					JR・CR(　)・SC	
2	自然環境							JR・CR(　)・SC	
2-1	TOPOGRAPHIC MAP (1:50,000) 82 sheets	地図オリジナル	○				SURVEY AND MAPPING DIVISION	JR・CR(　)・SC	

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		プロジェクトID	・　・	調査図番号	・　・　・		
地域		調査団名又は専門家氏名		調査の種類又は指導科目		担当部課	
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2-12	GEOLOGICAL MAP IKUNGI (1:125.000) 1973 Q.D.SHEET 122	図書，青焼	○				MINERAL RESOURCES DIVISION	JR･CR(　)･SC	
2-13	GEOLOGICAL MAP MANYONI (1:125,000) 1973 Q.D.SHEET 141	図書，青焼	○				MINERAL RESOURCES DIVISION	JR･CR(　)･SC	
2-14	GEOLOGICAL MAP ILUMA (1:125.000) 1973 Q.D.SHEET 160	図書，青焼	○				MINERAL RESOURCES DIVISION	JR･CR(　)･SC	
2-15	STATUS OF GEOLOGICAL MAPPING AS JULY 1996	図書，コピー	○				MINERAL RESOURCES DIVISION	JR･CR(　)･SC	
2-16	PROVISIONAL GEOLOGICAL MAP OF THE LAKE VICTORIA GOLDFIELDS	図書，コピー 地図	○				MINERAL RESOURCES DIVISION	JR･CR(　)･SC	
	TANZANIA 1990 (1:500,000)							JR･CR(　)･SC	
2-17	GEOLOGICAL MAP OF DEGREE SHEET No.29 (1:250.000) 1938	図書，コピー 地図	○				GEOLOGICAL DEPARTMENT	JR･CR(　)･SC	
	(with EXPLANATION) SINGIDA							JR･CR(　)･SC	
2-18	GEOLOGICAL MAP OF DEGREE SHEET No.52 (1:250.000) 1936	図書，コピー 地図	○				GEOLOGICAL DEPARTMENT	JR･CR(　)･SC	
	(with EXPLANATION) DODOMA							JR･CR(　)･SC	
2-19	HYDROGEOLOGICAL AND , ISOTOPIC CHARACTERIZATION OF A FRACTURED	図書，オリジナル	○				Berlin : KÖSTER	JR･CR(　)･SC	

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	BASEMENT GROUNDWATER FLOW SYSTEM IN THE SEMIARID AREA OF							JR・CR(　)・SC	
	DODOMA - TANZANIA , HUDSON MANISI NKOTAGU 1996							JR・CR(　)・SC	
2-20	APPLICATION OF ENVIRONMENTAL ISOTOPES TO GROUNDWATER	図書コピー	○				JOURNAL OF AFRICAN EARTH SCIENCES , Vol 22,No 4	JR・CR(　)・SC	
	RECHARGE STUDIES IN A SEMI-ARID FRACTURED CRYSTALLINE BASEMENT							JR・CR(　)・SC	
	AREA OF DODOMA , TANZANIA HUDSON H. NKOTAGU 1996							JR・CR(　)・SC	
2-21	ORIGINS OF HIGH NITRATE IN GROUNDWATER IN TANZANIA	図書コピー	○				JOURNAL OF AFRICAN EARTH SCIENCES , Vol 21,No 4	JR・CR(　)・SC	
	H. NKOTAGU 1996							JR・CR(　)・SC	
2-22	RECORDS OF THE GEOLOGICAL SUVEY OF TANZANIA Vol.1　1951	図書オリジナル	○				GEOLOGICAL SURVEY	JR・CR(　)・SC	
2-23	MONTHLY RAINFALL DATA （コンピュータ出力データ）	コピー	○				HYDROGICAL SECTION , WATER AFAIR M of Water	JR・CR(　)・SC	
2-24	SINGIDA REGION WATER SURVEY 1978 Volume 5 CLIMATOLOGICAL AND HYDROLOGICAL ANALYSIS	コピー	○				AUSTRALIAN EVELOPMENT ASSISTANCE BUREAU	JR・CR(　)・SC	
2-25	TOWARDS SUSTAINABLE ENVIRONMENT IN TANZANIA 1995	図書オリジナル	○				DIVISION OF ENVIRONMENT	JR・CR(　)・SC	

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2-26	NATIONAL ENVIRONMENT ACTION PLAN A FIRST STEP 1994	図書コピー	○				Ministry of Tourism , Natural Resources and Environment	JR・CR(　)・SC	
2-27	TOPOGRAPHIC MAP (1:250,000)	地図コピー	○				SURVEY AND MAPING DIVISION	JR・CR(　)・SC	
2-28	GEOLOGICAL MAP (1:125,000)	地図コピー	○				GEOLOGICAL DEPARTMENT	JR・CR(　)・SC	
3	井戸関連資料							JR・CR(　)・SC	
3-1	BOREHOLE DRILLING DATA MANYONI,IGUNGA,SINGIDA DISTRICT	コピー	○				Hydrogeology Section Water Research Division Ministry of Water	JR・CR(　)・SC	
	(1996刊)							JR・CR(　)・SC	
3-2	PRODUCTIVE AND UNSUCCESSFUL BOREHOLES	コピー	○				ARUSHA REGIONAL WATER ENGINEER'S OFFICE	JR・CR(　)・SC	
	IN HANANG DISTRICT ARUSHA REGION (1996刊)							JR・CR(　)・SC	
3-3	CAPACITIES AND BOREHOLE DATA ARUSHA RESION (1996刊)	オリジナル	○				〃	JR・CR(　)・SC	
3-4	SHALLOW WELLS AND BOREHOLE CONSTRUCTION SINCE 1985	コピー	○				Singida Regional Water Engineer's Office	JR・CR(　)・SC	
3-5	Borehole Logging Data of Existing Wells in Singida Rural and Manyoni District	コピー	○				Singida Regional Water Engineer 's office, Tanzania	JR・CR(　)・SC	

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3-6	Brehole Logging Data of Existing Wells in Singida Rural and Manyoni District	コピー	○				Drilling Unit, Ministry of Water, Ubungo	JR・CR(　)・SC	
3-7	CATALOGUE OF BOREHOLES IN SINGIDA DISTRICT	図書コピー	○				Singida Regional Water Engineer's Office	JR・CR(　)・SC	
4	マスタープラン (TABORA)							JR・CR(　)・SC	
4-1	TABORA REGION WATER MASTER PLAN FINAL REPORT VOLUME 1 SUMMARY	図書コピー	○				THE UNITED REPUBLIC OF TANZANIA MINISTRY OF WATER	JR・CR(　)・SC	
	AND MAIN REPORT (1978刊)						DEVELOPMENT, ENERGY AND MINERALS	JR・CR(　)・SC	
4-2	〃 FINAL REPORT VOLUME 2 WATER	図書コピー	○				〃	JR・CR(　)・SC	
	DEMAND AND VILLAGE PROJECTIONS (1978刊)							JR・CR(　)・SC	
4-3	〃 FINAL REPORT VOLUME 3A/1 WATER	図書コピー	○				〃	JR・CR(　)・SC	
	WATER SCHEME SURVEYS (1978刊)							JR・CR(　)・SC	
4-4	〃 FINAL REPORT VOLUME 3B/2 SHALLOW	図書コピー	○				DEVELOPMENT, ENERGY AND MINERALS	JR・CR(　)・SC	
	WELL SURVEYS (1978刊)							JR・CR(　)・SC	

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4-5	〃 FINAL REPORT VOLUME 3E VILLAGE	図書コピー	○				〃	JR・CR(　)・SC	
	VILLAGE SOURCE COSTS (1978刊)							JR・CR(　)・SC	
4-6	〃 FINAL REPORT VOLUME 6	図書コピー	○				〃	JR・CR(　)・SC	
	HYDROGEOLOGICAL STUDIES (1978刊)							JR・CR(　)・SC	
4-7	〃 FINAL REPORT VOLUME 6A BOREHOLE	図書コピー	○				〃	JR・CR(　)・SC	
	CATALOGUE (1978刊)							JR・CR(　)・SC	
4-8	〃 FINAL REPORT VOLUME 8 PHYSICAL	図書コピー	○				〃	JR・CR(　)・SC	
	GEOGRAPHY (1978刊)							JR・CR(　)・SC	
4-9	〃 FINAL REPORT VOLUME 9 WATER	図書コピー	○				〃	JR・CR(　)・SC	
	QUALITY STUDIES (1978刊)							JR・CR(　)・SC	
4-10	〃 FINAL REPORT VOLUME 10 WATER	図書コピー	○				〃	JR・CR(　)・SC	

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	SOURCE RECOMMENDATIONS FOR PRIORITY VILLAGES (1978刊)							JR・CR(　)・SC	
5	マスタープラン (ARUSHA)							JR・CR(　)・SC	
5-1	ARUSHA REGION WATER MASTER PLAN HANANG DISTRICT	図書コピー	○				Arusha Regional Water Engineer's Office	JR・CR(　)・SC	
	VOLUME 1 MAIN REPORT (1993刊)							JR・CR(　)・SC	
5-2	〃 VOLUME 2 WATER DEVELOPMENT ATLAS (1993刊)	図面コピー	○					JR・CR(　)・SC	
6	水道事業関連資料							JR・CR(　)・SC	
6-1	MAJI REVIEW(1974刊)	図書オリジナル	○				THE UNITED REPUBLIC OF TANZANIA MINISTRY OF WATER DEVELOPMENT AND	JR・CR(　)・SC	
							DEVELOPMENT AND POWER	JR・CR(　)・SC	
6-2	RPFB 1995/96 - BUDGET PROPOSAL	図書コピー	○				ACDC SECTION	JR・CR(　)・SC	
6-3	DEVELOPMENT BUDGET FOR 1996-97	図書コピー	○				Ministry of Water	JR・CR(　)・SC	
6-4	TABORA REGION WATER SANITATION AND HYGIENE PROMOTION FIVE YEAR	図書コピー	○				REGIONAL STEERING COMMITTEE TABORA	JR・CR(　)・SC	

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	DEVELOPMENT PLAN 1996-2000							JR・CR(　)・SC	
6-5	SINGIDA INTEGRATED RURAL DEVELOPMENT	図面コピー	○				Tangayika Christian Refugee Service(TCRS)	JR・CR(　)・SC	
	DEVELOPMENT PROJECT TECHNICAL PROGRESS REPORT							JR・CR(　)・SC	
	JANUARY - APRIL 1995(1995 刊)							JR・CR(　)・SC	
6-6	MANYONI DISTRICT COUNCIL(1996 刊)	オリジナル	○				MANYONI DISTRICT	JR・CR(　)・SC	
6-7	Current Status of Villages in Manyoni (1996 刊)	オリジナル	○				〃	JR・CR(　)・SC	
6-8	RIFT VALLEY WATER PROJECT MANYONI DISTRICT(1996 刊)	図面青焼き	○				〃	JR・CR(　)・SC	
6-9	MANYONI DISTRICT WATER DEPARTMENT DATA ANALYSIS	青焼き	○				〃	JR・CR(　)・SC	
6-10	WATER AND ENERGY(1996 刊)	オリジナル	○				ARUSHA REGION	JR・CR(　)・SC	
6-11	The Population of Priority Villages in Hanang(1996 刊)	コピー	○				ARUSHA REGION	JR・CR(　)・SC	
6-12	GENERAL INFORMATION ON SINGIDA RURAL DISTRICT(1996 刊)	オリジナル	○				SINGIDA REGION	JR・CR(　)・SC	

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6-13	HUMAN AND LIVESTOCK POPULATION - SINGIDA RURAL DISTRICT(1996刊)	オリジナル	○				〃	JR・CR(　)・SC	
6-14	LOCATION MAP OF SINGIDA DISTRICT (1996刊)	図面コピー	○				〃	JR・CR(　)・SC	
6-15	WATER SUPPLY DATA - SINGIDA RURAL DISTRICT(1996刊)	オリジナル	○				〃	JR・CR(　)・SC	
6-16	HUMAN AND LIVESTOCK DATA - SINGIDA PERI - URBAN(1996刊)	オリジナル	○				〃	JR・CR(　)・SC	
6-17	WATER SUPPLY STATUS (1996) - SINGIDA PERI - URBAN(1996刊)	オリジナル	○				〃	JR・CR(　)・SC	
6-18	VILLAGES WITHOUT WATER SOURCES - SINGIDA RURAL(1996刊)	オリジナル	○				〃	JR・CR(　)・SC	
6-19	TCRS SINGIDA PROJECT VILLAGE CLUSTERS(1996刊)	図面コピー	○				〃	JR・CR(　)・SC	
6-20	TCRS SINGIDA PROJECT VILLAGE IMPLEMENTED WITH	コピー	○				〃	JR・CR(　)・SC	
	S/WELLS & MEDIUM DEPTH (B/HOLES) (1984 - OCTOBER 1996)(1996刊)							JR・CR(　)・SC	
6-21	TCRS SINGIDA PROJECT SHALLOW WELLS CONSTRUCTION	コピー	○				SINGIDA REGION	JR・CR(　)・SC	
	SINCE 1985(1996刊)							JR・CR(　)・SC	

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6-22	TCRS SINGIDA PROJECT PRODUCTIVE BOREHOLES DRILLED	コピー	○				〃	JR・CR(　)・SC	
	SINCE 1985(1996刊)							JR・CR(　)・SC	
6-23	21st WEDC Conference SUSTAINABILITY OF WATER AND	図書コピー	○					JR・CR(　)・SC	
	SANITATION SYSTEMS Singida integrated rural development						21st WEDC Conference	JR・CR(　)・SC	
	project(1995刊)							JR・CR(　)・SC	
6-24	〃 Averting shallow well contamination	図書コピー	○				〃	JR・CR(　)・SC	
	in Uganda(1995刊)							JR・CR(　)・SC	
6-25	WATER SUPPLY DATA FOR THE PROPOSED AREA TO BE INVESTIGATED	オリジナル	○				Iguuga District Water Engineer's Office	JR・CR(　)・SC	
	(1996刊)							JR・CR(　)・SC	
6-26	The Location Map of Hanang	図面コピー	○				Arusha Regional Water Engineer's Office	JR・CR(　)・SC	
6-27	The Location Map of Singida District	図面青焼き	○				Singida Regional Water Engineer's Office	JR・CR(　)・SC	

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6-28	The Location Map of Manyoni District	図面青焼き	○				〃	JR・CR(　)・SC	
7	ローカルコンサルタント							JR・CR(　)・SC	
7-1	MMK Project Services Ltd COMPANY PROFILE	オリジナル	○				MMK Project Services Ltd	JR・CR(　)・SC	
	Consultant's Background, Experiences and Resources(1996年)							JR・CR(　)・SC	
7-2	M-Konsult Ltd. CAPABILITY DOCUMENT	オリジナル	○				M-Konsult Ltd.	JR・CR(　)・SC	
	Nobember 1996(1996年)							JR・CR(　)・SC	
7-3	Hydro Works Technic Co.Ltd. 会社概要／見積資料	オリジナル	○				Hydro Works Technic Co.Ltd.	JR・CR(　)・SC	
7-4	Env-Consult (Tanzania) Limited 見積資料	コピー	○				Env-Consult (Tanzania) Limited	JR・CR(　)・SC	
	Howard Humphreys (Tanzania) Ltd. 会社概要／見積資料	オリジナル	○				Howard Humphreys (Tanzania) Ltd.	JR・CR(　)・SC	
8	資機材関連							JR・CR(　)・SC	
8-1	INSTALLATION AND OPERATING INSTRUCTIONS	図書	○				MONO PUMPS (AUSTRALIA) PTY. LTD.	JR・CR(　)・SC	

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	MONO DEEPWELL BOREHOLE PUMPS TYPES							JR・CR(　)・SC	
	"B" AND "C"							JR・CR(　)・SC	
9	市場物価調査資料							JR・CR(　)・SC	
9-1	Dinamic Drillers Limited 会社概要，見積資料	図書	○				Dinamic Drillers Limited（掘井業者）	JR・CR(　)・SC	
9-2	Hydro Works Technic Company Limited 会社概要	図書	○				Hydro Works Technic Company Limited（水資源開発コンサルタント）	JR・CR(　)・SC	
9-3	China Geo - Engineering Corporation 会社概要	図書	○				China Geo - Engineering Corporation（掘井業者）	JR・CR(　)・SC	
9-4	Paclloyd - Drico Limited 見積資料	図書	○				Pacllloyd - Drilco Limited（掘井業者）	JR・CR(　)・SC	
9-5	Tanila Ltd. 製品カタログ（ハンドポンプ）	図書	○				Tanila Ltd.	JR・CR(　)・SC	
9-6	Lotus Water Well Equipment Ltd.. 製品カタログ（ハンドポンプ）	図書	○				Lotus Water Well Equipment Ltd..	JR・CR(　)・SC	
9-7	Orbit Pump Manufacturing Ltd.製品カタログ（ハンドポンプ）	図書	○				Orbit Pump Manufacturing Ltd.	JR・CR(　)・SC	
9-8	Grundfos International A/S 製品カタログ　ハンドポンプ，ソーラポンプ	図書	○				Grundfos International A/S	JR・CR(　)・SC	

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9-9	ハンドポンプ見積書 (Afridev H.P., Mark II/III H.P.)	図書	○				Tanzania Wells Service & Supply Co.Ltd.	JR・CR(　)・SC	
	エンジン，ポンプ価格資料 ・Mono・Pump						Central Store，Ministry of Water	JR・CR(　)・SC	
	・Lister Diesel Engine							JR・CR(　)・SC	
9-10	見積書（テント）	図書	○				Gram・Tucco	JR・CR(　)・SC	
9-11	見積書（エンジン発電機 10KVA）	図書	○				Ashman's Limited	JR・CR(　)・SC	
9-12	見積書（複写機）	図書	○				Computers and Telecoms Systems Ltd.	JR・CR(　)・SC	
9-13	Inmarsat Service，無線設備，電話設備の認可　登録等手続	図書	○				Tanzanian Communication Comission	JR・CR(　)・SC	
9-14	日本での Inmarsat Service の概要	図書	○				国際通信施設機	JR・CR(　)・SC	
9-15	Foraky: Rwanda Branch（さく井業者）見積資料	コピー	○				Foraky: Rwanda Branch	JR・CR(　)・SC	
9-16	AQUATEC LIMITED：Moshi Branch（さく井業者）見積資料	コピー	○				AQUATEC LIMITED：Moshi Branch	JR・CR(　)・SC	
9-17	見積書（エンジン発電機）	コピー	○				J.Henley Trading Supplies	JR・CR(　)・SC	

様式第１号（記第２関係）

（収集／作成資料）

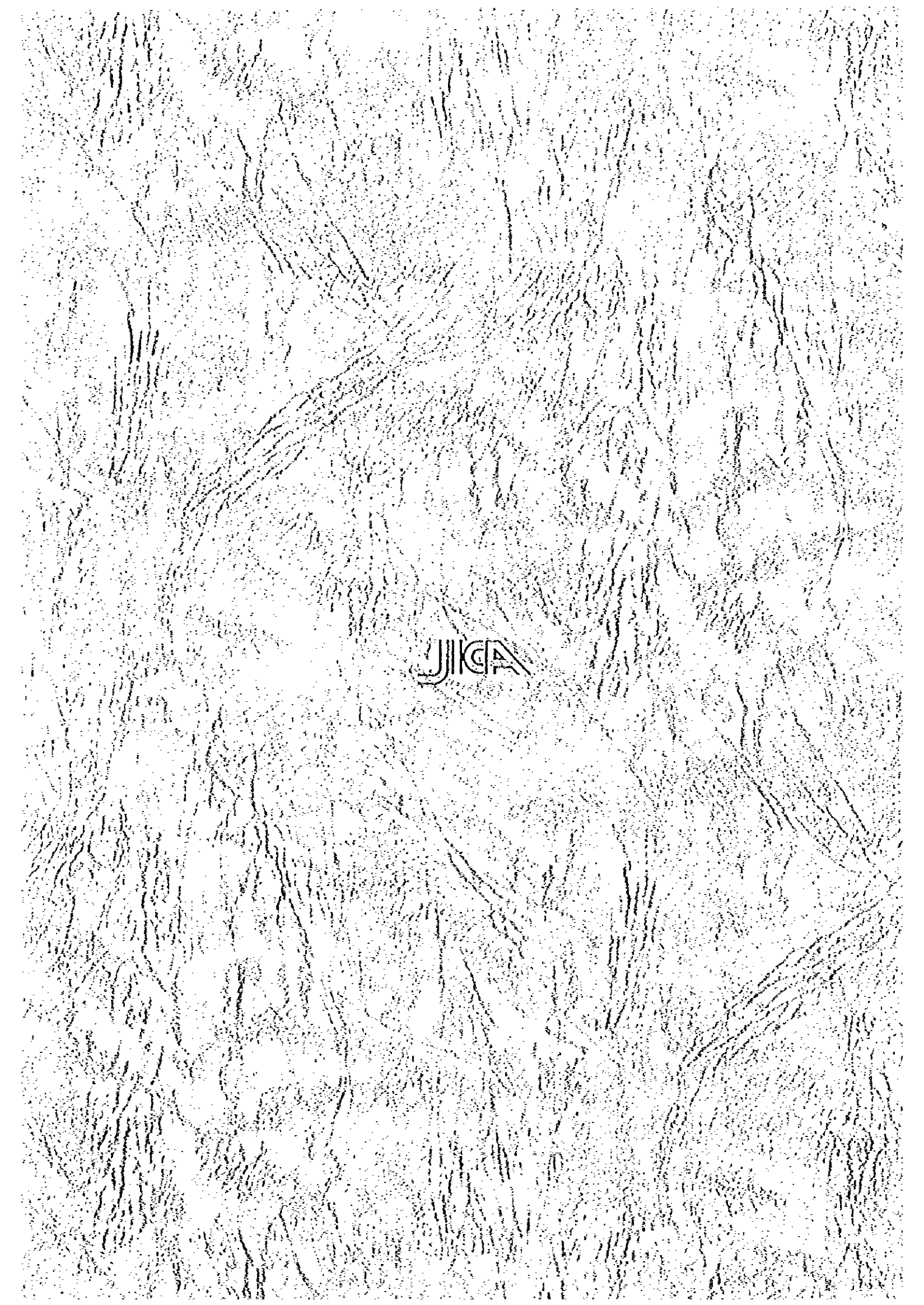
資料リスト（□収集資料／□専門家作成資料）

平成　年　月　日作成

主管部長	文書管理課長	主管課長	情報管理課長	技術情報課長	図書館受入日

		プロジェクトID	・　・	調査団番号	・　・　・		
地域		調査団名又は専門家氏名		調査の種類又は指導科目		担当部課	
国名	タンザニア国	配属機関名		現地調査期間又は派遣期間	年　月　日～　年　月　日	担当者氏名	

番号	資料の名称	形態（図書・パンフレット・地図・写真等）	収集資料	専門家作成資料	JICA作成資料	テキスト	発行機関	取扱区分	図書館記入欄
9-18	見積書（複写機）	コピー	○				Spectrum Technology Center Limited.	JR・CR(　)・SC	
9-19	レンタル料金表（レンタカー）	コピー	○				Central Tours and Travel Ltd.	JR・CR(　)・SC	
9-20	タンザニア内陸輸送費	コピー	○				Walford Meadows, DSM	JR・CR(　)・SC	
9-21	タンザニアにおける土木工事の諸単価資料	コピー	○				日系建設会社タンザニア法人	JR・CR(　)・SC	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