第5章　地図作成対象地域の概況

5—1　地形

本調査地域の地形構造は，比較的単純で東から海岸平野，海岸山地，中央平原，タイタ山地，西部高原と区分することができる。

海岸平野は，海浜から5～10kmの幅で調査地域の東部の北端から南端まで続き，南端のシモニア付近では15km程の幅となる。珊瑚礁が隆起した海岸段丘で多くの海岸は5～20mの段丘崖が発達している。この海岸平野の西側にやはりほぼ南北方向に伸びる幅25～35kmの山地が山脈状に展開しており，標高は200～600m程である。これより西は中央平原で，山や谷はなく緩やかな起状の準平原が広がっている。そしてその間に残丘が所々に突出している。この準平原は西部に行くにつれて高度を増して，デカ平原やセレンゲティ高原に続く。この間すなわち本地域の西北部にもう1つの山地タイタヒルと呼ばれる山塊がありその最高峰は2,000mにも達している。そしてその北にチュレ火山帯の末端であるングリアの火山群がある。なお東北部のサバキ川下流から河口にかけては本地域唯一と思われる沖積地が見られる。

地質も比較的単純構造で，海岸平野が新期堆積岩，その西に東部堆積岩といわれるゾーンがあり，さらにその西に古期堆積岩が広がり，西北部には火山噴出岩が一部見られる。

5—2　気象

本調査地域はインド洋に面したほぼ3°から4°10′に位置する熱帯地方であるが，全体としては寡雨地帯であり，最も雨量の多いモンバサ南部の海岸地帯においても年間降雨量は1,000～1,500mmである。ツァボ西辺地帯においては250mm前後という雨量の少ない所すら見受けられる。以上は降雨量の最低と最高の所を挙げたのであるが，本地域全体としては海岸地帯及び南部の国境にかけては年間500～1,000mmである。気候は雨期と乾期に分かれ，表5—1に見られるように年間を通じてそれが2回あり，内陸のボイにおいては11～12月（大雨期）及び3～4月（小雨期）が雨期であり，海岸のモンバサにおいては4～5月が大雨期で9～11月が小雨期である。当然のことながらその間が乾期ということになるが，ボイでは5～10月にかけて雨量が毎月50mm以下という乾燥状態になる。

気温は，高度の低い海岸地帯のモンバサより内陸のボイの方がかえって最高気温は高く平均33°ぐらいまで上がるが，モンバサではそこまで達していない。また最低気温もボイでは17°まで下がるが，モンバサでは20°止まりである。南緯3～4°というほぼ赤道直下でも年間を通してみると若干気温に差があり，モンバサでは5月から9月にかけて涼しく，10月から4月にかけてやや暑くなっている。内陸のボイでは6～9月がやや涼しく，10月から5月まで暑いが，特に2月，3月は暑い。

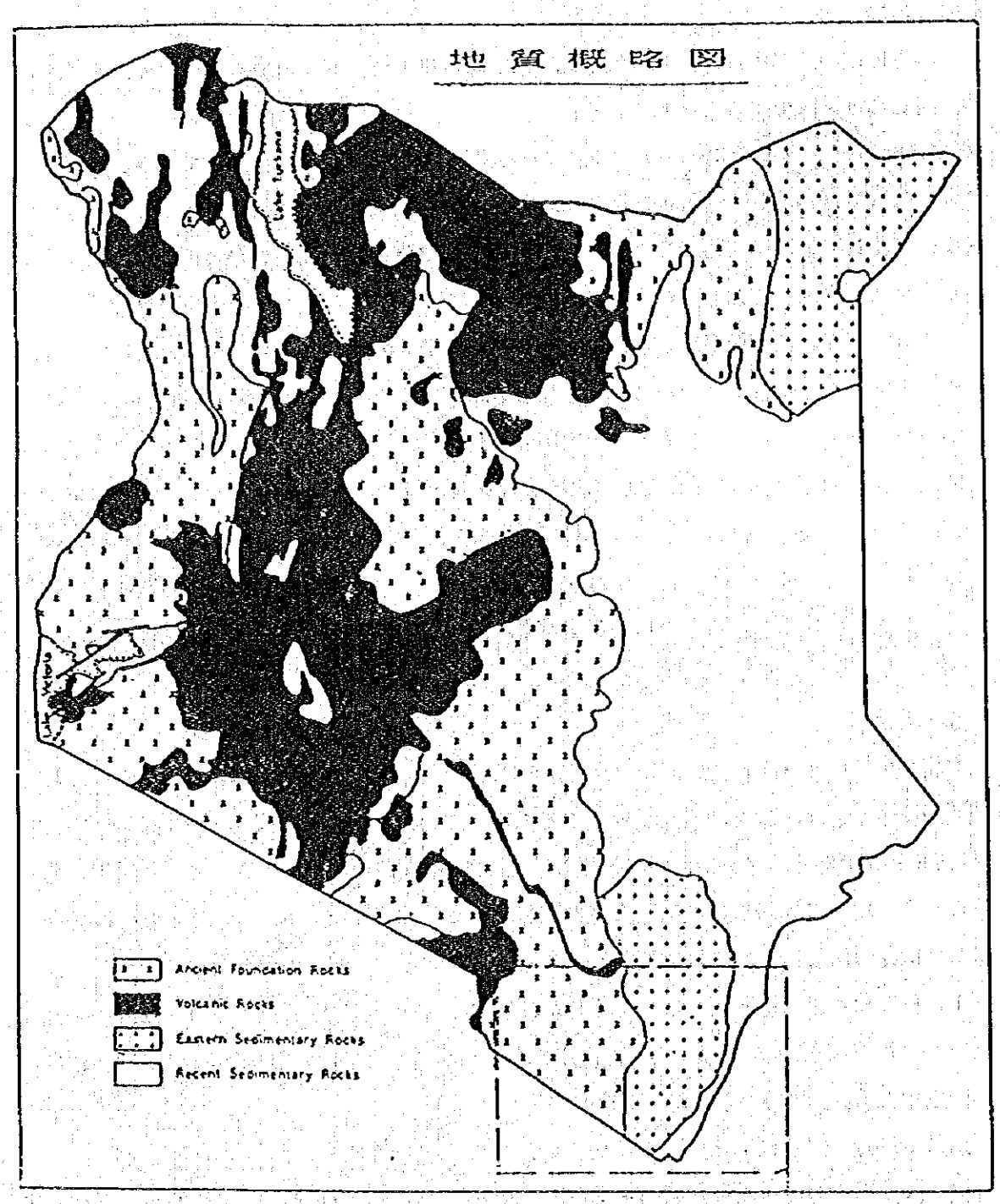


Fig. 6 Simplified geology of Kenya. There are thousands of different rock units in Kenya, but these can be grouped into four broad assemblages. The oldest foundation rocks range in age from 2,600 million years to 600 million years. The eastern sedimentary rocks range in age from 180 million to 13 million years. The volcanic rocks date from 25 million years to the present day while the large area of Recent sediments in eastern Kenya is as old as three million years.

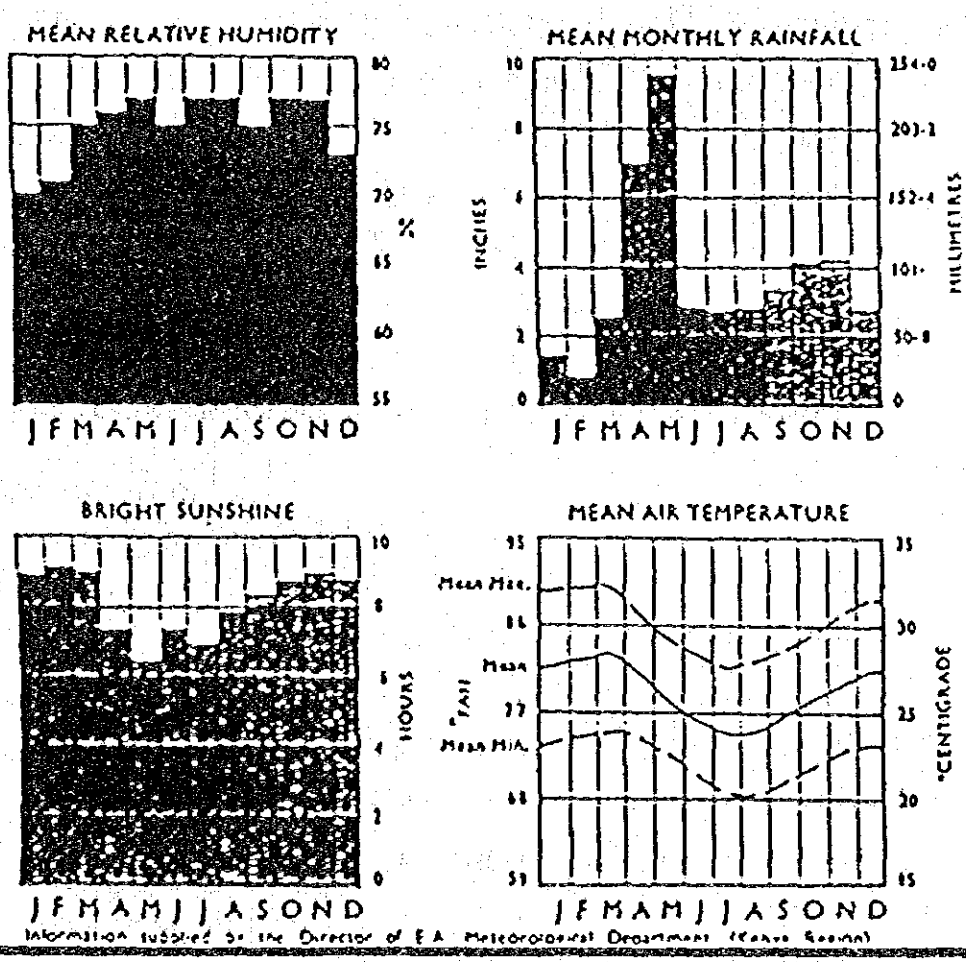
図 5 — 1

表５－１　　気象データ

モンバサ、ボイにおける月別平均最低及び最高気温表

	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.
モンバサ	32°	32°	32°	31°	29°	29°	28°	28°	29°	30°	31°	31°
	23°	24°	24°	24°	22°	22°	21°	20°	21°	22°	23°	23°
ボイ	31°	33°	33°	31°	30°	29°	28°	28°	29°	31°	31°	31°
	20°	20°	20°	20°	20°	18°	17°	17°	17°	18°	20°	20°

モンバサにおける気象諸元



Information supplied by the Director of E.A. Meteorological Department (Kenya Section)

何れにしても内陸部において気温の日較差及び年較差が大きいこと及び雨期と乾期があるぐらいで全体として気候的な変化に乏しい地区といえる。

5—3 植生

本調査地域の植生は，一部を除き半乾燥気候のため草地とブッシュとよばれる灌木が卓越し，いわゆるサバンナ的植生景観を呈している。この他には海岸地帯の一部に熱帯樹林が見られ，またタイタヒルの山間地域にも一部森林が見られる。また若干ではあるが海岸部の入江や湾にはマングローブ林も見られる。

海岸地帯の山地や平野は本来もっと熱帯樹林の繁茂する所であるが植生の回復するいとまもない程焼畑にするため人為的に荒廃した林相となってしまっている。

また中央平原においても，もともと貧弱な林地に無秩序に焼畑をやり炭焼きのため大量に木を切り林相を決定的に痛めつけている。

草地といっても完全な草地は意外に少なく，まばらなブッシュとの組合わせやサバンナフォレストとの組合わせで形成されている。サバンナフォレストと呼ばれるのはサウサジツリーやアンブレラツリーのように低木や灌木ではないが，疎林であり樹下には草や灌木が茂っているといった景観である。半乾燥のため草も刺のあるものが少なくないが，概して禾本科の草が多くキクユグラスやレッドオートグラス等が多いようである。

5—4 土地利用

本地域の土地利用は，海岸地帯及びタイタ山地のやや集約的な土地利用地域と中央部に見られる文字通りの粗放的な土地利用を行っている地域と西部及び西北部地域の未利用の地域とに区分することができる。

本地域のうちで最も集約的な土地利用を行っているタイタ山地は，冷涼でかつこの付近では雨量も多いことから本地域としては居住条件が秀れており，人口密度が高くまた住民も勤勉な種族であるため山頂付近まで耕作され急傾斜耕地も見られる程で，栽培作物も変化に富んでいる。

インド洋に面した海岸平野には都市及び都市的集落が点在し，本地域では人口密度の高い地域であり耕地や果樹園，さらにはサトウキビ，サイザル，ココナッツパーム等の商品作物も栽培されており，海岸平野に続くシンバ山脈も割合人口が多く主食のトウモロコシは勿論のことココナッツやマンゴーやカシューナッツの果樹園がみられ，耕地が比較的多く散在し，また焼畑もかなり見られる地域となっている。

中央部の平原地帯は，雨量も少なく水も得られにくい所から人口密度は極めて薄く，また土地も痩せているため林相も貧弱で耕地も少ない。しかもそれらのサバンナフォレストの間

に点々と畑地や焼畑が散在し，また放牧地にもなっており牛，山羊，羊などが放し飼いされている。

西部及び西北部は，さらに雨量が少ない地となり草地が卓越するナショナルパークとなっており，この地域は観光ホテルやロッジ以外は居住を制限されているので無人地帯となっており，本来なら未利用地であるがしかし，ここの動物保護区ともいえるナショナルパークは千古以来のその雄大な自然景観とそこに群がる野生動物は，観光資源として大いに利用されているのである。

5－5　開発可能性

地図作成によって促進される対象地域の開発計画または開発可能性は以下のとおりである。

（i）　タナ川流域開発計画

ケニア国経済開発5カ年計画で，タナ川流域の開発は非常に大きな重点が置かれているが，対象地域内を流れるサバキ(Sabaki)川の流域についても，タナ川流域の延長として開発が進められている。具体的には，タナ川開発公共事業機関(TANA River Development Authority)により，大規模な灌漑計画，区画整理，移住計画の対象地域とされている。

（ii）　タイタ，クエイル，キルフィ地区の農業開発

これらの地区は，National Park を除いた全域が，耕作地及び牧場として適しており，大規模な農業開発プロジェクトが進められつつある。具体的には，これら3地区全体で40カ所にのぼる大放牧場の開発，Jipe 湖畔農業開発，タイタヒル園芸センターの整備等があり，世界銀行はこれらに対して資金援助を開始している。

（iii）　鉱業及び石油探査

タイタ地区及びその周辺は，大きな鉱業の開発ポテンシャルを有するとされている。また沿岸域では，いくつかの石油探査の計画が有る。

（iv）　観光開発

対象地域は，ツァボウェスト国立公園のほとんど全部，ツァボイースト国立公園の3分の1，シンバヒル国立公園，ゲデ国立公園，マリンディ・ウァタム海洋国立公園，200km に及ぶ沿岸リゾート地帯を含んでいる。これらの観光地においては，正確で最新の情報が盛られた地図の作成が要望されている。

第6章　測量計画

測量の全体事業計画はS/W締結の結果，ケニア南部地区（南緯3°以南）の1/50,000地形図（15′×15′）43面，29,800km²を，昭和62年度より同65年度までの4カ年計画で，JICAの海外測量（基本図用）作業規程（精度区分A）に基づき作成することとしている。同地域には既設の基準点が比較的密に有し，新たな基準点測量は特に要しないと判断されることから，地形図の作成工程は対空標識設置，撮影，簡易水準測量，現地調査，空中三角測量，図化，編集，現地補測，地形図製図原図作成及び印刷とする。各年度の作業工程表は表6－1のとおりであり，各工程の作業計画の概要は次のとおりである。

6－1　対空標識設置

今回の事前調査における基準点の標石調査の結果，標石は破壊されているが，埋石されていた地点がその形跡により確認でき，1/50,000地形図作成のための対空標識設置には十分可能であると判断できる点を含めれば，全体の約7～8割の基準点が使用可能と考えられる。その調査結果はケニア南部地区標石調査状況図（p.86）のとおりである。対空標識設置点は，後続の空中三角測量の精度を考慮して約40点とする。対空標識設置については，設置後撮影までの期間が長くなることや，動物による被害も予想されることから十分堅固に設置する必要がある。

また，地元住民の注意をひくような木材等の使用は避け，現地で容易に調達できる材料を選ぶ必要がある。このため，前回の東部ケニアの場合と同様，コンクリートや岩石等を地表に標識状に敷きつめ，その上に白ペンキ，白色石灰等の白色塗料を塗布する方法が良いと思われる。

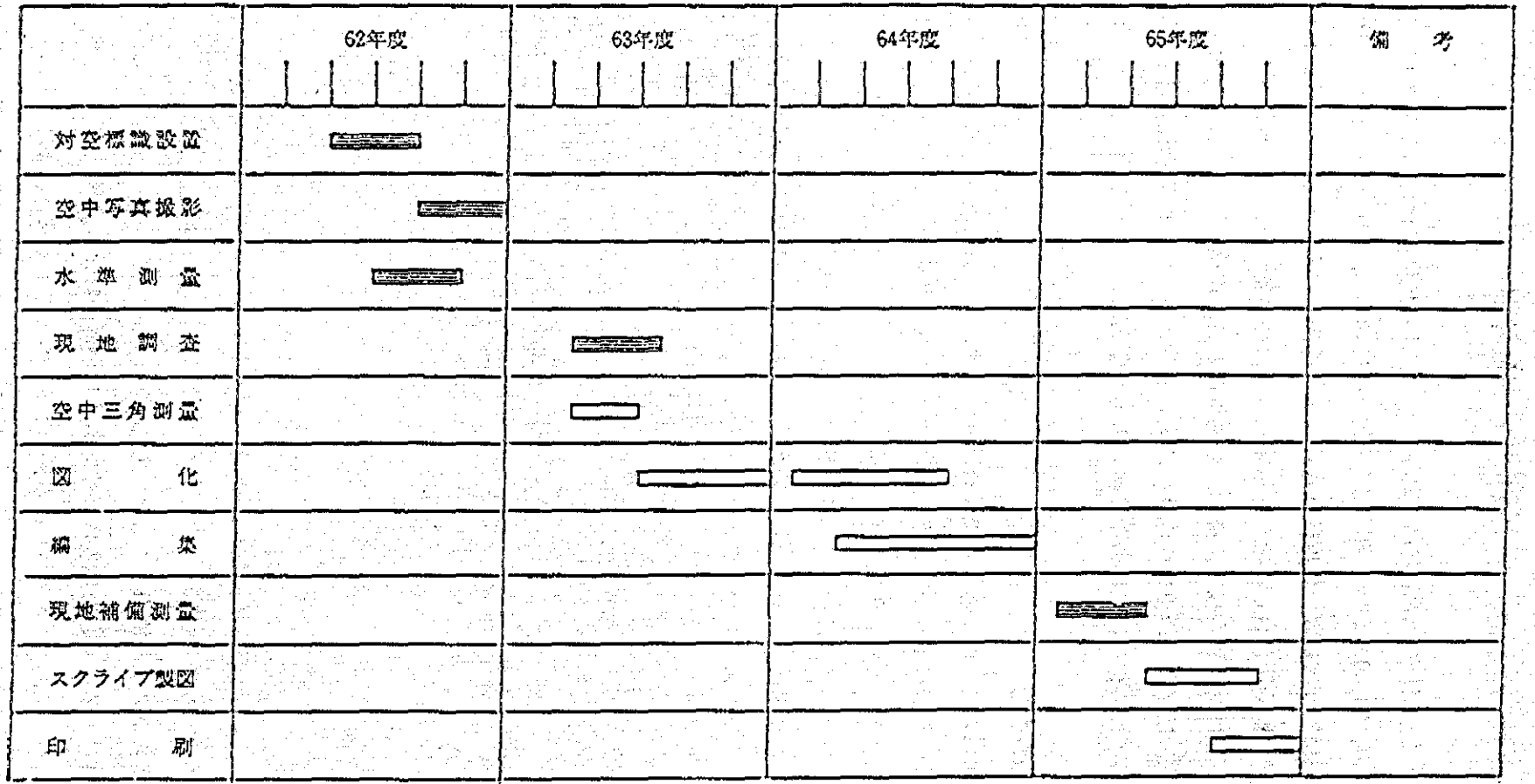
GPSの使用については，前章で述べたとおりである。

6－2　撮影

撮影は当初，広角カメラとリヤジェット機による縮尺1/80,000の空中写真を予定していたが，リヤジェット機の確保の問題や，SK側の多目的に使用したいなどの理由から，要望のあった縮尺1/60,000の空中写真とするとともに，使用航空機も一般のターボプロップ機を用い，カメラは超広角カメラを使用することとした。

また，飛行コースは撮影地域の地形や気象条件の違いにより，一括撮影は不適当との判断から，一般にコーストエリアといわれる海岸から約60kmの地域は，海岸線に沿った斜めコース（6コース程度）とし，基準面は約500m程度，それ以西の内陸部は東西コース（15コース程度）とし，基準面は約1,000m程度の2段撮影が効果的と判断される。撮影時期は当初の乾

表６－１　　ケニア南部地区国土基本図作成事業作業工程表



期に当たる12月末から２月までが最も望ましいと考えられるが，年により若干の前後もあるのでその前後までを含めて待機期間としたい。撮影基地としては，モンバサ及びナイロビ空港が使用可能である。

なお，タンザニアとの国境付近における撮影飛行については，SKとの協議により，SK側の責任でタンザニア側の承認を得ることで了解済である。本撮影可能航測会社として，ナイロビに１社（フォトマップ社）がある。

6—3　簡易水準測量

地形図作成地域は，全般的には緩やかな丘陵台地であるが，部分的には微細な地形も多く見られ，高さの精度がその地形表現に大きく影響することになる。特に同地域は，ケニア国の重点開発地域として位置づけられており，地形図が整備されれば，様々な開発計画に使用されることとなり，高さの精度も十分確保する必要がある。そこで後続の空中三角測量及び図化作業での高さの精度を向上させる目的から，既設の一・二等水準点を使用して地形図作成地域内の道路上約720kmの簡易水準測量を実施し，必要点を写真上に刺針する（図６—１）。刺針用空中写真の入手については本撮影に含める等の配慮が必要である。

6—4　現地調査

測量地域のうち，海岸から約60kmの内陸地域とタイタ地区の山間地は，モンバサ市街地を除いて，南方特有の複雑な農作地帯に加え，密林に点在する集落や複雑な道路網，植生などのほか，地形も複雑でかなりきめ細かな調査が要求される。その他の内陸部は大部分がサバンナ地域で，道路以外は調査事項も少ないが，ナショナルパークを始めとして野生動物が多く単独行動の禁止はもちろん，ゲームスカウトの護衛のもとでの作業が必要である。

また，降雨時後の未舗装道路の車両の通行は，スリップの他，通常水のない枯れ川での流水に注意する必要がある。なお，地名及び行政等の必要資料は，SKとの協議の結果，SK側が提供することで了解済である。

6—5　空中三角測量

空中三角測量は，前述の理由により特に高さの精度を確保するため，対空標識設置基準点の他，既設水準点や簡易水準測量の成果も使用し，調整計算は独立モデルまたはバンドル法によるブロック調整方法とする。なお，モデル数は約570モデルである。

6—6　図化及び編集

図化は，超広角カメラで撮影した空中写真がセットできる図化機を用い，縮尺1/60,000空

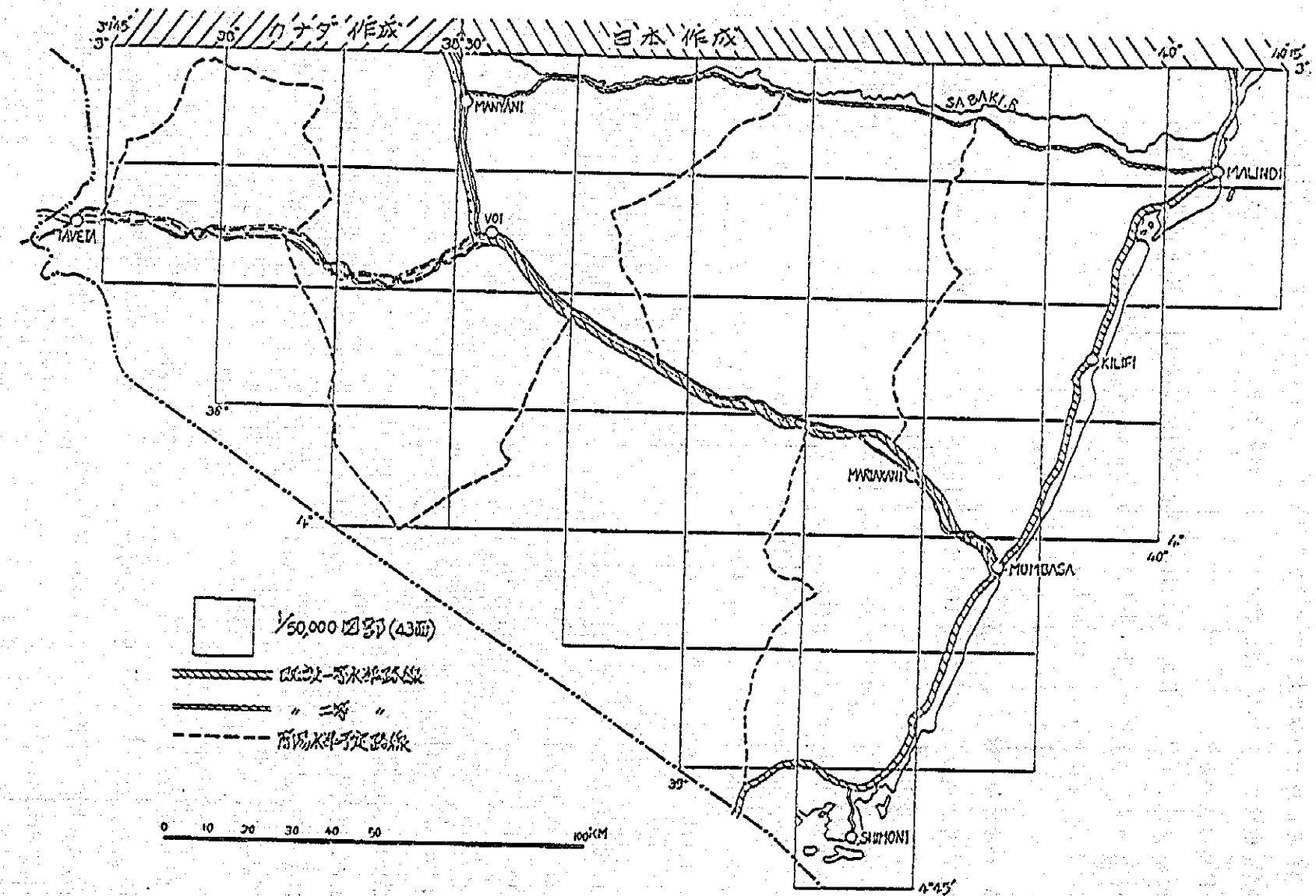


図 6－1　　ケニア南部地区国土基本図作成地域及び簡易水準測量予定路線図

中写真より図化縮尺1/50,000として図化し，図郭は緯度15分，経度15分（U. T. M 図法）とし，主曲線の等高線間隔は20m とする。図化及び編集に用いる図式は，前回の東部ケニアと同じ東アフリカ三国の共通図式と考えて良いが，現在アフリカ統一規格がほぼできつつありSK の要望もあり，これによることが望ましく今回は当然それによることとなる。但し，前回のものと大きく変わるものではない。なお，図化作業では前述のとおり緩やかな丘陵地での微細な地形が多いことから，特に図化もれや誤描に注意する必要がある。

6—7　現地補測

現地補測では，特に図化作業時に困難が予想される，密林内の小道のつながり等の補測が比較的多いと考えられる。地名及び行政界等の確認は，SK 側の責任において行うことで協議済である。

6—8　地形図製図原図作成及び印刷

地形図製図原図作成は，スクライブ方式により色数（6色）に応じてスクライブシート上に分版スクライブするとともに，マスク版及び注記版を作成する。印刷は6色刷のオフセット印刷とし，地図用紙は四六判（110kg）を用い，定められた大きさに裁断する。印刷枚数は各図葉1,000枚である。

6—9　成果等

本測量における各工程別のケニア側に供与する主な成果等は，次のとおりである。

6—9—1　対空標識設置

対空標識点明細簿及び偏心要素測定簿	一式
偏心計算簿	一式
対空標識点表示密着写真	一式

6—9—2　撮影

ネガフィルム	全巻
ポジフィルム	各1枚
密着印画	各1枚
標定図	1組

6—9—3　簡易水準測量

水準測量成果表	一式
水準路線図	一式
刺針表示写真	一式

6—9—4　現地調査

現地調査整理写真	一式

6—9—5　空中三角測量

空中三角測量成果表及び実施一覧図	一式
パスポイント及びタイポイントの表示密着ポジフィルム	一式
パスポイント及びタイポイントの表示密着印画	一式
基準点残差及びタイポイント較差表	一式

6—9—6　図化，編集及び地形図製図原図

図化素図	一式
基準点資料図	一式
標定記録簿	一式
編集素図	一式
注記資料図	一式
道路資料図	一式
スクライブ版	一式
マスク版	一式
注記版	一式

6—9—7　印刷

印刷図	各1,000枚
製版用フィルム	一式

付　　録

資料 1　Scope of Work (S/W)

SCOPE OF WORK

FOR

TOPOGRAPHIC MAPPING OF SOUTH KENYA

IN

THE REPUBLIC OF KENYA

AGREED BETWEEN

MINISTRY OF LANDS AND SETTLEMENT

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

NAIROBI, 19th MARCH, 1987

Mr. DAVID MWIRARIA
Permanent Secretary,
Ministry of Lands and
Settlement

Mr. TAKESHI HIRAI
Leader of Preliminary
Study Team,
The Japan International
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Settlement

Mr. AKIRA TAKAHASHI
Resident Representative,
JICA, Kenya Office

I. INTRODUCTION

In response to the request of the Government of the Republic of Kenya (hereinafter referred to as "Kenya"), the Government of Japan decided to conduct the Topographic Mapping of South Kenya in the Republic of Kenya (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 programme of the Government of Japan, will undertake the Study, in close cooperation with the authorities concerned of the Government of Kenya. The Survey of Kenya (hereinafter referred to as "SK") shall act as counterpart agency to the Japanese study team (hereinafter referred to as "the Team") and also as coordinating body in relation with other governmental and non-governmental organizations concerned for the smooth implementation of the Study.

The present document sets forth the scope of work with regard to the Study.

II. OBJECTIVE OF THE STUDY

The objective of the Study is to prepare the 1/50,000 Topographic Map covering an area of approximately 29,800 square kilometers shaded on the attached map (Appendix-1).

III. SCOPE OF THE STUDY

In order to achieve the above mentioned objective, the Study will cover the following items. (The technical details are shown in Appendix-4)

1. Aerial Photography
   Aerial photographs shall be taken at the scale of approximately 1/60,000.

2. Leveling
   Leveling shall be carried out to obtain vertical controls necessary for aerial triangulation and mapping work.

3. Aerial Signals and Pricking
   Aerial signals shall be placed in the field prior to aerial photography, and pricking of identified control points on the aerial photographs shall be done in the field, if necessary.

4. Field verification
   The topographic map information related to land use, vegetation, etc. shall be verified in the field.

5. Aerial Triangulation

Aerial triangulation shall be carried out by analytical method.

Adjustment shall be carried out by block adjustment method.

6. Stereo Plotting

Stereo plotting shall be carried out using stereo plotting instruments at the scale of 1/50,000.

7. Field Completion

Topographic features, vegetation, etc., which cannot be properly identified on the photographs shall be verified in the field and plotted on the compilation sheet.

Administrative boundaries and geographical names shall be verified and indicated on the paper copy of the compilation sheet by SK.

8. Drafting

Based on the compiled sheet, scribing shall be carried out on the stable polyester base for several colors separation plates. Map style and symbols shall be those adopted by SK.

9. Printing

Plate making shall be carried out using 1/50,000 scribed negatives, and printing shall be carried out by the offset method.

IV. STUDY SCHEDULE

The whole work will be conducted in accordance with the attached tentative schedule (Appendix-2).

V. REPORTS AND FINAL RESULT

A report shall be presented to SK by JICA every fiscal year (from April to March).
The materials mentioned in Appendix-3 will be submitted to SK by the Government of Japan.
All maps produced under this project shall bear at the lower margin the following:
This map was prepared jointly by Japan International Cooperation Agency (JICA) under the Japanese Government Technical Cooperation Program and the Government of the Republic of Kenya.

S.T J.H.

VI. UNDERTAKING OF THE GOVERNMENT OF KENYA

1. To facilitate smooth conduct of the Study, the Government of Kenya shall take necessary measures;

   (1) to secure safety of the members of the Team,
   (2) to permit the members of the Team to enter, leave and sojourn in Kenya for the duration of their assignment therein, and exempt them from alien registration requirements and consular fees,
   (3) to exempt the members of the Team from taxes, duties and other charges on equipment, machinery and other materials brought into Kenya 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 emolument or allowance 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 Kenya from Japan in connection with the implementation of the Study,
   (6) to secure permission for entry into all necessary areas for the implementation of the Study,
   (7) to secure permission for the Team to take all necessary data and documents, including original negatives of aerial photo, related to the Study out of Kenya to Japan by the Team,
   (8) to provide the medical services as needed. Its expenses will be chargeable on members of the Team.

2. The Government of Kenya shall bear claims, if any arises 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 members of the Team.

3. To facilitate smooth conduct of the Study, SK shall take necessary arrangements for the Team as follows, in cooperation with other relevant organizations;

(1) to secure permission for the flight for the aerial photography and use of airports for the implementation of the Study,
(2) to secure permission for the use of communication facilities including transceiver,
(3) to provide necessary game guards to work with the Team, necessary watchmen to look after the camps, and necessary labors,
(4) to obtain the agreement of adjacent countries for the implementation of the aerial photography along the international boundary.

4. SK shall, at its own expense, provide the Team with the followings in cooperation with other related organizations;
(1) available data and information related to the Study,
(2) counterpart personnel (staff of SK),
(3) suitable office space with necessary equipment, e.g. typewriter, furniture and telephones in Nairobi and Mombasa,
(4) credentials or identification cards to the members of the Team,
(5) administrative and technical support,
(6) existing facilities and space of SK for processing the aerial photographs,
(7) information of the necessary administrative boundary and geographical names on the maps, at its full responsibility,
(8) annotation sheets in Kenya.

VII. UNDERTAKING OF JICA

For the implementation of the Study, JICA shall take the following measures, in accordance with the relevant laws and regulations in force in Japan;

1. to dispatch, at its own expense, the Study Team to Kenya for signalization, aerial photography, ground control point survey, pricking, field verification and field completion,
2. to carry out aerial triangulation, stereo plotting, drafting and printing in Japan,
3. to pursue technology transfer to the Kenyan counterpart personnel in the course of the Study.

VIII. CONSULTATION

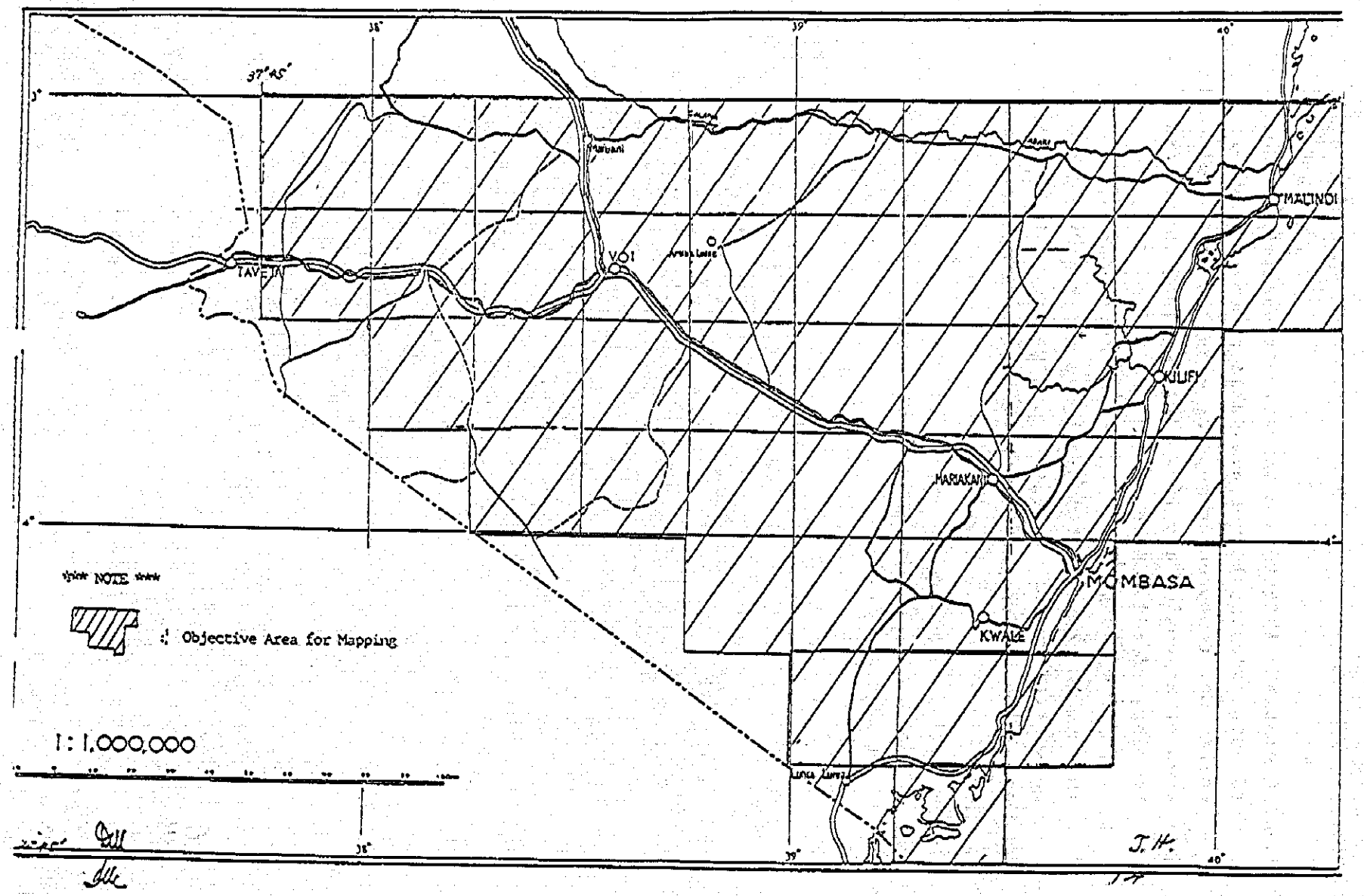
JICA and SK shall consult with each other in respect of any matter that may arise from or in connection with the Study.

NOTE:

1. In case the flight permission for the safety purpose by adjacent country is not available by one month before the operation, topographic mapping area shall be limited to the area of approximately 20 km inside along the international boundary of adjacent country.

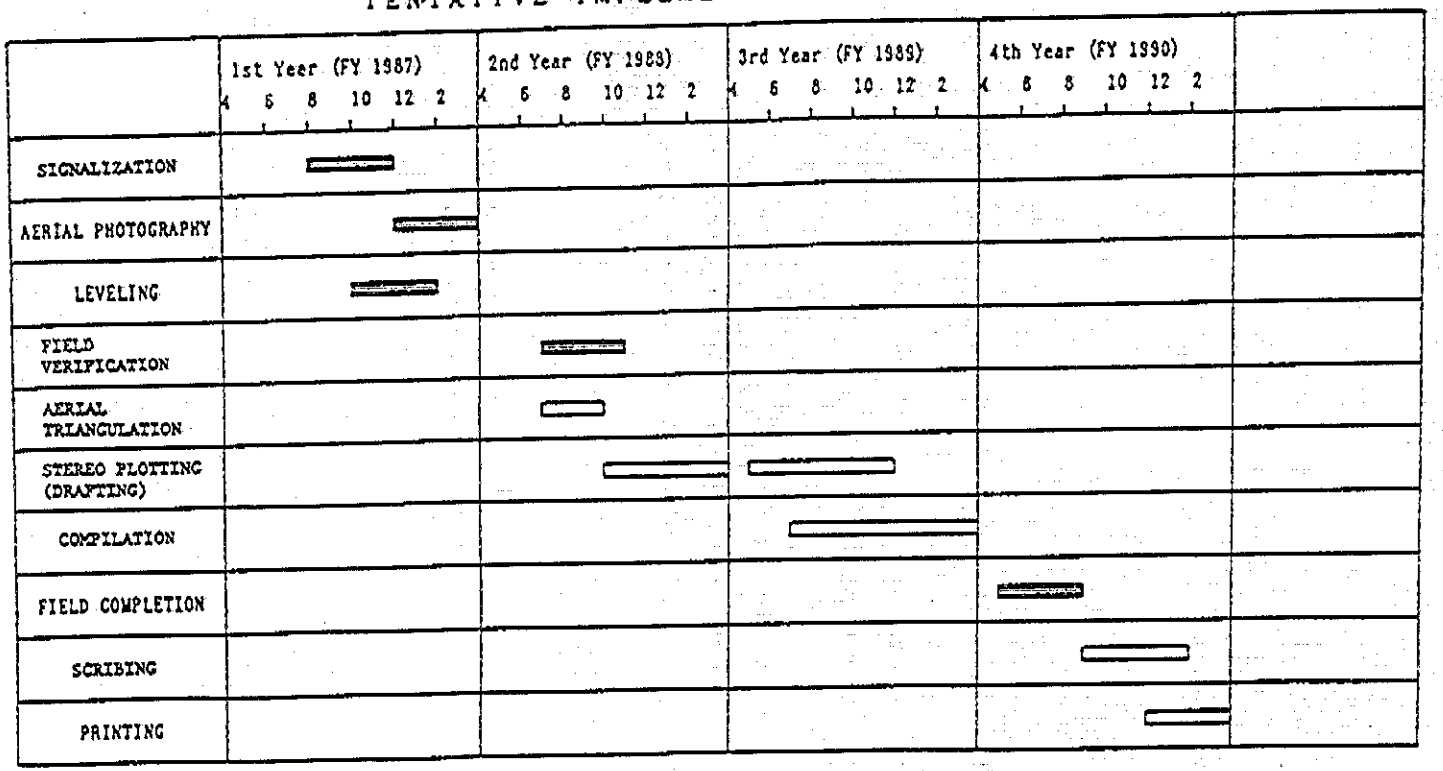
2. In case the aerial photography is not completed due to unexpected weather conditions, JICA and SK will consult with each other in respect of the confirmation of the topographic mapping area.

Appendix-1


37°45'
TAVETA
VOI
MALINDI
KILIFI
MARIAKANI
MOMBASA
KWALE
NOTE
Objective Area for Mapping
1 : 1,000,000

Appendix-2

Topographic Mapping in South Kenya
TENTATIVE IMPLEMENTATION SCHEDULE



APPENDIX-3

Final Delivery Items

1. Aerial Photography
   (1) original negative-film (1 set)
   (2) contact positive prints (1 set)
   (3) diapositive films (1 set)
   (4) index map of aerial photography

2. Levelling
   (1) final tabulation
   (2) route diagram
   (3) field sheets
   (4) computation sheets

3. Signalization & Pricking
   (1) description of signals & pricks
   (2) reference contact positive photos

4. Aerial Triangulation
   (1) final tabulation
   (2) reference contact positive photos
   (3) diagram of aerial triangulation

5. Field verification
   (1) result photos (1 set)

6. Stereo Plotting, Compilation & Scribing
   (1) original manuscripts
   (2) compilation manuscripts
   (3) annotation material
   (4) separate scribing sheets
   (5) negative-films for printing
   (6) negative screens

7. Printing

(1) printed maps (1,000 copies for each sheet)

(2) Aluminium printing plates

(3) Color progressives

APPENDIX-4

Principal Technical Specification

1. Aerial Photography

   (1) super-wide angle camera

2. Levelling

   (1) limit of reciprocal observation 5cm s s:km
   (2) interval of marks 2km

3. Stereo Plotting (Drafting)

   (1) sheet line 15' x 15' in latitude & longitude
   (2) contour interval 20m
   half interval contourline at flat area 10m

資料2　要請書

REQUEST FOR JAPANESE AID PROPOSED

1:50,000 SOUTH KENYA MAPPING PROJECT

I. PROJECT SPECIFICATION

1. AREA: The triangular area of Kenya bounded by the Indian Ocean Coastline from Nyoneni to Vanga, the Kenya-Tanzania boundary from Vanga to Mt. Kilimanjaro and in the North by the 3° South Latitude. (See Appendix I).

2. TASKS: (a) Ground Control, Aerial Photography and construction of 1:50,000 topographical maps covering the area, contours and spot heights being in metres. The map sheets number 44, covering an area of approximately 32,000 Sq. Kms, and their specification will be given by the Survey of Kenya. The sheets are Nos. 188/2 and 4, 189/1 to 4, 190/1 to 4, 191/1 to 4, 192/1 to 4, 193/1 and 3, 195/1, 2 and 4, 196/1 to 4, 197/1 to 4, 198/1 to 4, 199/1, 200/1 to 4, 201/1 and 3, and 202/2.

(b) Addition of Secondary and Tertiary ground Survey stations as will be necessary to ease future survey and development projects.

(c) Carrying out construction of more benchmarks and levelling along those new lines.

(d) Installation of 4 Tidal Stations at Lamu, Watamu, Mombasa and Shimoni.

(e) Assist in the production a landsat colour mosaic covering the whole of Kenya as a basis of future Regional Colour Mosaics.

II BACKGROUND

1. 1:50,000 MAPS

The 1:50,000 scale maps are a basic requirement for planning development projects. They are also the largest scale topographical standard maps intended to cover the whole country. About 61% of the country has been covered including areas whose maps are under preparation.

Like other technical fields the original mapping had been done long before the Metric Policy was introduced, and Surveying and Mapping Technology was not advanced. Distances, contours and spot heights were based on the foot, and construction of the maps was poor. All the new maps are now being constructed based on the metric system with contours and spot heights in metres. But for proper use of the maps, especially when projects extend from or sheet to another it is necessary for the maps to be based on the same system. The contours would then be continuous from sheet to sheet. The department was hence forced to reconstruct all the old maps dictated by the following factors:

(a) The Metric Policy was implemented in Kenya and thus affected most aspects of Surveying and Mapping.

(b) As the largest scale National Base Map, 1:50,000 topographical map has to be standardised.

... 2/

(c) Modern Engineering Technology has gone metric. Surveying instruments, especially those used for measuring distances, have all been constructed so as to read in metric units.

(d) As a result large scale maps at development sites are usually requiring contours in metres.

(e) The accepted Geodetic Projection used in obtaining ground coordinates is employed such as to give coordinates in metres. It is thus more necessary to use the same unit for planimetric and height control, especially on our maps.

(f) All the newly constructed maps have to be in metric form for uniformity. The 1:50,000 scale map is used as the base to construct the smaller scale topographical maps:-

(i) The 1:250,000 topographical standard Map covering the whole country.

(ii) All the 1:1,000,000 Maps of Kenya.

(iii) Tourist Maps.

(iv) Special Regional Maps arising out of necessity which are requested for from Survey of Kenya.

2. Project Area

In considering the project it is important to note that:-

(a) The area involved covers about half of Coast Province.

(b) It is the most populous and high potential area of Coastal Zone.

(c) The whole area (100%) is economically useful either for agriculture, for tourism, for mining and fisheries.

III ADVANTAGES OF NEW MAPPING

1. Contribution to A Sound National Base Map

(a) Metrication: Only three portions accounting for 16% of maps are not in the metric version. This area is the largest of the three. All the maps adjoining this area in the north have been reconstructed with contours and spot heights in metres while the Directorate of Overseas Surveys of Britain is remapping the North West Tanzania maps in the south. The maps of this area would hence remain as the only one in feet, hence lacking continuity with other blocks. It is not technically possible to change contours from one unit to another except by reconstruction.

(b) Accuracy: The existing maps were constructed between 1950 and 1963. Their accuracy is lower compared to today's maps whose construction data is computer adjusted. The construction of all the maps will improve the accuracy.

2. Revision: The maps of the selected area are very old, as stated above. The basic information was obtained from aerial photography taken mostly

... 3/

during 1954 and 1955. Thus the maps are badly outdated and a lot of new developments on the ground are not shown. New towns and settlements have emerged, new roads constructed, old roads realigned and other changes have taken place. This bulk of information cannot be collected easily, and be added accurately on the existing maps, except by replotting from fresh aerial photography as has been done for the rest of the 1:50,000 maps.

IV DEVELOPMENTS TO BE AIDED BY THE NEW MAPPING

1. Tana River Development Authority:

The Sabaki River Basin (also known as the Galana and Athi) has now been brought under Tana River Development Authority. Over 200 Kms. of its lower basin, the most likely portion to have major irrigation, rangeland and settlement schemes, is within this mapping block. The gigantic 50,000 hectare Magarini Settlement Scheme is already going on within the basin. Further more, in in practice, it is impossible to seperate the Lower Tana River Basin from the Lower Sabaki Basin both of which form a continuous large basin with similar geographical conditions. While the Middle and Lower Tana Basins have been covered by new metric maps the adjoining Sabaki River Basin Maps are still in feet. It is a great advantage to planners and engineers when the whole Coastal Lowlands are covered by similar maps. The Authority has already indicated the great need for proper mapping of this area.

2. Agricultural Petential of Taita, Kwale and Kilifi

Apart from the land covered by National Parks the rest is arablle or ranching land where major agricultural projects are going on or are planned. This includes:-

(a) Lake Jipe Agricultural Area.

(b) Taita Hills.

(c) Extensive ranching areas in the three districts.

(d) The Coastal Strip.

(e) The Sabaki Basin mentioned above.

Major agricultural projects are going on or are planned within all these area. Within Taita Hills is a Horticultural Centre and a huge Rural Development Project under German Aid. Over Fourty Ranches are being being developed in Taita, Kilifi and Kwale Districts. The World Bank is already helping the development of many of them. Up to now proper mapping of these large ranches has not been completed thus holding up developments.

3. Mining Potential And Oil Exploration

It has been established that Taita District and the surrounding region has a great mining potential. Also along the Coast are various oil exploration projects, inland and off-shore. The 1:50,000 scale map forms a base for all exploratory geophysical surveys prior to the expldtation of such natural resources.

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4. Tourism

One major requirement in the tourist industry is availability of maps with accurate and upto date information. This areas contains:

(a) Nearly the whole of Tsavo West National Park.

(b) A third of the Tsavo East National Park.

(c) Shimba Hills National Park.

(d) Gede National Park.

(e) Marine National Parks of Malindi and Watamu.

(f) Over 200 Kms. of the southern half of Kenya Coast including the most attractive Coastal Tourism Resorts.

The updated detailed information obtained from the new aerial photography would be used to revise not only the smaller scale topographical maps but also to update or reconstruct:

(a) The Tourist Map of Kenya.

(b) The very essential Kenya Route Map.

(c) The Kenya Coast and Guide Map.

(d) Tsavo East National Park Map.

(e) Tsavo West National Park Map.

(f) Any other special maps required for Tourism.

5. Automatic Intensification of Ground Control Stations

An automatic and very important development out of remapping the area is intensification and extension of ground survey networks. This area lacks proper and adequate ground control and levelling benchmarks. These are for:-

(a) As Datums for planimetric and height control during preparation of large scale site maps, eg., 1:10,000, 1:5,000, 1:2,5000 and larger scales, for irrigation and other related projects.

(b) The ground surveys by the Survey and Land Adjudication departments for ranches, adjudication sections, settlement scheme, development plans of townships and urban centres and other title surveys.

(c) Orientation of pipe routes.

(d) Orientation and levelling along road routes necessary for proper access to areas of economic activities for maximum exploitation.

In this particular area the development of many ranches by the world Bank has been held up by lack of proper survey. The Survey Department could not afford extending survey triangulation over hundreds of kilometres from the scarce stations to the ranches. Surveys of all sorts will continue in this area to unforseable end.

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6. Levelling Benchmarks:

The most wanted survey marks by various mappers and especially by all the Regional Development Authorities are levelling benchmarks. This is because they are the only marks giving accurate relative heights between points and above mean sea level. These heights are directly related to direction of flow, velocity, rate of flow, depths and other aspects of water engineering. It is proposed that the requested levelling be carried out because:-

(a) The benchmarks demand has increased especially by Regional Developpent Authorities of Lake Basin, Tana River and Kerio Valley.

(b) Where such are missing their problem has adversely affected projects as Masinga Dam and, currently the Turwell Gorge and other projects in Kerio Valley.

(c) Benchmarks are indispensable in areas of river, lake, or Coastal Basins where irrigation, dams and other water projects are always going on.

7. Tidal Station

Sound National levelling network involves determination of precise heights of bench marks above a well known reference surface. This surface is the geoid which for practical purposes is the seal level. In practice sea level fluctuates daily due to ocean tides and over the years due to oceanic and earths crustal dynamics. It follows that to determine mean sea level as a levelling reference surface continuous observations of tides have to be made over along period. The internationally accepted period of observation leading to a sound mean sea level is over 18 years of tidal recording.

An old tide gauge had been installed at Kilindini Harbour in 1931 by the then E.A.R. & H. Cooperation which operated until 1956, for this purpose. Due to poor siting the ocean eroded it away and finally was destroyed when it was hit by a ship. Its results were poor and only the mean of 1 year period between 1932 and 1933 was accepted. The over 3,000 Kilometres of levelling lines in Kenya, and the heights obtained, are based in this 1 year mean Several attempts have been made by this department, the defunct E.A.R. & H. Corp. and other agencies since 1950 to establish other lasting tidal stations.

The summary of tidal station uses are as follows:-

(i) Determination of height datum for the national levelling network: Kenya's network is based on a mean of observations made over 1 year period only. The information will be used to adjust all our levelling networks, and as a datum for all future levelling.

(ii) Provision of Data necessary during constructions, extension and operation of Harbours: The data is used to continuously determine highest and lowest water levels.

(iii) Prediction of Tides: This includes ocean levels fluctuations over many years periods.

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(iv) Study of the earth's plate tectonics: It has been known that various plates forming the earths crust are in continuous motion relative to each other. This has resulted in gradual separation of the great Rift Valley which divides our country into two. As a result Kenya is greatly interested in the studies of crusted movements which are believed to cause earthquakes. Hence Kenya has been represented by this department at various international conferences dealing with this subject.

(v) Movement of the continental shelf: This movement with respect to the ocean plate is very useful for hydrographers and for administration of our Territorial Sea Economic Zone as defined by United Nations Law of the Sea.

(vi) Admiralty Charts: To provide information for updating the old Admiralty Charts currently in use and for any new ones which might be prepared in future.

(vii) All these information is used by Mariners, Geodesists, Hydrographers, the Navy, Marine life and Fisheries Exploitation and, of great relevance to Kenya, for Ocean Bed Petroleum Prospecting and Extraction.

8. Landsat Colour Mosaic

The objectives of this effort are:-

(a) To construct a Kenya Colour Landsat Mosaic at a scale of 1:1,000.000.

(b) To develop a manual on the procedures of constructing such a mosaic.

(c) To evaluate and establish the role and usefulness of such a mosaic in map construction, map revision and resource mapping in Kenya.

The construction of a national Landsat Colour Mosaic will have the following significant justifications and advantages to the Survey of Kenya and other sister departments.

(i) Since Landsat started imaging Kenya in 1972, no national colour mosaic has been made.

(ii) SK has spent a lot of funds to train people in cartographic applications of remote sensing including mosaicing and has not deployed them to exploit their knowledge.

(iii) The Kenya Government has contributed millions of shillings and a fifteen acre plot to support the Regional Centre for services in surveying, mapping and remote sensing. Further, the Government now plans to construct a satellite ground receiving station in Kenya with support from the Eastern African Partner States. In all these developments, SK, is the key user of remote sensing and is thus justified to make full use of the potential and opportunities provided by satellite imagery.

(iv) A national mosaic will give an entire picture of Kenya in colour and its maplike appearance with cultural detail overprint will generate alot of interest in a wide map user community.

(v) The mosaic will be lithographically printed and commercially sold to pay for its production costs.

(vi) Enlargement of certain sections of the mosaic showing important national features and script interpretation will form useful inclussions in the proposed new National Atlas.

...

(vii) The mosaic will serve as a convenient base to relate with national mapping projection (UTM) and map series of 1:500,000; 1:250,000 and 1:50,000.

(viii) Experience earned through this effort will form the basis of developing a Kenya oriented manual on the procedures of carrying out similar mosaicing in Kenya.

(ix) Through this effort, SK will be able to build a capability in personnel and equipment to support future mapping by Landsat Imagery and related photomosaic maps - especially the need to acquire colour processing and colour separation capability for lithographic colour printing will be justified.

(x) The product and its enlargements, will be made available to all interested organizations and will find direct use in regional planning authorities.

(xi) Geology, Forestry, Land Use/Land Cover, Hydrology, Desertification, Rangeland Monitoring, Transport Route Planning, Tourism, Marine Resources, and University Teaching.

(xii) Information gained and problems indentified will help the department determine and authoritatively specify refinements and research in remote sensing systems that would confdrm to Kenya's mapping specifications and overall cartographic applications.

9. Transfer of Technology

By an agreement the Japanese Government has attached three experts in Geodesy and Surveying. They specialise in:-

(a) Geodetic Levelling - including Tidal Observations and Levelling Networks adjustments.

(b) Satellite Geodesy and Remote Sensing.

(c) Geodetic Control Computations and Computer adjustments.

At present the Japanese experts are confined to office treatment of data. With Survey of Kenya Personnel they have prepared various computer programmes related to surveying, started analysis of the present levelling networks and carried out a thorough reconaissance for tidal stations along the Kenya Coast.

It is felt that this transfer of technology cannot be complete without practical field work. Lack of material and equipment resources has hindered this field work. This project would hence help in:-

(a) Supply the required equipment for levelling, Tide gauges, Colour Seperation equipment and colour photographic equipment for Landsat imagery analysis.

(b) Giving a chance for the Kenyan Staff to instal tidal station, observe and analyse the tidal data with the Japanese experts.

(c) A joint effort between Kenyan Remote Sensing experts (who have completed their courses recently) and the Japanese experts in preparation and analysis of landsat mosaics as mentioned paragraph 7 above.

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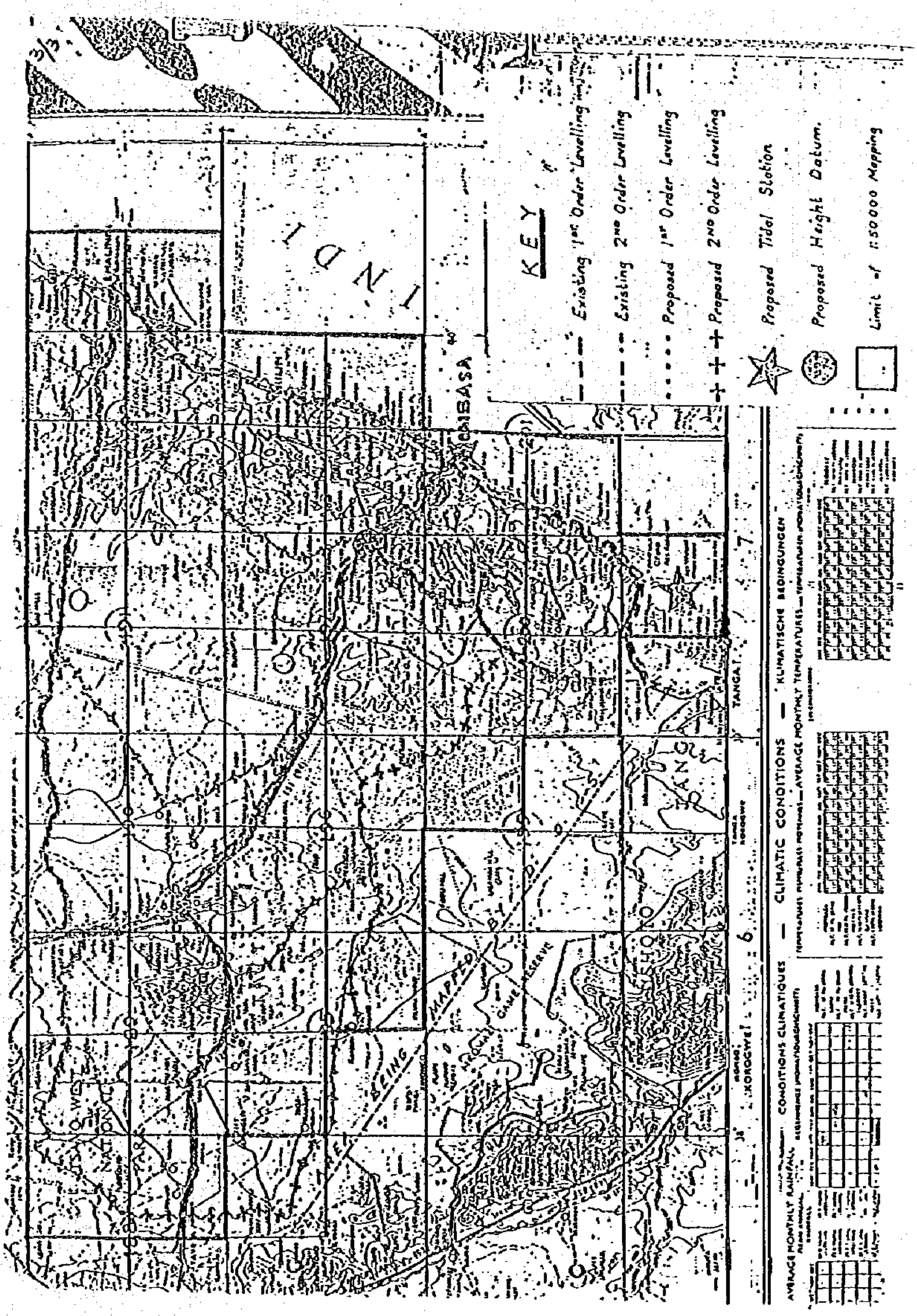
(d) Transfer of technology which would follow from the above is in line with the Kenya Government's Policy and intentions when recruiting expertriates in Technical Fields.

V PLANS AND FEASIBILITY STUDIES

Subject to the acceptance of this project by the Japanese Government detailed plans of the project shall be prepared by the Survey of Kenya and the Japanese Mapping Team.


KEY
Existing 1st Order Levelling
Existing 2nd Order Levelling
Proposed 1st Order Levelling
Proposed 2nd Order Levelling
Proposed Tidal Station
Proposed Height Datum
Limit of 1:50000 Mapping
BEING MAPPED
GAME RESERVE
TANGA
KOROGWE
AVERAGE MONTHLY RAINFALL
CONDITIONS CLIMATIQUES — CLIMATIC CONDITIONS — KLIMATISCHE BEDINGUNGEN

資料3　コンタクト・ミッションのミニッツ

MINUTES OF THE MEETING

ON

THE TOPOGRAPHIC MAPPING STUDY

OF

SOUTH KENYA

BETWEEN

SURVEY OF KENYA, MINISTRY OF LANDS

AND SETTLEMENT

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

NAIROBI, 6th February, 1987

MR. DAVID KAMAU
Director of Surveys,
Survey of Kenya
Ministry of Lands and
Settlement

MR. TAKESHI HIRAI
Leader of the Contact
Mission
The Japan International
Cooperation Agency (JICA)

Witnessed by:

MR. A. K. NJUKI
Assistant Director of
Surveys
Survey of Kenya

MR. AKIRA TAKAHASHI
Resident Representative
JICA, Kenya Office

The meetings on the Topographic Mapping Study of South Kenya (hereinafter referred to as "the Study") were held in Nairobi, Kenya on 28th January through to 6th February, 1987, between the contact mission for the Study (hereinafter referred to as "the Mission") dispatched by Japan International Cooperation Agency (JICA) and the Survey of Kenya, the Ministry of Lands and Settlement of the Republic of Kenya (hereinafter referred to as "the SK").

The purpose of the meetings was to discuss the outline of the Study which was requested by the Government of Kenya.

The list of the attendants of the meetings are shown in Appendix I.

The following is a summary of the discussions held in the meetings;

I. The SK explained the terms of reference of the request, and they were confirmed by the Mission and the SK as follows;
   (1) the objective of the Study is to prepare topographic maps on the scale of 1:50,000 based on the metric system,
   (2) the mapping area is limited within the area shown in Appendix II.

II. The Mission and the SK discussed the matters necessary for implementation of the Study, and the results of the discussion are as follows:

(1) The maps should be prepared according to the unified african specification which shall be provided by the SK. In case this specification is not available by the time of field survey, specification adopted in Eastern Kenya Mapping Project by JICA shall be applied to the Study.

(2) The control points that have already been established shall be used for the aerial triangulation.
In addition, the minor order levelling shall be carried out.

(3) The maps should be prepared so that they are properly edge-matched with the maps of the adjacent area which have already been prepared, and the maps of the adjacent area shall be provided by the SK.

(4) The scale of the aerial photographs shall be 1:60,000.

(5) The procedure necessary for the permission of the aerial photography, including the permission of the aerial photography near and around international boundaries, shall be undertaken by the SK.

(6) The investigation of the geographical names and the administrative boundaries shall be undertaken by the SK, and all materials and information concerning the special area shall be provided by the SK.

(7) The arrangements necessary for the entry into the national parks, including the arrangement of necessary game scouts, shall be undertaken by the SK.

(8) The procedure necessary for the permission to take the original negative films of aerial photographs out of Kenya to Japan shall be undertaken by the SK.

(9) The counterpart personnel (the SK staff) shall be provided by the SK at its own expense for each party of each field work.

(10) The arrangements of providing the game guards, the watchmen and the labourers shall be undertaken by the SK.

(11) The permission for entry into private properties or restricted areas, if necessary for the field work, shall be secured by the responsibility of the SK.

(12) The arrangements necessary for medical services, shall be undertaken by the SK.

(13) Necessary arrangements to secure permission for the use of communication facilities, including transceivers shall be undertaken by the SK.

(14) The procedure of the work from drafting to printing, shall be carried out in the same way which was adopted in the mapping project of Eastern Kenya by JICA.

(15) SK shall provide, at its own expense, suitable office space, with necessary equipment, furniture and telephone in Nairobi and Mombasa.

APPENDIX I

Attendants of the meetings

(JAPAN SIDE)

The Contact Mission

Mr. Takeshi Hirai	Deputy Director General, Geographical Survey Institute (GSI) Ministry of Construction
Mr. Masao Ishihara	Head of third geodetic Div., GSI
Mr. Kenji Kuroda	Official Development Cooperation Department Economic Cooperation Bureau Ministry of Foreign Affairs
Mr. Hiroshi Magome	Director of Planning Div. Japan Surveys Association
Mr. Hideo Miyamoto	Staff, First Development Survey Div. Social Development Cooperation Dept. Japan International Cooperation Agency

JICA Kenya Office

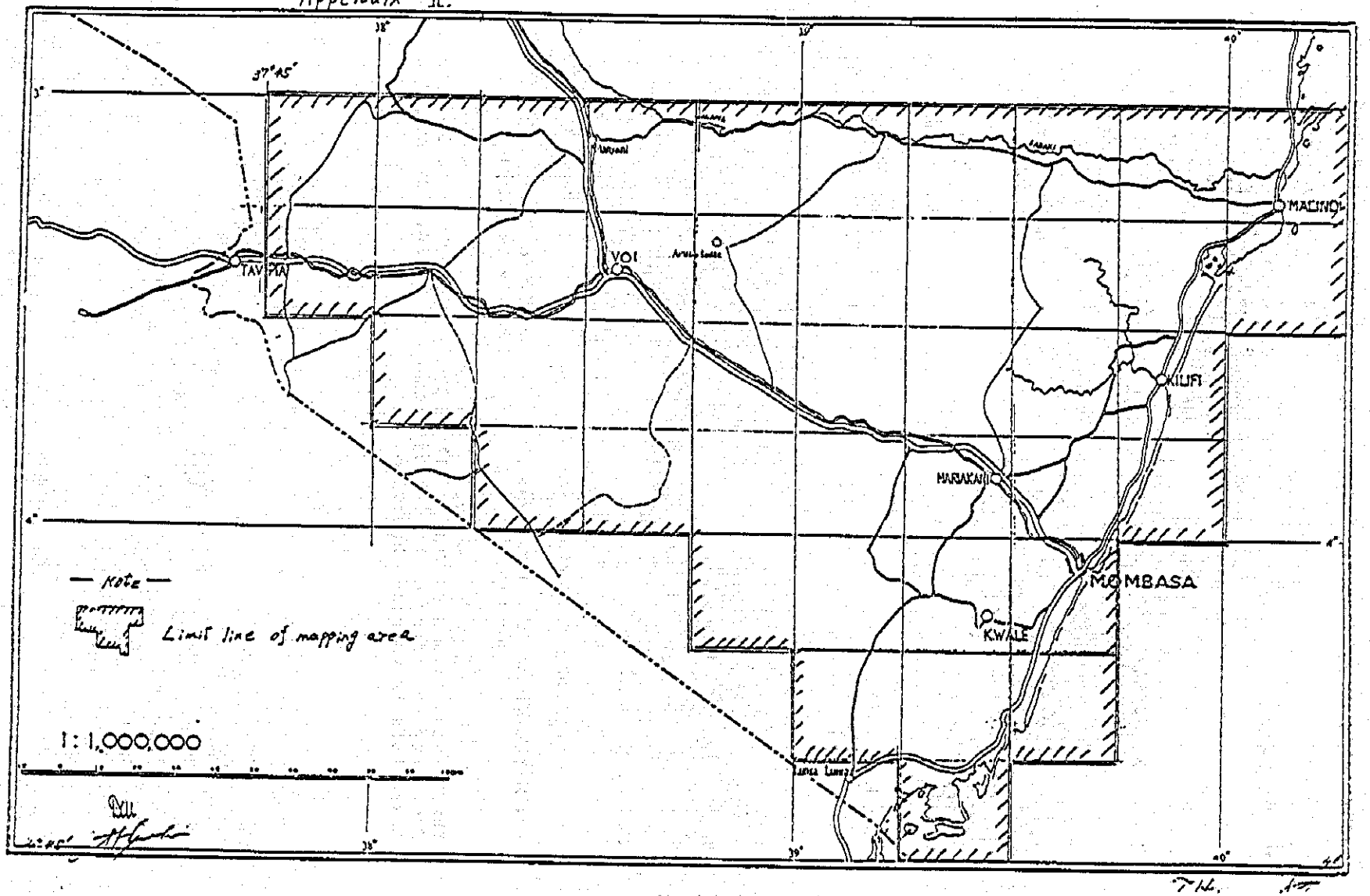
Mr. Akira Takahashi	Resident Representative
Mr. Norio Shimomura	Assistant Resident Representative
Mr. Seiji Kaiho	Assistant Resident Representative

(KENYA SIDE)

Mr. D. KAMAU	Director of Surveys Survey of Kenya (SK) Ministry of Lands and Settlement
Mr. A. K. NJUKI	Assistant Director of Surveys Survey of Kenya
Mr. O. M. WAINAINA	Superintending Surveyor Survey of Kenya
Mr. P. NDUNDA	Chief Cartographer Survey of Kenya
Mr. J. KIBORE	Chief Photogrammetrist Survey of Kenya
Mr. D. CHABEDA	Chief Lithographer Survey of Kenya
Mr. E. MBUTHIA	Asst. Photogrammetrist Survey of Kenya
Mr. B. M. OKUMU	Officer in charge technical section Survey of Kenya
Mr. MIYAZAKI	Geodetic Mapping Expert Survey of Kenya

The Mission paid a courtesy call on Mr. David Mwiraria, Permanent Secretary, Ministry of Lands and Settlement on 30th January, 1987; this is recorded herewith.

Appendix II.


37°45'
TAVETA
VOI
MACINDI
KILIFI
MARIAKANI
MOMBASA
KWALE
— Note —
Limit line of mapping area
1 : 1,000,000

資料4　S/W ミッションのミニッツ

MINUTES OF MEETINGS

ON

SCOPE OF WORK

FOR

TOPOGRAPHIC MAPPING OF SOUTH KENYA

IN

THE REPUBLIC OF KENYA

AGREED BETWEEN

MINISTRY OF LANDS AND SETTLEMENT

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

NAIROBI,　19th March, 1987

MR. DAVID KAMAU
Director of Surveys,
Survey of Kenya,
Ministry of Lands and
Settlement

MR. A.K. NJUKI
Assistant Director of
Surveys,
Survey of Kenya

MR. TAKESHI HIRAI
Leader of Preliminary
Study Team,
The Japan International
Cooperation Agency (JICA)

MR. AKIRA TAKAHASHI
Resident Representative
JICA, Kenya Office

The meetings on the Scope of Work for the Topographic Mapping of South Kenya in the Republic of Kenya (hereinafter referred to as "the Study") were held in Nairobi, Kenya on 13th through 19th March, 1987 between the Japanese Preliminary Study Team (hereinafter referred to as "the Team") dispatched by Japan International Cooperation Agency (JICA) and the Survey of Kenya, Ministry of Lands and Settlement of the Republic of Kenya (hereinafter referred to as "SK").

The list of the attendants of the meetings are shown in the Appendix.

Main items discussed between both sides are as follows:

1. SK requested the Team, that six vehicles necessary for the implementation of the Study be provided by JICA, and the Team promised to convey the request to the Government of Japan.

2. SK promised that in case the vehicles will be provided by JICA, SK shall take the necessary measures in cooperation with other relevant organizations to exempt from taxes, duties and other charges on those vehicles, whether those vehicles are brought into Kenya from Japan or purchased in Kenya.

3. Both sides agreed that those vehicles shall be exclusively used for the Study until the completion of the Study.

4. SK requested the Team, that the vehicles be donated to SK after the completion of the Study, and the Team suggested this matter shall be discussed further between JICA and SK.

5. Both sides agreed that SK will be responsible for the procedure of entering into all the mapping areas for field survey and verification, following the Survey Act of Kenya and as required for mapping at the same scale.

APPENDIX Attendants of the Meetings

(JAPAN SIDE)

The Preliminary Study Team

Mr. Takeshi HIRAI	Deputy Director General, Geographical Survey Institute, Ministry of Construction
Mr. Masao ISHIHARA	Head of Third Geodetic Department, Geographical Survey Institute, Ministry of Construction
Mr. Hiroshi MAGOME	Head of Planning Div., Surveys Technical Center, Japan Surveys Association
Mr. Minoru MIYAKOSHI	Deputy Head, National Large Scale Mapping Div., Topographic Department, Geographical Survey Institute, Ministry of Construction
Mr. Masaaki YAMADA	Deputy Head of Technical Div., Surveys Technical Center, Japan Surveys Association
Mr. Hideo MIYAMOTO	Staff, First Development Survey Div., Social Development Cooperation Dept., JICA

JICA, Kenya Office

Mr. Akira TAKAHASHI	Resident Representative
Mr. Seiji KAIHO	Assistant Resident Representative

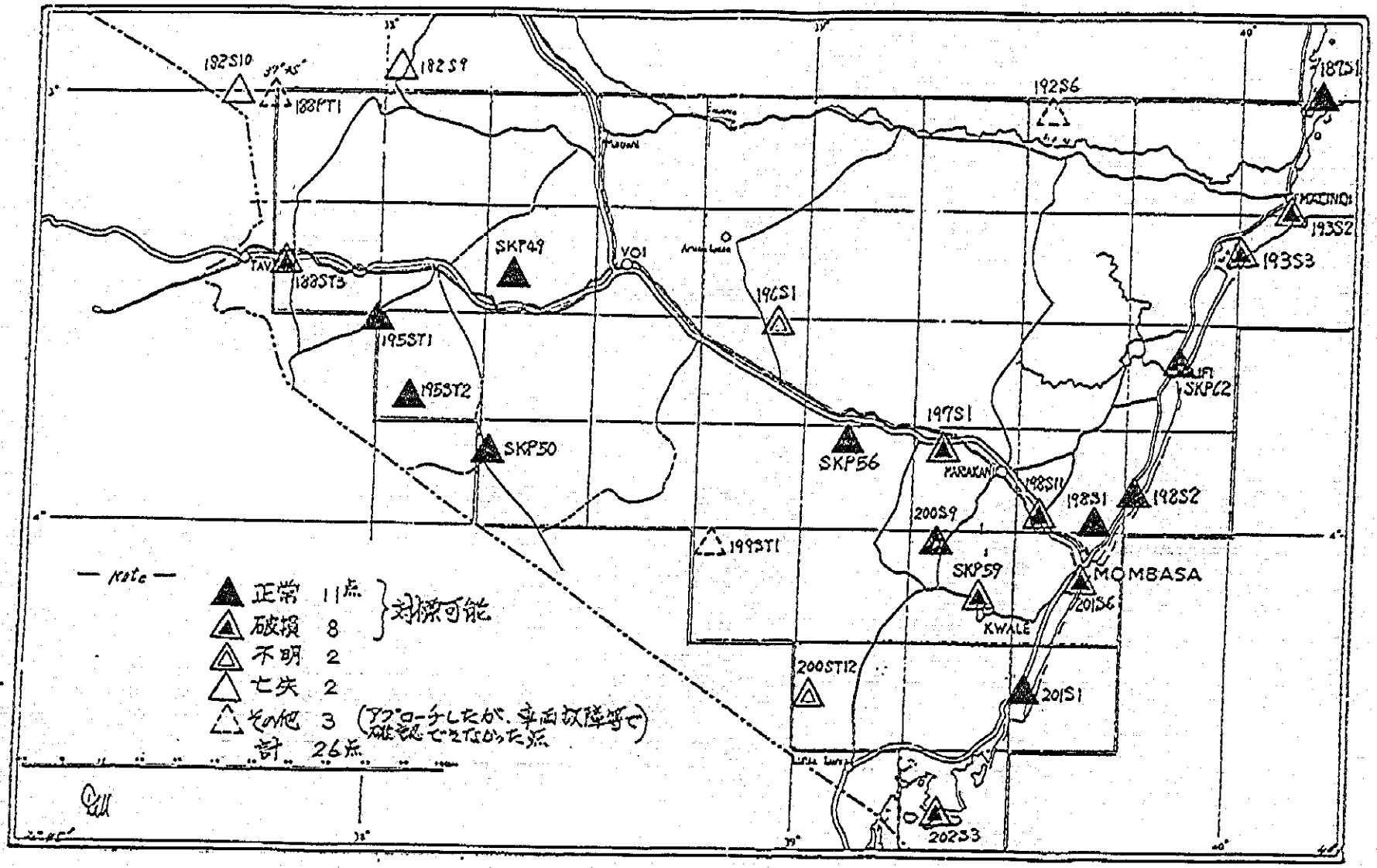
(KENYA SIDE)

Mr. D. KAMAU	Director of Surveys, Survey of Kenya, Ministry of Lands and Settlement
Mr. A.K. NJUKI	Assistant Director of Surveys, Survey of Kenya
Mr. O.M. WAINAINA	Superintending Surveyor Mapping, Survey of Kenya
Mr. P. NDUNDA	Chief Cartographer, Survey of Kenya
Mr. J. KIBORE	Chief Photogrammetrist, Survey of Kenya
Mr. D. CHABEDA	Chief Lithographer, Survey of Kenya
Mr. E. MBUTHIA	Senior Photogrammetrist, Survey of Kenya
Mr. K. MIYAZAKI	Geodetic Mapping Expert, Survey of Kenya

資料5　ケニア南部地区 標石調査実施状況

点　名	点の状況
ＳＫＰ４９	正　常
ＳＫＰ５０	正　常
ＳＫＰ５６	正　常
ＳＫＰ５９	破　損
ＳＫＰ６２	正　常
１８２Ｓ９	亡　失
１８２Ｓ１０	亡　失
１８７Ｓ１	正　常
１８８ＰＴ１	その他
１８８ＳＴ３	破　損
１９２Ｓ６	その他
１９３Ｓ２	破　損
１９３Ｓ３	破　損
１９５ＳＴ１	正　常
１９５ＳＴ２	正　常
１９６Ｓ１	不　明
１９７Ｓ１	破　損
１９８Ｓ１	正　常
１９８Ｓ２	正　常
１９８Ｓ１１	破　損
１９９ＳＴ１	その他
２００Ｓ９	正　常
２００ＳＴ１２	不　明
２０１Ｓ１	正　常
２０１Ｓ６	破　損
２０２Ｓ３	破　損

正常	１１点
破損	８点
不明	２点
亡失	２点
その他	３点
計	２６点



ケニア南部地区 標石調査状況図 (1987.2.25～3.11)

資料6　現地での物価

（1シル＝10円……1987.3.10現在）

1　雇用費

人夫賃	30シル/日	モンバサ
ポーター・ガイド	30シル/日	モンバサ
レンジャー	70シル/日	モンバサ
ドライバー	70シル/日	ナイロビ

2　車両借上料（ドライバー付）

ジープ	1,500シル/日	ナイロビ
（車のみ）		
ジープ	600～700シル/日	モンバサ
マイクロバス	700シル/日	モンバサ

燃料消費量　1リットル当たり5～6 km

3　船借上料（船頭，ガソリン込み）

小船（エンジン付，7～8人乗り）	300シル/3時間	マリンディ
小船（エンジン付，10人乗り）	500シル/3時間	シモニー

4　航空機借上料

サハリ用飛行機（4人乗り）	2,800シル/時間	ナイロビ
サハリ用飛行機（8人乗り）	8,500シル/時間	ナイロビ
ヘリコプター（4人乗り）	11,000シル/時間	ナイロビ

5　宿泊施設（内容に応じて異なる）

ホテル（1食付）	400～850シル/泊	ナイロビ
ホテル（1食付）	500～700シル/泊	モンバサ，マリンディ
ロッジ（3食付）	1,200～1,400シル/泊	タイタ，キランゴニ

6　電話料金

モンバサ～ナイロビ	30シル/3分	直通
〃	50シル/3分	ホテル（手数料50%）

モンバサ～日本	270シル/3分　直通
〃	340シル/3分　ホテル（手数料50%）
ナイロビ～日本	260シル/3分　直通
〃	390シル/3分　ホテル（手数料50%）

7　郵便料金

国外　葉書　10g迄　5シル　（アジア・ヨーロッパ）

8　通行料等

モンバサ道路	普通車	5シル/台　モンバサ
ニューニヤリ橋	普通車	2シル/台　モンバサ
リコニーフェリー	普通車（24時間運行）	11シル/台　モンバサ

9　雑　貨　（モンバサ調べ）

ガソリン		77～85シル/リットル
パンク修理		15～50シル/本
乾電池（単1）		10.5シル/2本
〃　（単2）		8.9シル/2本
〃　（単3）		9.8シル/4本
コピー	A4　1シル/枚	A3　2シル/枚
用　紙		A4　16.5シル/50枚
ボールペン		18シル/本
蛍光ペン		7.5シル/本
消しゴム		7.9シル/個
ノート		A4　10シル/冊
新　聞	平日　3シル/部	土日　3.5シル/部
フィルム	36枚	140～145シル/本
フィルムDP		7シル/枚
たばこ	20本	12.5～20シル/箱
石　鹸		6.1シル/個
歯磨き		8.9シル/本
歯ブラシ		5.9シル/本
スニーカー		130シル/足

ビーチサンダル	60～90シル/足
くつ下	20～30シル/足
ズボン	250～350シル/本
バンド	100～150シル/本
アンダーシャツ	50～80シル/枚
パンツ	20～30シル/枚
ワイシャツ	120～150シル/枚
ネクタイ	50～80シル/本
ハンカチ	10シル/枚
帽　子（サハリ用）	65～125シル/個
バッグ（スポーツ）	134シル/個
飲料水（エビアン）	100シル/1.5リットル
ビール	7～9シル/本
コーラ・ジュース	2～3シル/本
コーヒー・紅茶・ミルク	3～4シル/杯
パイナップル・バナナ（20）	5シル/個
ヤシの実	2.5シル/個

ケニア国入出国時の外貨持込み，持出しについて

ケニア国に入る時には，入国申請書の他に外貨持込み額の申告書を提出しなければならない。これがなければ銀行に行ってもドル等の外貨をケニア通貨のシリングに替えることは出来ない。勿論ケニア国内では一流ホテルでもシリング以外を使用することは禁じられている。また，帰国時にシリングは持出せないのでドルに替えなければならないが，この時もEXCHANGE CONTROL ACTの申告書がなければ不可能であり，その場合はさらに両替した時にくれる銀行等の両替証を失くさずに持っていて，ケニアシリングからドルに替える時提示しなければならない。ケニア国内を旅行する者にとって申告書は旅券と同じくらい大切なものである。

Form C.D. DUPLICATE

CENTRAL BANK OF KENYA

EXCHANGE CONTROL ACT

(Cap. 113) H No. 915632

FOREIGN CURRENCY DECLARATION
TO BE COMPLETED IN DUPLICATE
BY ALL PERSONS ARRIVING IN KENYA

I, the undersigned, hereby declare that I have the following foreign currency (Cash, Travellers' Cheques, Bank Drafts, etc.) in my possession:

A. Description and Type of imported foreign currency, e.g. Bank notes, Travellers' Cheques, Drafts, etc.	Amount of Foreign Currency In Figures	In Words
T.C	5.200	US Dollars
Cash	1.000	"
Cash	21.000	Yen

B. I am a:
(a) Returning Resident
(b) Visitor on holiday
(c) Visitor on business
} ☒ whichever is applicable

C. I normally reside in JAPAN (state country)

My visit has been arranged through

(State name and address of Tour Operator where applicable)

Signature

Full Name (in block letters)

Passport No. and Place of Issue M1235265 Tokyo

Address While in Kenya

For Customs Stamp, date and Signature

ケニア共和国

ナイロビバイパス建設計画調査（実施設計）事前調査報告書

平成九年三月

JICA