

SOIL SURVEY WORK IN KENYA

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WORK COVERED

Kenya is covered by 1:3,000,000 soil map which appears on page 17 of the Kenya Atlas (1962 edition). The field work for this map was conducted by asking the District Agricultural Officers ^(See Map Sheet 1 as attached) to investigate and report on the soils in various parts of their districts. The manner in which the field work was conducted (considering that the District Agricultural Officers employed for the investigation were not trained Soil Scientists) and the small scale (see attached Map Sheet one) at which the map is published makes it no more than diagrammatic. It merely indicates some of the major soils that may be expected in the country and is inadequate for development planning or any form of practical use. A pamphlet ^(No 3) outlining these soils and a map ^(Sheet 1a & b) depicting the soil distribution are herewith presented.

Nevertheless, for the last few years tremendous progress has been made in producing more detailed soil maps for areas earmarked for development. Some of these surveys have been possible through the help of consultant firms. Hunting Technical services (a firm based in England) is responsible for area 1 (see the attached shaded map); Sir Alexander Gibbs and Partners ^{Sheet 2} (a firm based in Nairobi) is responsible for part of area 6; whereas survey of area 13 is the work of a Dutch Consultant firm. So far the total area surveyed amounts to 1,431,774 hectares. This is only 6 percentage of the high potential agricultural land which excludes the Semi-arid land or 2.4 percent of the Kenya land. The areas covered are as outlined below:-

DETAILED SURVEY

<u>Year Surveyed</u>	<u>Scale</u>	<u>Location</u>	<u>Map Ref. No.</u>	<u>Hectarage</u>	<u>Intended Development</u>
1965	1:10,000	Lower Tana	13	4,000	Irrigation
1964	1:1,000	Kamleza-Taveta	17	300	"
1967	1:10,000	Mwea	11	1,544	"
1967	1:2,500	Naivasha	8	766	"
1966	1:5,000	Ahero	6	1,400	"
1966	1:3,100	Bunyale	4	300	"
1969	1:12,000	Yatta (Machakos)	12	3,200	"
1968	1:3,100	Thika	12	340	Research Station
1968	1:2,500	Univ. Farm (Nairobi)	12	70	Farm
1968	1:3,125	Kibos (Kisumu)	6	160	Research Station
1968	1:5,000	Wamumu (Kirinyaga)	11	440	Cotton
1970	1:3,125	Ishiara (Embu)	10	110	Irrigation
1970	1:1,250	Tigoni (Limuru)	12	72	Research Station

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SEMI - DETAILED

Year Surveyed	Scale	Location	Map Ref. No.	Hectarage	Intended Development
1966	1:12,500	Mumias	3	31,000	Sugar Cane
1960	1:50,000	Songhor	6	52,000	"
1961	1:50,000	E. Konyango	5	39,682	"
1965	1:50,000	Lower Tana	13	370,000	Irrigation
1966	1:50,000	West Sasia	4	9,600	Cotton
1967	1:12,500	Simba Hills	16	53,200	Settlement
1969	1:12,500	Mapeya (Lamu)	14	9,152	"
1970	1:50,000	Salin Road (Mombasa)	15	2,400	Cassava
1969	1:12,500	Turbo	2	10,262	Afforestation
1970	1:12,500	Ramici Sugar Estates	16	4,800	Sugar Cane

RECONNAISSANCE

1945	1:25,000	Taveta	17	14,000	Irrigation
1956	1:50,000	Kano Plain	6	88,200	"
1962	1:50,000	Kwaso Ngiro	9	88,000	"
1963	1:50,000	Machakos-Yatta	12	597,376	General
1965	1:50,000	Lambwe Valley	5	32,000	Settlement
1959	1:30,000	Sotik	7	7,000	Tea
1958	1:10,000	Msea	11	30,400	Irrigation

1,431,774

METHODS EMPLOYED

The terms detailed, Semi-detailed and reconnaissance refer primarily to the intensity of soil examination on the ground as it may be realized technique for soil surveying now heavily relied on the use of aerial photographs. For reconnaissance purposes, for instance, emphasis is laid more on the use of aerial photographs and ground inspection may only be made at intervals of 1.6 Kilometers. Reconnaissance soil maps are however considered adequate for development planning although they may be inadequate for special schemes like irrigation which require detailed soil maps. Aerial photographs are available for the whole country on a scale 1:50,000 and these have been flown as recent as 1967. Larger scale aerial photographs upto 1:5,000 are also available for certain agriculturally high potential land. Besides aerial photographs, ^{are also available on a scale 1:50,000 for the whole country. Both} topographic maps ^{and} ~~maps~~ may be used as base maps for the survey are available from the Survey of Kenya but the former are on sale at \$4/- each if bought in quantities more than a hundred (or Shs. 7/50 each for quantities less than 100) while the latter are free for government use. The recent aerial photographs are of fair quality and may present little problem if any.

Except for a few Surveys, the soil classification followed for the above outlined investigations does not conform to any international classification. The classification closely follows Scotts scheme of classification which was devised for Classifying soils for the soil map of Kenya ^{See Map sheet 127b} (~~Kenya Atlas~~). A separate paper is submitted outlining the background to this classification system. However, for part of area 5, part of area 6 and area 13, the United States 7th Approximation classification has been used. In all cases the description terminology is that of the United States Soil Survey Manual ^(See enclosed pamphlet No 4) while the analytical methods follow those currently in use at the National Agricultural Laboratories, Nairobi ^(to be submitted separately).

Criteria for Selecting areas for investigation and Scope of work

At present no general soil mapping is conducted. Investigations, as may be seen from areas already mapped, are geared towards areas for specific development. Each year provinces are requested to indicate the areas they wish to be surveyed and the timing of the proposed development. Priorities are then selected in accordance with the Kenya Development plan which is continually revised.

The fact that investigations are directed towards areas for specific development and not general mapping is not to say the latter could not be considered necessary. Directing soil surveys to areas for specific development caters for immediate priorities but should be done so that it fits into a programme for general soil mapping.

The section which is to follow outlines areas which are considered merit investigation in accordance with the current five year development plan. The items are tentatively listed in priority but which comes first will depend on the timing. It need not be emphasized that improved facilities for soil survey is a pre-requisite if the scope of work to be outlined below is to be adequately accomplished. The work that should be covered during the next five years and above is as follows; the page number and the timing refer to the 1970-74 Development Plan handbook.

1. Proposed Rural Development Centres. p.175 Section 6.37.

PHASE I 1969/70

Western Province	- Kakamega District	- Vihiga Division
Nyanza "	- S. Nyanza "	- Migori/Kuria Div.
E. Valley "	- W. Pokot "	- Kapenguria Div.
Central "	- Nyeri "	- N. Tetu Div.
Eastern "	- Embu "	- Nhere Div.
Coast "	- Kwale "	- Kikonyoni Loc.
		- Mwereni Loc.
		- Mkongoni Loc.

PHASE II 1970/71 onwards

Western Province	- Busia District	- Central Div.
Nyanza "	- Kisii "	- Irianya Div.
R. Valley "	- Baringo "	- Northern Div.
	- Mandi "	- " "
Central "	- Murang'a "	- Kiharu Div.
Eastern Province	- Machakos "	- Yatta Div.
	- Meru "	- S. Isenti Div.
Coast "	- Taita "	- Wandanyi Div.

2. Proposed areas for expansion of both major and minor irrigation schemes - p 228 to 232 Sections 8.106, 8.109, 8.112, 8.113 and 8.114.

MAJOR IRRIGATION SCHEME AREAS FOR EXPANSION

Galele to be extended by 360 hectares in 1971/72

Pilot Irrigation Scheme in Kano Plains - 810 hectares in 1973/74 along the Lake Shore.

Yala
Yatta Swamp-various investigation (including Soil Survey) 1970/72

Trials at Taveta to be initiated 1970/72

Major irrigation scheme in Kano Plain if feasibility 1973/74
Studies favourable.

MINOR IRRIGATION SCHEMES

Rift Valley Province

Kajiado: Rosbo
Kimana
Nguruman

Baringo: Lobo
Njemps
Endao
Barvessa

W. Pokot: Selbit
Ortum
Lobut
Wei Wei
Kongelai - proposed new scheme

Narok: Narosura
Saipai

Eastern Province

Machakos: Kiyai

Eastern Province

Machakos: Kifun
Kithite Katino

Meru: Kanjoo

Coast Province

Taita (Taveta): Kimorigo
Kisale Block A.
" " B.
Kamleza
Kitobe

Taita : Muanu
Mkajini

Tana River : Oda
Mesani - proposed new scheme
Wema - proposed new scheme

4. Proposed area for settlement schemes and intensive agricultural development - List supplied by the Provincial Directors of Agriculture.

Rift Valley Province

Kericho District: ^{Location} Sec. 6 and 7 (Chepalungu) for cotton
Kipsitet (Belgut Division) for Sugar cane.

Kajiado " : Central Kaputiei for group ranches
Lower areas of Loitokitok for ranches and crops

Baringo " : Tugen Hills for non-perishable crops e.g. Macadamia
Roboi areas for ranching and short term maize.

Central Province

Kiambu District : Manyu and Ngoliba settlement schemes
Nyandarua " : Kiari Division for wheat, potatoes, pyrethrum and dairy cattle.

Eastern Province

Embu District: Bracken Zone area.

Coast Province

Kwale District: Kinango/Lungalunga 10 mile belt for dairy cattle.
: Nguluku for Sugar Cane block.
: Vavini for Sugar Cane block
: Kikoneni for Sugar Cane block.

3. Proposed areas for land reclamation following tsetse eradication and proposed development of the underdeveloped area - Surveys required during the early part of the plan - p 233.

Nyanza Province

Siaya District: Western Part to be reclaimed following tsetse eradication.

By Nyasaⁿ : Lambwe to be reclaimed following tsetse eradication.

Western Province

Busia District: Western part to be reclaimed following tsetse eradication

Rift Valley Province

W. Pokot District: Kerio Valley to be reclaimed following tsetse eradication.

* Narok District: Presently underdeveloped - to be reclaimed.

Elgeyo Marakwet: Northern part to be reclaimed following tsetse eradication

5. Proposed areas for Farmers Training Centres and Research Stations

Western Province

Bungoma District: Bungoma F.T.C.

Eastern Province

Machakos District: Range Research Station near Chyulu Hills.

Coast Province

Taita District: Taita F.T.C. on 36 hectares Land.

6. Soil mapping of the marginal Coffee areas and the sisal areas with the aim of crop diversification.

7. Soil Survey of the existing Research Stations where required with a view

to correlating the research data with soils.

8. Soil Survey of areas around Forest reserves and plantations with a view to solving future conflicting demands when they are to be expanded. Forests are now found generally in the relatively high potential agricultural areas. Forest and plantation areas are the following -
 Pcs. 283 & 284 Sections 9.3, 9.4 and 9.6.

	Area Under forest as at 1969 (Hectares)	Proposed Expansion during 1970-74 (Hectares)
<u>KISUMU DIVISION</u>		
Latitude $0^{\circ}55'S - 0^{\circ}23'N$ Longitude $34^{\circ}20'E - 35^{\circ}17'E$	3,400	2,100
<u>LONGDIANI DIVISION</u>		
Latitude $0^{\circ}17'S - 0^{\circ}23'N$ Longitude $35^{\circ}52'E - 35^{\circ}47'E$	19,500	5,600
<u>ELBURGON DIVISION</u>		
Latitude $0^{\circ}32'S - 0^{\circ}19'S$ Longitude $35^{\circ}31'E - 35^{\circ}57'E$	14,100	3,300
<u>ELDORET & TURBO DIVISION</u>		
Latitude $0^{\circ}04'N - 0^{\circ}42'N$ Longitude $34^{\circ}59'E - 35^{\circ}30'E$	16,300	13,800
<u>KITALA DIVISION</u>		
Latitude $0^{\circ}08'N - 1^{\circ}14'N$ Longitude $34^{\circ}41'E - 35^{\circ}31'E$	5,500	1,800
<u>THOMSON FALLS DIVISION</u>		
Latitude $0^{\circ}34'S - 0^{\circ}10'N$ Longitude $36^{\circ}05'E - 36^{\circ}41'E$	12,300	4,200
<u>NAIROBI DIVISION</u>		
Latitude $1^{\circ}18'S - 0^{\circ}43'S$ Longitude $36^{\circ}E - 36^{\circ}50'E$	13,300	2,900

	Area Under forest as at 1969(hectares)	Proposed Expansion during 1970-74 (hectares)
<u>NYERI DIVISION</u>		
Latitude $0^{\circ} 31'S - 0^{\circ} 22'N$ Longitude $36^{\circ} 36'E - 36^{\circ} 50'E$	12,400	2,600
<u>SOUTHERN DIVISION</u>		
Latitude $1^{\circ} 31'S - 0^{\circ} 22'N$ Longitude $37^{\circ} 16'E - 38^{\circ} 11'E$	15,400	600
<u>COAST DIVISION</u>		
Latitude $4^{\circ} 11'S - 2^{\circ} 16'S$ Longitude $38^{\circ} 21'E - 40^{\circ} 54'E$	900	300

9. Survey of areas around Game Reserves and Parks with a view to solving future conflicting land use demands when they are to be expanded. The areas to be considered are around the following Parks - page 442 Section 16.36.

Tsavo East
Tsavo West/Chyulu
Meru
Nairobi
Ol Donyo Sabuk/14 Falls
Lake Nakuru
Aberdares/Mt. Kenya
Mt. Elgon
Siaba Hills
Marsabit
Rift Valley Park
Lake Rudolf Park

10. General Soil mapping with a view to obtaining data that may be used for the following:-

- (a) Land capability classification for rational location of various types of development. (Agricultural, Forestry, Wildlife, Recreation etc.). - p.192 Section 8.5.
- (b) Crop diversification - p.224 Section 8.97 and p.250.
- (c) Objective crop research and fertilizer recommendation - page 224 Sections 8.97 and 8.89.

STAFF

Soil Survey work has not proceeded as ^{fast} first as one might have wished because of many problems among which are inadequate staff and lack of funds. Almost throughout the life of soil survey in this country there has always been only one government soil Surveyor with a supporting staff in the way of one technical assistant. The Surveyor was even at one time the driver as well. Nevertheless the Staff position has now greatly improved. There are now one Soil Surveyor, Two Assistant Surveyors (trainees), two Technical Assistants and a driver.

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