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> PETROLEUM INDUSTRY IN THE EAST AFRICAN SUB-REGION

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CHAPTER I

INTRODUCTION

Scope of the Report

1. This report constitutes a preliminary study of the situation of the petroleum industry in the East African sub-region.

The report examines the situation of petroleum industry in the world economy in general and in the sub-region's economy in particular.

It estimates future demand of petroleum products of the sub-region till 1975. On the basis of the anticipated demand it proposes an expansion of refining capacities and the construction of a lubricating oil plant, which, as an integrated industry, would have to serve the whole sub-region.

2. The countries covered by the report are divided into two groups:

			 and the second second	1 C	1.11	1 - A - 1
a)	1.	Ethiop i a				
1. T	1911 - 1913 - 1913 - 1914 - 1914 - 1914 - 1914 - 1914 - 1914 - 1914 - 1914 - 1914 - 1914 - 1914 - 1914 - 1914 -	a in in The State of the State				See gunerador de

- 2. Somalia
- 3. Kenya
- 4. Tanzania
- 5. Uganda
 - 6. Rwanda
 - 7. Burundi
 - 8. Zambia
 - 9. Malawi
- 10. S. Rhodesia
- 11. Madagascar
- 12. Mauritius
- (b) 1. French Somaliland $\frac{1}{2}$
 - 2. Reunion
 - 3. Mozambique

^{1/} These three countries have been included in the study because of their geographical proximity to the sub-region, and possible future economic relationship.

3. Since individual country statistics did not give consumption of petroleum products according to kinds and years it was decided to use: "Overseas Geological Surveys Statistical Summary of the Mineral Industry (Export and Import) as a main source for this information.

The estimates of future consumption between 1960 and 1975 have been made for two separately observed periods, i.e.

a. period between 1960 and 1965 and

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b. period between 1965 and 1957; for the following reasons:

Firstly, data are partly available for the actual consumption in 1961, 1962 and 1963. Secondly, the greater number of East African countries achieved independence between 1960 and 1964 and there are indications that this transition period had adverse repercussions on the rate of growth.

On the other hand, the period between 1965 and 1975 may be regarded as likely to be one of stabilized political and economic conditions in the newly independent countries.

4. The quantities consumed for bunkering of ships and aircraft in a country have been recorded as consumption in that country, and the forecast of consumption of petroleum products also includes bunkering.

CHAPTER II.

SIGNIFICANCE OF PETROLEUM ECONOMY

5. The rapid growth of the petroleum economy is to be attributed, in the first place, to the unique characteristics of petroleum and petroleum products.

6. Its high calorific power (about 10,000 kcal/kg) and easy handling while being transported (simple loading, unloading and transportation through pipelines) have inabled petroleum to replace to a considerable extent the earlier conventional sources of power, i.e., wood and coal.

7. Petroleum has also opened a new era in the chemical industry in providing a series of valuable chemical products, in particular, the olefins obtained as gaseous by-products in refining.

8. A third field covered by petroleum is the production of lubricating oils and greases. The rapid progress of mechanization and motorization has only been possible through the utilization of petroleum products.

9. Though at present a new form of power i.e., nuclear - is in sight petroleum will still remain an important source of power, while its importance as a raw material for chemicals and lubricants will grow still further.

10. Today petroleum products are used in all economic sectors (industry, agriculture, transport etc.) so that petroleum has become one of the most important raw materials of the world economy and its <u>per capita</u> consumption serves today as one of the indicators of the economic potential as well as of the standard of living of a country. Moreover, as a modern army cannot be operative without utilizing petroleum products, petroleum has become not only an economic, but also a first class strategic raw material.

11. The modern history of petroleum began only some hundred years ago (1359 in Pensylvania-USA). Industrial processing (refining) started around 1900 while chemical processing started only some 30 years ago.

Consequently one may justifiably expect further achievements in processing as well as in the application of petroleum and petroleum products.

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12. The growth of the petroleum industry, for the world as a whole, has been among the fastest, as may be seen from the following indicators:

TABLE 1
World economic growth 1938-1956
i <u></u>
server againstance of 1938 = 100 server is a server for a first literation of the server for the server of the
Industrial production
Crude Steel production
Crude oil production
main and Synthetic)
Mertesa Aluminium production a
an a

the second for rubber has increased mainly through the application of petroleum products in Transport, while aluminium is a newer material which game into general use only during and after World War II and therefore shows a relatively higher increase.

Algebraic The share of petroleum (including natural gas) in the world
 energy supplies phase been as follows:
 Starso world as the start of the start

1/ Petroleum Handbook, Shell International Petrol Co. 1959 - page 19.

a	Petroleum Handbook Shell International	19.59		··· • ···
1. 1.1	16 01 01 01 01 01 01 01 01 01 01 01 01 01			
		1920		1956
<u>م</u> ر ال	Coal <u>Marka</u> production of the states	-		
	Petroleum and gas	14%	·.	50%
	Hydro	2%		<u> </u>
	Total	100%		100%
	Coal	2,204		*
	(in million of tons coal equivalent)	Ţ	1960	
		•		*
	Crude oil and gas	•		
	Hydro, geoth. nuclear	321		7%
	Total	4,589	25	100%
c.	United Nations World Energy Supply			an ar
	(in million of tons coal equivalent)]	1962	
	Coal	2,209		48%
	Crude oil and gas	2,341	=	50%
	Hydro	96		2%
	Total	4,646		100%

TABLE 2

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ALC: 100 - 100

The differences in these figures are most probably due to the application of various conversion factors, as is being obvious in the case of hydro-power.

14. In the long run it seems, nuclear energy will take a considerable share in total energy supplies. However, till 1975 it is expected to be modest, while that of petroleum will increase still further i.e., above 50 per cent of total energy supplies.

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15. The above data and indicators show the significance of the petroleum industry in the world economy. They also show that a further steady growth of this industry may be expected.

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an 12000 and 1000 and An easy of the Analysis of the South Constant and 1000 and Analysis of the Analysis of the

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CHAPTER III م موجود با مراجع المراجع WORLD CONSUMPTION OF PETROLEUM ري ۽ مستقدي منظور ۽ مان ۽ 16. World production and consumption of crude oil and natural gas has been as follows: 1/

TABLE 3

			aaree a see a s	
	1938	1946	1956	1963
Quantity in million tons	290	391	869	1,304
Index	100	135	300	450
na seconda de la constance de l La constance de la constance de	j. j.			

According to the above data, world production and consumption of petroleum has increased during the last 25 years by 41 times, or at a rate of about 6 per cent per year.

17. The per capita consumption for the world as a whole was as follows:

Or Barrow

· · · · _

1938	290 million tons 2200 million population	- = ca 130 kg
1946	391 million tons 2380 million population	- = ca 164 kg
1956	869 million tons	= ca 316 kg
1963	2750 million population 1304 million tons	- = ca 408 kg
	3200 million population	- = ca 400 kg

The per capita consumption of petroleum products differs considerally among the countries; economically advanced countries consuming much more petroleum products per capita than developing countries.

TABLE 4

Years 1938, 1946, 1956 source Petroleum Handbook Shell: for 1963 1/Petroleum Times, June 26, 1964.

For instance the USA consumed in 1963 about 3,000 kg of petroleum products <u>per capita</u>, while other industrially advanced countries consumed from 500 to 2,000 kg. <u>per capita</u>.

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18. The per capita consumption in some European countries was as follows:

• · · · · · · · · · · · · · · · · · · ·	(In kg	•)		
Country	1953	1956	1963	
Austria	150	- 250	550	
Belgium	340	540	1,100	si.
France	290	410	820 ⁴	at.
Italy	145	230	730	· · . ·
Norway	530	740	1,200	6 . .
Sweden	750	1,250	2,000	
West Germany	135	255	1,000	
	Belgium France Italy Norway Sweden	Belgium 340 France 290 Italy 145 Norway 530 Sweden 750	Belgium340540France290410Italy145230Norway530740Sweden7501,250	Belgium3405401,100France290410820Italy145230730Norway5307401,200Sweden7501,2502,000

TABLE 5

		(1963)	A: ***	
a. <u>5</u>	outh America		9 ~	e.
	Bolivia	110 kg.		
سابی و محمد است از این ا	Brazil	230-4	a salawa ka ka ka ka	s sak ∎ sat ti na na
	Chile	365."		TE L.
a a constant	Columbia	sigen≉ 270 [™]		
	Paraguay	1946 - 194 <u>7</u> 0 19 <mark>70</mark> 19 ¹¹ - 194		*
	Feru	260 "		

	T.	ABLE 6 (Cont'd) Mariana ang sa	• · · ·
	 	(1963)	······································	
-		(1903)		ta turz nan inanya ta
b .	<u>Asia</u>			
	Burma	40 1	kg.	
inana a sa ana ana ana ana ana ana ana an	Ceylon	108	۱۴ · · · · · · · · · · · · · · · · · · ·	 A state of the sta
•	India	23 ·	11	
a na sana ang kana a	Indonesia	56		
	Jordan	165	21 · · · ·	
	Pakistan	31	9 Q	
 ⟨∑₁) ⟨C₁⟩ ⟨C₁⟩ ⟨C₁⟩ 	Africa (Excluding	the East Afri	can sub-region))
•	Algeria	130 1	kg.	
And an oral and an oral and an	Congo Leo,		11 	
Alter de la Constantina	Chana and states	73	Ft	
· · · ·	Nigeria.	26	Harris (Marine Street	
	South Africa	275	29 2	
	Sudan	45	11	
	UAR	200	1¥	
correlatio	er capita consump n with income per comparative data:	·····	y be observed i	where we are a second
Country	Petroleum con in kg. per ca	sumption 1963 pita	Income US\$ per capita	Year
Austria Belgium Italy Sweden Bolivia Brazil Chile Paraguay Burma Ceylon India	550 1,100 730 2,000 110 230 365 70 40 108 23		831 1,198 618 1,592 96 252 352 126 55 128 73	1961 1961 1961 1961 1958 1958 1958 1958 1958 1961 1961 1961

However, the rate of growth of petroleum consumption <u>per capita</u> as shown in the following countries is faster than that of income <u>per capita</u>. The following data supports this assumption:

Country	Petroleum 1953	consumption kg. 1963	Index 1953 = 100	Inecze 1953	US\$ 1963	Index
Austria	150	.550	367	407	831	204
Belgium	340	1100	324	903	1198	133
Italy	145	730	503	353	618	175
Sweden	750	2000 <u>2000</u>	267	981	1592	162
West Germany	135	1000	741	611	1000	164

ΤA	BI	Œ	8
TA	मम	18	0

20. For the world as a whole the comparative rates of growth of petroleum consumption and of income (GDF) for the period 1950-1960 were as follows:

TABLE 9

World total	Petroleum consumption	Income ¹
	ca 6.0%	

21. A further analysis shows that the consumption of petroleum products is in still closer correlation with the rate of growth of industrialization of a country. The rate of growth of industry between 1950 and 1960 in the above mentioned European countries was as follows: $\frac{1}{2}$

. . .

1/ Source: ECA Tables East Africa Survey.

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TABLE 10

Austria	7.1%
Belgium	4.1%
Italy	9.0%
Sweden	3.3%
W. Germany	10.1%

As will be noted, the above table shows that the countries which had the highest rate of growth of industry had also the highest increase in petroleum consumption (Austria, Italy, West Germany).

22. The assumptions and results obtained from the analysis of petroleum consumption for the world as a whole and of some individual countries are used in preparing the projections for future petroleum consumption for the East African sub-region.

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CHAPTER IV

PRODUCTION AND CONSUMPTION OF PETROLEUM IN THE EAST AFRICAN SUB-REGION

23. The petroleum industry in the East African sub-region is just at its beginning. The first refineries were constructed a little more than a year ago (Mombasa and Mozambique) and there are four other refineries under construction. At present there is no production of crude oil in the countries of the East African sub-region. (Methane gas is exploited from the Lake Kivu in Rwanda). Exploration for petroleum was and still is carried on in almost all East African countries, but up to now without success.

The situation in the individual countries is as follows:

Ethiopia

a. Exploration

24. At present there are three concessionaires to carry on exploration for petroleum and natural gas in Ethiopia.

. . . <u>.</u> .

A German concern, Elwerath, has a concession in Ogaden while Mobil Petroleum (affiliate of Socony Mobil) and Gulf Oil Corporation hold the exploration permits for Eritrea including onshore and offshore area around Massawa harbour. Elwerath started exploration in 1962, Mobil in 1963 and Gulf in 1964. Some test drilling was done in Ogaden but no discovery was reported.

b. Petroleum processing

A petroleum refinery of 500,000 tons/year capacity is under construction at Assab harbour. It is a Government refinery projected and constructed by a USSR firm. Operations are expected to start mid-1966.

c. Consumption of petroleum products

The total consumption of the country is covered via import, and imported quantities of petroleum products have been as follows: (all kinds of products - see Annex I, Table 1): :

		and the second	a dagan mendagan dan dagan dan bagian bagian dan bagian dan bagian dan bagian dan bagian dan bagian dan bagian
t i tong	Year	Tons	
	1950	40,930	
	1951	38,727	
	1952	46,940	
	1953	65,640	· · · · · · · · · · · · · · · · · · ·
	1954	82,076	Second Second Second
	• 1955	66,323	$= \sum_{i=1}^{n} \left(\frac{1}{2} \sum_{i=1}^{n} \left(2$
· · · ·	1956	77,925	steril and prove laws in the second
$\gamma_{\rm eff} = \frac{1}{2} \sum_{i=1}^{n} \frac{1}{2} \sum_{i$	1957	101,985	n a la companya da serie da s
	1958	112,198	 Constraint and a second se
	1959	127,116	
	1960	124,038	
	1961	132,657	

TABLE 11

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According to the records of petroleum companies, sales of petroleum products were as follows:

TABLE 12

		化化化化物 化化化物
Year	Tons	
1962	164,329	
1963	183,847	
		

 $(X_{i}) \in \{1, \dots, n\} \in \{1, \dots, n\}$

It is expected that consumption including refinery fuel will reach about 300,000 tons in 1966 when the refinery will start operations.

The forecast for the years 1967/1970 is as follows:

いた 日本の かいい

TABLE 13

		t for stars.		<u> </u>	
e Alegan di Sara	Year	· · · · · ·	Tons	2	·
$\phi_{1} \in U^{(1)} [\frac{1}{2} + \frac{1}{2} + \frac{1}{2}$	1901		344,000		
	1968	- -	371,000		, sa s
	1969		409,000		
	1970		452 ,0 00		

and the second state of the se

			capita consump	otion was as
follows:				na <u>n</u> a subana 129 - 139 A
			(1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,	
		TABLE 14	· · · · ·	
	Year	Kg.	a sur a transferra	
	1950	about 2.5		
	1960		a second a second s	

and is expected to rise in 1970 to about 18.0 kg.

Total annual consumption in the period between 1950 and 1960 increased by 3 times (from 40,930 in 1950 to 124,038 in 1960) and for the next 10 years is expected to increase again by about $3\frac{1}{2}$ times (to 452,000 tons in 1970). The second definition of the second s

 $(-\infty)_{n \in \mathbb{N}}$, where $(-\infty)_{n \in \mathbb{N}}$, $(-\infty)_{n \in \mathbb{N}}$,

" 9.0

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Somalia

a. Exploration

25. The principal explorer in Somalia is Sinclair-Somal in association with a number of other companies. Three wells were drilled during 1962 and 1963 but abandoned.

Guld-oil received a concession in 1962 and began to explore in 1963.

Mobil Petroleum has been active on its concession in 1963. In . mid-year 1963, total footage drilled from the beginning of work was 30,239 ft.

Processing of petroleum ъ.

At present there is no processing plant in the country and no plans are known for the construction of such a plant.

c. Consumption of petroleum products

All quantities consumed in the country are imported. Unfortunately, there are no complete data for the whole territory comprising today's Republic of Somalia. Imported quantities for the period 1950 to 1960

are only available for the former British territory and for the whole territory from 1960 to 1962 (See Annex I, Table 2).

The consumption (import) of petroleum products for the whole territory was as follows:

* * ·
Tons
19,712
19,838
24,687

Association of the second

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TABLE 15

According to import data, former British Somaliland accounted for about 45 per cent of total consumption (for 1960). Taking this as the basis and using available data for consumption in the former British territory, it is estimated that total consumption of petroleum products in the year 1950 may have been about 12,000 tons.

This would mean that the total consumption of the Republic of Somalia from 1950 to 1960 increased by about 70 per cent; and the per capita consumption from about 7.5 kg. to about 10 kg.

Estimates for the future consumption are not available.

Kenya

a. Exploration

energy and the second state of the second

26. Only one company is known to be exploring in Kenya, i.e. BP-Shell Petroleum Development Co. of Kenya Ltd. Test drillings have been made but no reports on the results are available.

 $= \frac{1}{2} \sum_{i=1}^{n} (i + i) \sum_{i=1}^{n} (i$

b. Petroleum processing

and the second second second second second

The new East African Oil <u>Refinery</u> at Mombase of about two million tons/year capacity started operating on February 21, 1964. It is jointly owned by Shell and BP.

c. Consumption of petroleum products

Up to the year 1963 all the petroleum products consumed in the country were imported (see Annex I, Table 3), and the figures are as follows:

	TABLE 16			3 1
			2	1
Year		Tons		
1950		416,247	,	
1951		598,452		
1952		672,302	· · · · ·	
1953		595,107		
1954		659,120	i na in in i	
1955 in 1955	an an an	737,252		
- 1956	рана. По 1911 г. – К	804,367		an ann an
1957		806,534	n talen 175 - L	• • ₂ -
1958		748,002		,
1959		778,062	· · · · · · · · · · · · · · · · · · ·	
1960)	821,212		ъ.
1961	n an	801,089		
		an that	• 	·

The above quantities include export-bunkering for ships and aircraft supplied in the harbour and airports of Kenya, which ranged from about 100 thousand to about 200 thousand tons per year.

The internal consumption of Kenya (excluding bunkering) is shown in Annex I, Table 3. It amounted 275,301 tons in 1950 and increased to 703,241 tons in 1960. According to the above data total consumption between 1950 and 1960 increased as follows.

TABLE 17

a.	consumption	n including	bunkering =	=	Ъу	about	200%
b.	internal co	onsumption		=	by	about	256%

Consumption per capita was as follows: <u>1950</u> a. consumption including bunkering 60 kg. 100 kg.

40 kg. 88 kg.

b. internal consumption

According to the Statistical Abstract of Kenya net import for 1962 amounted to 880,495 tons and for 1963 to 838,100 tons.

Estimates for future consumption of petroleum products are not available.

· · · · ·

Tanzania

a. Exploration

27. British Petroleum Company has been doing exploration work in Tanzania. No drilling was reported for 1963 but seismic reflection survey was carried out in the Pugu-Msanga area. BP-Shell is the concession holder in Zanzibar. A deep well was drilled and abandoned in 1962. No drilling was reported during 1963.

b. Petroleum processing

An ENI affiliate, Tanganyikan Italian Petroleum Co. (TIPER) was formed in 1963 with the aim of building a refinery at Dar-es-Salaam with an initial capacity of about 500,000 tons/year. The Tanzania Government has option to participate to the extent of 50 per cent in the venture. The refinery is under construction and is exported to start operation in 1967.

c. Consumption of petroleum products

All the petroleum products consumed are imported. Imports are as follows: (See Annex I, Table 4).

Alto Alexandre de la construcción de l

and the second		<u>– Alexandra (</u> 1995), stali s	a a sa
	Year	Tons	
an brê Tet	1950 1951	120,063 107,599	99 - 999 - 944
		130,580 	5
a thir, thurse	1955 to e the sta	204,478	
	1956 1957	239,548	
	1959	294,441	
	1960 1961	302,905 282,383	

. Antonia esta calente autore a canda **TABLE 18**. Considerador estas conservadores da Antonio da Antonio

In Annex I, Table 4, separate figures are shown for Tanzania (Zanzibar and Tanganyika territory). Zanzibar consumption was small i.e. amounted in 1950 to 7,538 tons and in 1960 to 10,758 tons. The above quantities include export-bunkering which was relatively small, amounting to from one thousand to two thousand tons per year only.

According to the above data the total consumption of Tanzania between 1950 and 1960 increased by about 250 per cent, and the <u>per capita</u> consumption from about 15 kg. to about 32 kg.

No forecast for the consumption of petroleum products is available. <u>Uganda</u> Deciding the consumption of petroleum products is available. <u>Uganda</u> Deciding the consumption of petroleum products is available.

28. Surface indications of the presence of oil and gas are found at several localities within the Lake Albert Rift Valley in Western Uganda.

Drilling programmes were carried out some time ago in these areas but without promising results and at present no exploration is underway.

b. Petroloum processing

There is no processing plant in Uganda and no plans are known for the future.

.

c. Consumption of petroleum products

All the petroleum products consumed in the country are imported. Imports were as follows: (See Annex I, Table 5)

	Year	Tons	
	1950	71,050	
	1951	66,106	
	1952	76,843	A
	1953	102,914	
	1954	96,862	instanting a British British An
	19.55	115,856	e Allinder en Berlinder en Berlinder En Berlinder
and a second	1956	117,904	n a the second the second s
in the trade of the second	1957	126,141	
	1958	136,446	
	1959	127,392	
	1960	128,214	an a
	1961	131,754	
		ь.,	$\frac{1}{2} \frac{1}{2} \frac{1}$

TABLE 19

The above figures include export-bunkering (aviation spirit) from 0.5 to 3.5 thousand tons per year. According to the above data the total consumption of petroleum products increased from 71,050 tons in 1950 to 128,214 tons in 1960, i.e. by about 65 per cent, and consumption per capita from about 12 kg. to about 19.5 kg.

No forecasts for future consumption are available.

Zambia, Malawi and Rhodesia

29. As the data for the past (1954 to 1962) are available only for the territory of the former Federation of Rhodesia and Nyasaland it was not possible to obtain separate data for the three countries.

a. Exploration

No exploration has been reported in any of the three territories.

b. Petroleum processing

A seven company syndicate is building a refinery at Umtali (S. Rhodesia), with ownership 42 per cent Shell-BP, 16 per cent Caltex, 15 per cent American Independent Oil (Aminoil), 5 per cent Kuwait National Petroleum Company, 4 per cent Compagnie Française de Pétroles (CFP) and 18 per cent Mobil Oil. Shell will operate the plant which is scheduled to start in 1965. It will have an annual capacity of one million tons.

Crude oil will be supplied from Beira (Mozambique) via a 10-inch 190 miles long pipeline.

No other refinery is at present under construction and no plans are known for construction in the near future.

c. Consumption of petroleum products

All the petroleum products consumed in the three countries are imported. Imports were as follows: (See Annex I, Table 6).

TABLE	20

LARR CL. C. CONSTRUCT

	Year	Zambia	Malawi	· .	Rhodesia	- Pétal
1950	······	42,383	15,558		141,387	199,328
1951		52,928	15,226		177,558	
1952		63,482	18,558		196,056	278,096
1953	a ka ta ja	68,642			186,423	273,810
1954					• • •	5 5 6 8 7 0
1955		. #1	,	e en Dara		378,518
1956	and the second s	11 11 - 11 11 - 11 11 - 11				150 700
1957				· ·		482,705
1958	n de la dúd	tin and such the			States and the second second	. •
1959		*				511,739
1960		130,000 est	. 34,458	est.	370,000 est.	534,458
1961		Not availa				542,247
1962		ŧr				581,452

Consumption for the three countries was separately estimated for the year 1960 in order to make possible projections of future demand.

According to the above data the total consumption of all three countries increased from 199,328 tons in 1950 to 534,458 tons in 1960, i.e. by 270 per cent. Taking the estimated consumption in 1960, the corresponding increase of consumption for the individual countries was as follows:

TABLE	21		<i>,</i>	an ta shekara a s	
الباليات لشخاك ياو	£		·- A.A.		

a. Zambia from 42,383 t to 130,000 t or by 310 per cent
b. Malawi from 15,558 t to 34,458 t or by 220 per cent
c. Rhodesia 141,387 t to 370,000 t or by 260 per cent

The corresponding consumption per capita is as follows:

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It was planned that the Umtali refinery would supply all three countries, and in order to facilitate distribution of petroleum products a pipeline was to be constructed from Umtali to Salisbury and extended to Lusaka.

No official forecasts on consumption of petroleum products by these three countries is available.

Rwanda' and Burundi

A Star Star

30. Almost no data are available for these two countries as all statistical data were recorded together with the Congo (Leo.).

It is not known whether exploration for petroleum is being undertaken, and no processing plants are in operation or planned for the

near future. However, great reserves of methane gas, about 57 billions m^3 are known to exist in Lake Kivu, and are at present being exploited at a small extent for the local brewery (about one million m^3 /year).

There are plans for utilizing the methane gas for the production of fertilizers, and as fuel for various industrial plants, and there is also a possibility of using it in transport. Consequently, in Rwanda and the boardering countries, i.e., Burundi and Uganda, the methane gas could, to a greater or smaller extent, depending on the suitability of exploitation and application, replace the conventional petroleum products.

Consumption of petroleum products for Rwanda and Burundi together has been estimated at about 12,000 tons in 1950 and about 25,000 tons in 1960.¹/<u>Per capita</u> consumption for both countries together was about 3 kg. in 1950 and about 5.5 kg. in 1960.

Madagascar

a. Exploration

31. Exploration is carried on by SPM, a company which, together with French Government's BRP has done extensive seismic and other exploration works, including drilling, but so far without results.

b. Petroleum processing

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At present there is no processing of crude oil, but a company has been formed to build a refinery at Tamatave. According to agreement the Malagasy Government will have a 15 per cent interest, the French Government 35 per cent through BRP, and the remaining 50 per cent will be held by Shell, BP, Esso, Caltex and local affiliatesof C.F.P.

The capacity planned is 600,000 tons per year and the start of operation scheduled for 1965.

<u>1</u>/ According to Banque d'émission du Rwanda et du Burundi No.5, import for 1962 amounted to 30,850 tons of all petroleum products for these two countries.

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	and the second first and a second	and the second
c. <u>Consumpti</u>	on of petroleum product	i <mark>8.</mark> Na Statistica (National Statistica (National Statistica)) National Statistica (National Statistica)
For the past	period all petroleum pr	oduots consumed in the country
were imported. Th	e import was as follows	: (See Annex I, Table 7)
211-5-1-1942 ⁰¹ -1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-	TABLE 23	a de la calenda de la construcción de la construcción de la construcción de la construcción de la construcción La construcción de la construcción d
and a second	Year	Tons
		and the second
	1951), starts ¹ (1	50,000 60,000 73,000
	-//-	1
war yn Alvand ân ^{ar}	1953	88,665 mm Lat. ACCOUNTS
and a state of the	••••••••••••••••••••••••••••••••••••••	
n ∰gan stransfer fin 14 million i Nem N	1956	115,615 and the first state of
	1957	120,361 (1990) 37 at 20
	1958	122,916
	1959	122,916 121,719
	1960	125,953
and an	1961	123,483
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. 31

The consumption for the years 1950, 1951 and 1952 was estimated on the basis of imported quantities in 1948 of 35,216 tons and 88,665 in 1953.

According to the above data total consumption between 1950 and 1960 increased by about 245 per cent, and consumption per capita from about 11 kg. to about 25 kg. According to the country's plan, the anticipated consumption will be 232,000 tons in 1967 and 339,000 tons in 1972. The surplus quantities of the refinery are expected to be exported to Reunion and Comoro Islands (gasoline and keresone) and to Aden and Djibouti (fuel oils). There is no plan to use asphaltic liquid in the Bemolanga region in the immediate future since the possibilities of extraction are still uncertain.

		25		and a second second second second second
	Year	Tons		. etc. k to t
	1950	56,236		
	1951	64,566		
	1952	1990 d., 2000 d. 70,000		
	1953	ere et vind i 75,540 .ar		
	1954	1807-999-00-001-00-0 82,416	· .	
	1955	90,112		
	1956	103,789		
	195 7	115,265		
	1958	131,940		1 - 4
n an an an an Arabana. An	1959	133,499	•	. ``
	1960	152,429		
	1961	145,058	• •	

TABLE 25 and the second secon and the state of the

According to the above data total consumption increased from 56,236 tons in 1950 to 152,429 tons in 1960, i.e. by about 270 per cent, and per capita consumption increased from about 10 kg in 1950 to about 23 kg in 1960. No official forecast for the consumption of petroleum products is available.

The refinery capacity equals three times present consumption. It is not known where the surplus quantities will be disposed of or whether the refinery will work at reduced capacity.

Summary of the situation in the sub-region estreniler de 1. 1. C. 1. Exploration and exploitation

36. Exploration is carried on in Ethiopia; Somalia, Kenya, Tanzania; Madagascar and Mozambique, but up to now there has been no discovery of crude oil. Gas has been discovered in Mozambique and methane gas (reserve 57 billion m^3) is to a small extent exploited from Lake Kivu in Rwanda. Nevertheless, it is believed that some of the prospective

oil bearing areas (See attached map Annex IV) will in the near future start production of crude oil.

Petroleum processing

37. At present there are only two refineries under operation in the sub-region, i.e., one in Kenya and the other in Mozambique, although four others are under construction, in Ethiopia, Madagascar, S. Rhodesia and Tanzania. When these four refineries are completed in 1967, the sub-region will have the following capacities:

	TABLE 26	an sainte Sainte Sainte Sainte Sainte		
l.	Mombasa, Kenya	2,000,000 tons	, started	1964
2.	Umtali, S. Rhodesia	1,000,000 "	11	1965
3.	Tamatave, Madagascar	600,000 "	*1	1965
4.	Assab, Ethiopia	500,ÖOO "	11	1966
5.	Dar-es-Sala am, Tanzania	500,000 "	11	196 7
	.ees Total I landaland (Conduct			
6.	Mozambique	600,000 "	Bolling (Second More Second	1963
e Le regener				

All the refineries will produce: gasoline (regular and premium), keresone and jet fuel, gas and diesel oil, fuel oil and bitumen as well as liquefied gases. The refinery at Untali will in addition produce paraffin and in the future petrochemicals. None of the refineries is producing lubricating oils and greases and other specialized petroleum products which have to be imported. As the total consumption of the sub-region in 1967 will amount to about 3.5 million tons it would mean that there will be considerable surplus in refinery capacity. In order to utilize the installed capacity the refineries will have to look for export outside of the sub-region.

Consumption of petroleum products

38. As was stated for individual countries, all petroleum products consumed in the sub-region between 1950 and 1960 were imported. The total consumption of the sub-region (including bunkering) amounted to 1,015,521 tons in 1950 and was increased to 2,330,603 tons in 1960, i.e. it rose by 2.3 times (see Annex I, Table 10). This means that the annual compound rate of growth between 1950 and 1960 for the subregion amounted to 8.7 per cent. As the annual rate of growth for the world as a whole was about 6 per cent, it would appear that the annual rate of growth of petroleum consumption of the sub-region was higher by 2.7 per cent than the world average. The higher rate of growth of the sub-region is due partly to the initial very low level of consumption. However, this is a good sign showing that the countries of sub-region have commenced to mechanize their economies. When analysing the world consumption of petroleum products it was found cut that its rate of growth is correlated with the rate of growth of GDP in total and per capita. It was further established that the rate of growth of petroleum consumption was faster than that of GDP. The comparative figures for the world and sub-region are as follows (for 10 years period 1950-1960);

TABLE 27

· · ·	Rate of growth of GDF (at current prices	Rate of Growth of petroleum consumption	
World	3.6 per cent	6.0 per cent	
Sub-region	5.4 per cent	8.7 per cent	

This shows that the ratio between these rates of growth was the same for the sub-region as for the world as a whole.

The correlation between GDP per capita and consumption of petroleum products per capita for the countries of the sub-region for the year 1960 was as follows (patroleum consumption excluding bunkering):

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••••••••••••••••••••••••••••••••••••••		GDP per US\$	oapita	Petroleum consumption per capita kg.
1.	Ethiopia	- 40	5 y 18 e	6.5 ····
2.	Sonzlia	51	.e. <u></u> .76	10. 10 July 10
3.	Kenya	78	a ser se	We consider the 88 system to the \cdot of \cdot .
4.	Tanzania	9	e 1 (1	1.00 ± 1.0032 and 1.000 and 1.000
5.	Uganda	64	and the second	19,5 Anna 19,5
6	Rvanda		• . b/	5•5• ³ •• ³ •
7.	Burundi	53	<	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1
8.	Zambia	181	#1	40
9.	Malawi	42		12.5
.10.	S. Rhodesia	211		105 · · · · · · · · · · · · · · · · · · ·
11,	Madagascar	100		
12.	Mauritius	180		. 1. 1997 - 18 80 - 1997 - 19
13.	French Somaliland			80

TABLE 28

The comparison between GDP <u>per capita</u> and petroleum consumption <u>per capita</u> shows some discrepancies, i.e. some countries with lower income have higher petroleum consumption <u>per capita</u> (for instance Kenya with GDP per capita US\$78 had petroleum consumption 88 kg. <u>per capita</u>, while Zambia with GDP of US\$181 had only 40 kg.). Such discrepancies in the case of countries with relatively low consumption may be due to the different economic structure or level of mechanization and to the availability of other fuels, e.g., while Zambia

45

71

83

23

40

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14. Reunion

15. Mozambique

average

consumes large quantities of coal, Kenya consumes very little. The average consumption of about 40 kg. <u>per capita</u> for the sub-region (1960) is about one-tenth that of the world average consumption of 408 kg. (1963). The individual countries' consumption show that Ethiopia, Somalia, Rwanda, Burundi and Malawi are among the countries with the lowers <u>per capita</u> consumption of petroleum products in the world.

CHAPTER V

ESTIMATION OF FUTURE PETROLEUM CONSUMPTION (till 1975)

1 . . . **.**

In the absence of forecasts on petroleum consumption by individual 39. countries and without knowing the requirements of the "end-consumers" of petroleum products, the established correlation between the rate of growth of GDP and petroleum consumption for the past period is used as the basis for estimating future consumption of petroleum products. This, however, implies the availability of GDP rate of growth for individual countries and for the Sub-region as a whole. The development plans of individual countries usually cover a period of five year. The countries of the sub-region have prepared such plans for the years between 1960 and 1970, but none covers the whole period of 15 years (from 1960 to 1975). Since we are now in 1965 and for the period between 1960 and 1965 partial data on realized consumption are already available it would be, perhaps, advisable to make an estimate for the remaining 10 years from 1965 to 1975. A further point if favour of the division of the 15-year period into two shorter periods, one 1960 to 1965 and the other 1965 to 1975 is the fact that most East African countries got their independence between 1960 and 1964. The transition in political and economic leadership seems to have caused a slower rate of economic growth during this short period. On the other hand, the newly independent countries are vigorously attempting to accelerate their economic development.

40. It would therefore, be logical to expect, for the period 1960 to 1965, a lower rate of growth of GDP than was achieved during the decade 1950 to 1960, while for the period 1965 to 1975 the rate of growth should be higher or at least the same as was realized during the period 1950 to 1960.

41. It might be assumed that the GDP rate of growth for the sub-region on the average would be as follows:

· · · · · ·

TABLE 29 (a)

realized for period 1954/60 a. 4.7 per cent b. planned ." 1960/65 4.0 per cent ---planned H 11 1965/75 С. 6.0 per cent **....**

In relation to these planned annual compound rates of growth of GDP the following rates of growth of petroleum consumption for the sub-region as a whole have been estimated as follows:

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TABLE 29 (b)
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		· · · ·		1.	'
					· · · · · · · · · · · · · · · · · · ·
a.	realized for peri	od 1950/60	, a	8.7 p	er cent
Ъ.	projected " "	1960/65		5.0 F	er cent
c.	projected and and "	1965/75	,=	.7.6. I	er cent

Although for the period 1965/75 a higher rate of growth of GDP is expected than was realized during 1950/60, the projected rate of growth of petroleum consumption for this period is lower than was realized during 1950/60. The reasons for such a decline in petroleum consumption in relation to GDP are:

- first, the level of consumption at the end of 1965 will be about 3 times higher than it was in 1950, and the most urgent needs may have been met;
- secondly, it is reasonable to expect some structural changes in the national economies of newly independent countries, which might result in a reduction in the rates of growth of petroleum consumption.

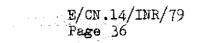
The projection is been presented in Annex I, Table 11 by individual countries and for the sub-region as a whole. The quantities of petroleum consumption for the sub-region at the beginning and end of the chosen periods are as follows:

a.	Actual con	sumption	1950	=	1,015	th.	long	tons
Ъ.	11	11	1960	c	2,330		rt	n
с.	estimated	?1	1965	5	2,985		"	11
d.	ŧt	11	1975	-	6,100		**	11
			_					

TABLE	30
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The average <u>per capita</u> consumption is expected to rise from about 32 kg in 1960 to about 60 kg in 1975.



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REFINERIES CAPACITIES

42. The total capacity of the refineries already constructed and of those which are at present under construction, when completed in 1967 will be about 5.2 million tons, while the total consumption of the subregion is expected to reach about 6.1 million tons in 1975.

43. As was said earlier the consumption of the sub-region in 1967 might be about 3.5 million tons and consequently from then up to 1971 the refineries will have a capacity in excess of the consumption of petroleum products. From 1971, however, new refinery capacities should be established in order to meet requirements in 1975. The required new refinery capacity may be assessed through a comparison of the quantity of petroleum consumption expected in each country and the refinery capacity already installed. and the second second

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s <u>.</u>		<u>1975 th. tons</u>	Installed Capacities 1967
1.	2thiopia	520 ki to second	500 c
5.	Somalia	80	e segundente a contra a
3.	Kenya		2,000
4.	Tanzania	1,450 900 - burneda	500
5.	Uganda	350	enten 1947 de la tradiç <mark>a</mark> de t
б.	Rwanda, Burundi	n n 80 . solda	
	Zambia	e α. μ. τα τ 550 <u>μ</u> ατατάζει μα	n al an
8.	Malawi	100 mar 21	an a
9+	S. Rhodesia		1,000
10.	Madagascar	420	600
. 11.	Mauritius	1	astronom to da 🛶 teo
12.	French Somaliland	20	an an tao amin' an 🖅 🕁 S
	Reunion	The sector and sector and	ຄະ. ອະຊີ່∧ີ່,ລະກະເຊຍຫຼະດາ ເ ົົ້ ວ.
14.	Mozambique	410	600
	Total	6,100	5,200

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According to the above table, the requirements for the extensions and/or construction of new refineries, might be as follows:

The Dar-es-Salaam refinery might be extended in the year 1972/73 by an additional 0.6 million tons; Zambia might build a new refinery in the year 1972/73 with a capacity of 0.6 million tons; additional new total 1.2 million tons; installed earlier = 5.2 million tons; by 1975, total available would be 6.4 million tons.

44. With these capacities the whole demand of the sub-region (expected to amount to 6.1 million tons in 1975) would be supplied. Of course by 1970 the prevailing conditions might require other solutions, since actual consumption up to then and the expected trend of consumption as well as advances in technology might influence the position. In particular, the establishment and capacity of a new refinery in Zambia will depend on the relation prevailing at the time with Rhodesia and Katanga. There might be a possibility of extending the Umtali refinery capacity (especially if the pipeline is constructed to Salisbury and on to Lusaka). There might be also an advantage in constructing a refinery which would cover the demand of Zambia and Katanga, in which case a bigger capacity (and cheaper per ton of production) could be constructed.

45. A separate problem is the supply to other inland countries, i.e., Uganda, Rwanda and Burundi which together will have in 1975 consumption of about 430,000 tons. These countries could be best supplied from the Mombasa or Dar-es-Salaam refineries, since it does not seem to be economical to construct a new refinery for them. Perhaps the most economical solution for those three countries would be to find a way of increasing consumption of methane gas from Lake Kivu, instead of importing petroleum products. Finally, the construction of the new refineries could be influenced through discoveries of crude oil on one or more of the respective oil fields.

46. It was mentioned earlier, that the refineries which are constructed or are under construction, will produce common petroleum products, while highly valuable products like lubricants and aviation gasoline as well as other specialized petroleum products will not be produced.

The reasons for this are the low quantities consumed and the relatively high investment costs of the installations for producing these products. For this reason, collaboration among the refineries of the sub-region should be sought in order to achieve a specialization in production and exchange in the kinds of petroleum products manufactured. With the same object it is proposed that a lubricating oil plant should be established as an integrated industry to meet the whole demand for lubricants in the sub-region.

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$(\mathbf{r}_{1}, \mathbf{r}_{2}, \mathbf{r}_{3})$. The constant of the set of \mathbf{C} $\mathbf{H}_{\mathbf{A}}$ $\mathbf{P}_{\mathbf{T}}$ $\mathbf{E}_{\mathbf{R}}$, $\mathbf{V}_{\mathbf{T}}$ $\mathbf{I}_{\mathbf{T}}$, and the set of the se

INTEGRATED JUBRICATING OIL PLANT

March March 199

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47 Lubricants are highly valuable and highly priced petroleum products. No running of engines is possible without lubricants and/or greases, and the prices of lubricants are on the average about five times higher than those of petroleum fuels (gasoline, kerosene, gas oil). It is tolay established that due to costly machinery and production processes, a minimum economic size for a lubricating oil plant is from 75,000 to

80,000 tons capacity per year. The investment costs for such a plant are estimated to amount to about US\$ 15 million. (This investment is equal to the construction cost for a marinery of about 500 to 600 thousand tons per year capacity).

48. In 1960 all the countries of the sub-region consumed about 66 thousand tons of lubricating oils and greases; the consumption-by individual country ranging from one to maximum 14 thousand tons per year. Logically, no country will find it economical to construct its own lubricating oil plant. However, consumption is growing and in the near future there will be a possibility of establishing a lubricating oil plant for the sub-region as a whole, provided that all countries of the sub-region agree to buy lubricants from this plant.

Consumption of lubricants

49. Annex I, Table 12 shows the realized consumption of lubricants according to years and countries for the period 1950 to 1960. The total consumption of the sub-region amounted in 1950 to 36,775 tons, reaching 66,126 tons in 1960. According to this, consumption in ten years increased by about 180 per cent or at an annual compound rate of growth of about 6.5 per cent. For petroleum products over the same period the rate of growth was 8.7 per cent.

50. The projection of the future consumption of lubricants may be made on the same basis as for all petroleum products. However, such a projection should be controlled by the proportion which the consumption

of lubricants bears to that of other petroleum products. It is known that lubricants are consumed in proportion to the consumption of socalled "engine fuels" i.e. gasoline, power kerosene and gas oils, or in proportion to that of all petroleum products. For the world as a whole less than two per cent of all petroleum products made from crude oil are lubricants. This percentage varies, however, from country to country depending on economic structure and the kind of other petroleum products consumed. For instance, a country not having coal and consuming proportionally more fuel oil (furnace oil) will consume as a percentage less lubricating oils than one which uses coal as fuel.

51. Projection on the basis of realized rate of growth in the same way as for all petroleum products, would be as follows: (for the sub-region as a whole).

		TABLE 3	2	$(1-1) \hat{C}_{ij}^{(1)} = (1-1) \hat{c}_{ij}^{(1)}$
	Per	iod	All petroleum products	Lubricants
	a.	realized for period 1950/60	8.7%	6.5%
*	Ъ.	estimated for period 1960/75	5.0%	2.5%
	c.	estimated for period 1965/75	7.6%	4.0%

Annex I, Table 13 shows the comparative figures included in the projection for all petroleum products and for lubricants in total for the sub-region and for individual countries. According to Annex I, Table 13 the total consumption of lubricants for the sub-region at the beginning and end of the various periods will be as follows:

TABLE 33

· · · ·				
	a.	realized at 1950	=	36.7 thousand long tons
	b.	realized at 1960	=	66.1 thousand long tons
•	C.	estimated at 1965	_ =	74.0 thousand long tons
	d.	estimated at 1970	=	91.0 thousand long tons
	e.	estimated at 1975	=	110.0 thousand long tons

52. Annex I, Table 13 shows that the consumption of lubricants in 1950 amounted to 36.7 thousand tons, compared with 1,015 thousand tons for all petroleum products or about 3.6 per cent of the total. In 1960 the consumption of lubricants was 66.1 thousand tons or about 2.8 per cent of that of all petroleum products. The share of lubricants in the total consumption of petroleum products has fallen and the reason for this is the relatively faster consumption of so-called "black petroleum products" (diesel oils, fuel oils) than of so-called "white products" (gasoline, kerosene). For the world as a whole the demand for white petroleum products has grown between 1938 and 1956 by two and three-fourths times, while that of black products require less lubricants, it follows that the share of lubricants in total petroleum products consumption has diminished.

53. Such a development has been forecast for the sub-region as well. In order to be as realistic as possible the lowest possible rate of growth for lubricants has been anticipated, namely 2.5 and 4.0 per cent for the periods after 1960, compared with the actual rate of 6.5 per cent between 1950 and 1960. On this basis, the share of lubricants in total petroleum consumption is as follows:

	Period	All petroleum			icants
,	1 01 404	prod. th. cons. in	tons	cons. in	<u>th.t.%</u>
	a." estimated for 1965	2,985	8 - A.	74	2.5
	b. estimated for 1975	6,100	на, 19 ⁴	110	1.8
	(actual for 1950 _ 3	.6% and 1960_2.8%)			na an a

TABLE 34

In spite of these estimated low rates of growth, consumption in 1970 will reach about 91 thousand tons, which would allow the construction of an economic-size lubricating plant.

1/ Petroleum Handbook Shell Inter. 1959.

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Lubricating Oil Plant

54. At present all requirements for lubricants for the sub-region are supplied from Europe, mostly from England. For the time being there is no lubricating oil plant on the whole continent of Africa (this year one plant will come into operation in the UAR) and all lubricants are imported from outside. There is a plan to construct a lubricating oil plant at the Durban Refinery which is expected to start operation in 1968. It is not known what the capacity of that plant will be, but South Africa is consuming between 120 and 150 thousand tons of lubricants per year and it may be presumed that it will be somewhere between 150 and 200 thousand tons, in order to meet the growing demand. It is, however, assumed that for political reasons no supply of lubricants for the sub-region from this source may be anticipated, though this situation may change with time. It is reasonable, therefore, to plan the construction of a lubricating oil plant which will supply all the countries of the subregion, and it would also be reasonable to construct such lubricating oil plants in either sub-regions of Africa where consumption may justify it.

Capacity

55. It has already been stated that in the year 1970 a consumption of about 91 thousand tons for the sub-region is expected. This would mean that in 1968 the construction of a lubricating oil plant could be started with a capacity of about 100 thousand tons per year to meet the growing requirements in coming years. $\frac{1}{2}$

Location

56. Lubricating oils are produced from the residue of vacuum distillation in a refinery, and a refinery having a distillation plant and producing a sufficiently great quantity of residue would be a suitable place, from the technical point of view, for the production of lubricants.

^{1/} In case co-operation with Rhodesia and Mozambique should not be possible for political reasons, supplies to the Sudan (which will consume about 17 thousand tons in 1970) could be considered.

For economic reasons it is also advisable to construct a lubricating oil plant near its raw material supply in order to avoid transport costs. A third element that has to be taken into consideration are the transport costs of the finished product to the consumers. The sub-region consists of countries of which only a few are land-locked; the majority being located along the sea. Therefore, the location of a lubricating oil plant on the ccast is to be preferred not only from the point of view of accessibility to the various markets but also because of lower costs of sea transport. It may be observed that out of six refineries in the sub-region, five are located on the coast.

57. Practically all the refineries situated on the coast and having distillation plants might come into consideration for the location of the proposed lutricating oil plant. However, the refineries situated in the centre of the sub-region (Mombasa and Dar-es-Salaam) and which have also communication lines with the land-locked countries (Uganda, Rwanda, Burundi and later with Zambia, when the railway line is completed) will have advantages in comparison with the other refineries, for the transport cost of lubricants and greases, (usually delivered in barrels and tins), is quite high.

The site of the plant could be determined:

- (a) by the participating countries;
- (b) on the basis of the detailed investigations undertaken as part of a project-study to be elaborated in accordance with the directives of the participating countries.

Financing

58. It is proposed to build the lubricating cil plant as a subsidiary plant of a refinery situated on the coast of one of the countries of the sul-region and consequently, the construction and financing of the plant, could be undertaken by the owner or owners of this refinery. Another alternative could be to form a new company which would buy feedstock from the refinery and would undertake the construction of the lubricating plant in the vicinity of the feedstock supply (refinery).

The partnership of one of the petroleum companies having its distribution network in all the participating countries would be desirable, however, in order to facilitate the sales of lubricants.

.59. The investment required for a lubricating oil plant of 80 to 100 thousand tons per year capacity could amount to from US\$ 15 to 18 million.

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CHAPTER VIII

ESTIMATE OF BENEFITS TO THE SUBTREGION STREAM AND STREAM Investment 60. The total investment involved is estimated to be as follows: 1.2121 for the refineries already constructed or under construction (a) ···] . of about 5.2 million tons capacity = about US\$ 125 million. anadar ing kara tan ta (b) for new refinery constructed (one extension and one new) about 1.2 million tons = about US\$ 30 million. (c) for new proposed lubricating oil plant of about 80-100 thousand tons capacity = about US\$ 15-18 million. Total about US\$ 170-173 million. Gross-output and Value-added: . YA - 61. The gross-output and value-added for the existing and proposed plants, working at full capacity is estimated to be as follows: (a) refineries with capacity of 6.4 million tons . . at US\$ 25 per ton on average = about US\$ 160 million. (b) lubricating oil plant of about 90,000 tons = about US\$ 12 million. capacity at US\$ 130 per ton

Gross-output total about US\$ 172 million. Material costs <u>about US\$ 122 million</u>. Value-added total about US\$ 50 million.

Employment

62. When in full operation, the existing and proposed plants will provide employment (direct) for about 4,500 people, distributed approximately as follows:

- chemical engineers about	100
- mechan, & elctr. engin. about	100
- economists about	100
- technicians about	300
- qualified workers about	400
- semi- and unqualified about	3,500

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Indirect employment connected with the operation of the plants could amount to an additional 1,000 people.

Foreign currency savings:

63. The financial arrangement for all the plants should not come dominantly from foreign sources andwould entail repayment of loans and/or export of profits. It will also be assumed that all crude oil is supplied from outside the subregion as well as the bigger part of chemicals and maintenance materials.

Gross-output assumed equal to the c.i.f. value of imported products = about US\$ 172 million.

1997 - 1997 -	- supply of crude oil and other materials
X	from abroad about US\$ 115 million
An park we consider the second s	export of profit about US\$ 20 million
-	- salaries to foreign personnel and other about US\$ 5 million = <u>about US\$ 140 million</u> .
	Savings about US\$ 32 million.

After the repayment of foreign loans, and should some of the countries find their own crude oil, the savings in foreign currency would be greatly increased.

Formation of Petroleum Institute

64. The petroleum industry is known to be highly profitable with the highest profit rates obtained in the sphere of crude oil production and relatively lower rates in the refining and distribution of petroleum products.

The modern petroleum industry embodies an intricate and world-wide integration of closely related activities, each responsible for different phases: exploration, exploitation, refining, storing and distributing, i.e., it shows a very strong vertical integration of all activities connected with petroleum. In the world there are about seven great petroleum concerns which have in their hands about 90 per cent of the petroleum industry outside the centrally-planned countries.

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However, there are today more and more "out-siders", i.e., small petroleum entrepreneurs which own oil fields, refineries or distribution networks in all parts of the world. In addition, all the crude oilproducing countries are today asking for an increased share in the petroleum economy.

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65. Being aware of the importance of the petroleum economy many countries have their own petroleum institutes which are studying the situation in the world and in their own country in order to promote this industry and obtain corresponding benefits.

66. For the time being no country of the sub-region has a petroleum institute, and therefore it is proposed to establish one in the sub-region which would perform the following tasks:

- (a) follow and co-ordinate exploration works;
- (b) initiate new explorations;
- (c) prepare and advise on exploration contracts;
- (d) in the case of gas and crude oil exploitation advise on the best method of utilization;
- (e) prepare and advise on the contracts for crude oil supply to the refineries;
- (f) study and advise on the economy of crude oil or gas processing, (collaboration and specialization);
- (g) advise on the location of new plants, construction and supply of machinery and equipment;
- (h) advise on pricing and distribution of petroleum products.

67. The establishment of one petroleum institute does not exclude, of course, the possibilities of the establishment of another such institute if an individual country should find it necessary.

63. The staff, specialized in the petroleum industry, proposed, initially is as follows:

- 3 geologists
- 3 chemical engineers
- 3 mechanical and electr. engineers
- 5 economists specialized in various spheres of petroleum economy
- 16 other technical and administrative staff
- 30 Total

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CHAPTER IX

SUMMARY

69. With the progress and modernization of the economies of the countries of the East African sub-region, the importance of the petroleum industry is increasing. For the period 1950 to 1960 the actual annual compound rate of growth of petroleum consumption amounted to 8.7 per cent, and it was higher by 2.7 per cent than the world average (6 per cent). The total consumption of petroleum products for the sub-region has increased from 1,015 thousand tons in 1950 to 2,330 thousand tons in 1960 or by 2.3 times.

70. It is expected that a slower rate of growth of petroleum consumption will obtain for the period 1960 to 1965, namely, 5.0 per cent, which would bring total petroleum consumption in 1965 to 2,985 thousand tons.

71. A higher rate of growth of petroleum consumption is expected for the period 1965 to 1975, i.e., 7.6 per cent which will bring total consumption to about 6,100 thousand tons in 1975.

72. The refinery capacity in the year 1967 will amount to about 5.2 million tons while the consumption of the sub-region will be only about 3.5 million tons. This will necessitate the sale of refinery products outside the sub-region in order to secure economies of production.

73. After 1970 new refinery capacity should be constructed. An extension of the Dar-es-Salaam refinery and the construction of one new refinery in Zambia is proposed so that the total refinery capacity of the sub-region at the end of 1975 will amount to about 6.4 million tons and will be able to cover all the demand.

74. An integrated lubricating oil plant is recommended which will cover the total demand for lubricants in the sub-region. The capacity suggested is from 80-100 thousand tons, depending on the number of participating countries, and shall be operative in 1970. The investment cost is estimated to be from 15 to 18 million US\$.

75. At the end of 1975 when the refineries should have a capacity of 6.4 million tons per year, and the lubricating oil plant one of about 80-100 thousand tons per year, the petroleum industry should make the following contribution to the economy of the sub-region:

· · ·

(a)	total investment of aboutUS\$ 170 to 175 mil.	
(ъ)	total gross-output of aboutUS\$ 172 million	
(c)	total value-added of about	
(d)	total foreign currency savings aboutUS\$ 32 million	
(e)	total direct employment of aboutUS\$ 4,500 people	

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76. In order to promote the petroleum industry and to establish the necessary co-operation among the countries and industries of the sub-region, it is proposed to establish a petroleum institute which will employ about 30 professional and administrative staff.

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Table 3 K E N Y A Import = Consumption

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Table 4 TANZANYA - IMPORT = CONSUMPTION

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2.Mctor Spirit 40,839 37,565 41,241 49,274 52,404 53,316 65,514 75,019 72,204 66,926 F4,065 3.Kercsene 9,956 17,446 19,788 17,196 17,872 24,706 21,093 30,926 25,429 30,351 29,741 4.Gas. diesel, fuel 52,258 36,556 49,609 54,876 63,798 96,829 125,586 145,554 172,645 138,339 184,033 5.Lubricating oil 5,233 4,964 9,212 2,746 4,239 7,234 5,285 4,716 6,320 4,886 6,441 6.Greases 425 266 588 453 261 412 448 374 503 506 381 7.Petr leum Jelly, wax 25 23 56 20 34 72 75 43 75 62 25 5.Bitumen - - 4,246 7,165 7,727 4,630 4,237 5,367 3,960 - - 112,525 100,130 122,492 128,378	
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5. Lubricating oil 5,233 4,984 9,212 2,746 4,239 7,234 5,285 4,716 6,320 4,886 6,441 6. Grenses 425 262 588 453 261 412 448 374 503 506 381 7. Petroleum Jelly, wax 25 23 56 20 34 72 75 43 75 62 25 5. Bitumen - 4,246 7,165 7,727 4,630 4,237 5,367 3,960 - Total 112,525 100,130 122,492 128,378 144,257 195,011 229,243 264,878 264,137 249,611 292,147 ZANZIBAR - INPORT -	30,636
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Total 112,525 100,130 122,492 128,378 144,257 195,011 229,243 264,878 284,137 249,611 292,147 ZANAIBAR - IMPORT	
ZANJIBAR - IMPORT 1.Aviation & Motor Spirit 2,561 3,339 3,427 354 3,810 4,174 4,303 4,235 4,043 3,780 4,155	7,699
1.Aviation & Motor Spirit 2,561 3,339 3,427 354 3,810 4,174 4,303 4,235 4,043 3,780 4,155	272,266
1.Aviation & Motor Spirit 2,561 3,339 3,427 354 3,810 4,174 4,303 4,235 4,043 3,780 4,155	
	• • • • • - •
2.Kercsene 2,416 2,897 2,796 3,144 2,865 3,214 3,541 3,595 3,031 3,241 3,266	4,034
	2,372
3.Diesel, ruel pil 2,561 1,233 1,865 2,259 748 2,079 2,461 2,996 3,230 3,599 3,337	711, د3.
Tobal 7,538 7,469 8,088 5,757 7,423 9,467 10,305 10,826 10,304 10,620 10,758	10,117
TANZAN YA-IMPORT	
Total 120,063 107,599 130,580 134,135 151,600 204,478 239,548 275,704 294,441 260,231 302,905	282,383
	and a second
TANGANYIKA-BUNKERS	1499000 + . 38 (49) Long
I.Aviaticn Spirit 897. 503. 763. 22 1,240. 610. 414. 831. 818.	272
2.Fuel xil 119: 668: 1.428; 1.507: 661 50 84; 13 6 632 224	1_245
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Scurce: Overseas Geological Surveys Statistical Sumhary - For 1963 Tanzania import Statistics	

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E/CN.14/INR/79 Annex 1

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Table 5

UGANDA - IMPORT - CONSUMPTION

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-	1950	1951	1952	1 95 3	1954	1955	1956	1957	1.958	1959	1960	1961	1962	1963	1964
·	1,842	1.734	2.149	4,346	4.538	6.875	4,187	4.269	4.540	3.407	3.341	3.703	3.768	5,400	
	1					i i	54,997	•		1 1	1	1	•		
		ř I					22,801	ť							*****
	30,014			. 1			30,536		1	30,612					
	1,964	2,422	2,541	2,316	3,560	4,110	3,590	3,245	3,745	3,648	3,671	3,544	3,797	4,017	
	137	167	159	193	259	298	404		339	422	419	302	362	444	
fin.	13	21	31		61	52	43	51		70	85	93	126		
«					<u> </u>	1,914	1,346	3,647	4,046	2,091	277	4,568	1,755	c 67	
	71,050	66,105	76,043	102,914	96,062	115,056	117,904	126,141	136,446	127,392	128,214	131,754	130,061	177,245	4 c.m.no w 1070
*** ****	· · · · · · · · · · · · · · · · · · ·	••••••	nanalasya (daamaaling mila – fa sodila (gila mila / ang	, 4-4400		Alan 1977 - Aven Mar Affri - Alan Sa a Ma A Angel - Angel	99 (1999) - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1	n X na -na huno hu na na na	ana shee dal dan oo ay shaqaanaa	- 18	annanda rayaligina giro yang ya mara naka yang k	anna 1967 (ha 1997 - Juan 1974) a sharanna Ar s-1967 (h. 1967 - Juan Albhaither—ar		nihanimaan istaalin yhyyse van	1997 - 19
	1,568	724	1,604	346		anninent - Ton - Ann Sannin -	2,788	3,631	3,213	2,002	2,291	3,585	n.a.	6 ali - Marijaki — Miya Ali I, Miya Ali I, Miya Ali Miya - Marikatika Miya I, Miya - Miya Ali Miya - Marikatika Ali I, Miya - Miya Ali Ali Ali	14 - 14 - 2 Jan, Jan, Jan, Jan, Jan, Jan, Jan, Jan,
••••••••••••••••••••••••••••••••••••••	e antere encodina alte del anciente		and a second and a s	-195	Martall	alarahilan diri aras dalahilan di isar	nik - Happellin ak mangali - Pri dy	n - na - Na - John - na - marandin - Ma na - marangi I. Jama Marangi - Marangi	ante de la companya d	9 au 2017 - Alexandra an Alexan - Tanana 19 au 2017 - Alexandra an Alexandra - Tanana	tai tai an	1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -			f del - angle dans solo e concer
B WHIG:														1997	niversite the second second
	Surveys	ł	oal Sum	ary			ti Birdi Birz (1997). Mana Miriy dadihi Shaya dari		*		All-de - Sta n M. 196 Anne sender, sinn		1997 - African - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 19		
TUDC	rt Stati	STICE		46.5. WAY 41-17 (80%) 190-1500/WWW.Austad			anna airean airean dhe Mairis a'd an ann a dhe a	a, 1944 vatta 200 V alko val avalvada				inter andre attende for titte anne destate saidt			
alla andre Saltannete agging			*****	, MALE MAY IT ME M. M. MARY MARY AND			salatasaline dan 2002 salah sala salah dalah salah	and and an and an analysis and			andarian ana ana sana ana a	ter - Marcalita, che Lantro alle cominante i	-aft- aranya, <u>mma (0)</u> ////////////////////////////////////		

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Table 6

ZAMBIA, MALAWI, S.RHODESIA Import = Consemption

Long tons

1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
25.582	32,720	36,229	40.043		, <u></u> , <u></u> _, <u></u>		-							
5,582	6,886			.	<u> </u>		anago de anteces en a				an (1997) - 1997 - 19			
5,677		12,449	a. segnet a'tot i vviad											
2,421	3,337													
3,121	1,640	4.672	1,341										 	
42,383	52,928	63,482	68,642							170,000		1		-
		-				 	4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1							
· · · · · · · · · · · · · · · · · · ·				-	 	1 1 1								
7,938	8,388	9,405	9,964	-										ļ
2,188	1,362	2,052	2,299	-	, , ,	((a , .			
4,525	4,640	6,031	5,653	1960, 197 - 1969 (1970), 1970 (1970) (1970)	ra, annals braissaí ar a	(nite and the second sec				ng saka ng mgangkang ang mga	· · · · · · · · · · · · · · · · · · ·		
907	C28	1,070	829					· · · · · · · · · · · · · · · · · · ·			na ang kumanakusa sa sa sa			
15,558	15,226	18,558	18,745	و بېر د د بوهنمو د هو او		; 	-			<u>34,458</u>			general films for the star	• • • •
							n./ n. a = +a	· · · · · · · · · · · · · · · · · · ·			-		1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	
·				·						40° 40-40-40° 40-100/84 40°		a	100-100-100-10-10-10-10-10-10-10-10-10-1	
4,602	6,526	9 , 491	6,269	11,209	12,552	12,541	12,331	10,944	<u>1೧,062</u>	11,486	10 , 267	9,417		
30,449	91 , 600	99,341	103,577	1 <u>75,29</u> 8	188,216	215,328	221,074	240,589	239,523	237,895	244,723	240,642		ļ
19,157	26,513	27,634	26,904	38,935	38,598	41,494	36,546	40.601	50,406	59 , 919	68,996	77,699	-	
20,018	26,285	2°,327	35,338	74,202	91,197	146,949	163,563	182,554	164,364	171,853	180,180	199,165		
6,972	<u>8,519</u>	11,494	6,342			17,502						21,153		+
26C	402	851	n.a.	1,417	2,243				2,063	2,050				
513 9,410	467	482, 10,436	520 7,473	<u>41</u> 16,293	743	<u>1,090</u> 22 001	ام هد. کا استخد است. ا	23 400	<u>1,210</u> 25,776					
<u>74.0</u>	177,55			_10,2.90	26,457	22,801	<u>426, 27</u>	<u></u>		370,000				t

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Table 6 ZAMBIA, MALAWI, S.RHODESIA

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ORLER F. DERATION		E 1 European an ann anna an	1977 F. 12 (20 - 14)	1			an an annual annat in a					
Tctal	199.328	245,712	278,096	273,811	334,438	378,510	459,700	482,705	520,247	511,739	534,4 58	542,24
mendada manaka napragamengan gangala amening sa karanga narang nara seri se se se se na na ang ang ang ang ang	. 2. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	l han an an ann an an an h		9. / / M X X A		1430 M. (1990) 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990	and the of the distance of	 	19. /		ی به به بو به سو مواجه	
naanta kan ha ambabbaa mayaan dagaad daraat in	and the second s	a dinamentina an ana ana an di t			nany zana - anitag sayin za alama nakan saha	ana an ing an an ing ana a	ан к. н. а. н. н. н. т.	5 4 44 1 40 - 20 40 - 40 - 10 - 10 - 10 - 10 4	a mitar sa dan kalifan i nakar angala 1988 da sina 5 mm		n nimeny e isje	*
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niz Normanie – Mitania aprezinau da i vari biti kar βri atri ar ily initi atri atri atri atri ar vanas specian ni n	in companies and accordination of the second s			• • • •. • •		fa	1997 - 1997 - 1977 - 19	n, p. e. k. m. e. wo. k ≸)		an ar an yang a	
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Scurce: Overseas Gerlogical	Surveys	statisti	oal Summ	, 177	and any market a second contraction of		¶	.	n 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	• • • • • • • • • •		1 ↓ ∦ • • • • • •
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E/CN.14/INR/79 Annex 1

Long tons

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 Table 7

 MADAGASCAR - IMPORT-= CONSUMPTION

1950	1951	1952	1953	1954	1955	1956	1957	1958	1,959	1960	1961	1962	1963	1964
			9										· · · · · · · · · · · · · · · · · · ·	
	1		3,901	5,718	5,641	6 , 189	8 , 269	۵,044	5,245	5 , 219	5,611	4,492		
			43,122	41,388	47,662	<u>49,777</u>	141و47 _	<u>50,114</u>	48,226	51,522	<u>51,533</u>	<u>. 54,354</u>	·* .	
			11,917	12,099	11,013	15,471	12 , 768	16,730	15,299	17 , 236	16,972	17,710		
			16,344	22,419	26,614	29,188	. 33 . 575	<u>39,415</u>	43,102	41,495	38,832	46,105		
			3,382	2,501	2,635	<u>787</u>	203		806	656	1,093			
		-	5,800	2662و 2	<u>3,886</u>	5,158	5,436		• • • • • • • • • • •	5 <u>75</u> .				L
				5,348	7,720	8 , 741	12,485	3,639	3,927	4,104	•			
			48	1	162	79	178	80	25	-22	117_	<u>761</u>		
			11	20		7	10	a ha antina a tanàna dia				21		
	-		418		and start design				وكالأكاف المحادة المحادة المحادة				ay she can say the same	ļ
50,000	60,000	73,000	88 , 665	93,720	105,438	115,615	120,361	122,916	121,719	125,953	123 , 483	133,942		<u> </u>
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	<u></u>	· · · · · · · · · · · · · · · · · · ·	*****		adaaadiyahaa shidahadi d	1999 - W. (1994 - March 1997 - Ma	1. A. 1. A. 1. V. 1. A. 1.				****			· - · ·
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Table 8 MAURITIUS - IMPORT - CONSUMPTION

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IMPORT	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961
alian (1 - 10 - 10 - 10 - 10 - 10 - 10 - 10												
1.Aviation Spirit	163		604	939	705	1,171	1,191	1 , 389	2.279	1,676	2,245	1,293
2.Motor Spirit	10,727	11,316	15,186	16,264	18,951	16,682	25,802	24,275	24,680	20,426	27,559	12,109
3.Kerosene	3,172	<u> </u>	2,824	2,776	3,726	3,004	4,525	3,548	3,590	3,034	4,518	4,158
4.Gas, diesel, fuel	8,679	9,223	16,089	17,231	14,229	12,785	22,992	27,699	22,274	28,058	22,576	39,861
5.Inbricating oil	1,162	1,330	<u>1,493 ا</u>	1,507	1,667	1,23	1,424	1,444	1,586	1,436	<u>1,779</u>	2,065
6.Greases	116	168	165	176	136	137	150	109	97	156	103	147
7.Bitumen	1,712	826	1,355	1,887	1,498	2,474	1,613	4,766	3,635	2,040	5,003	<u>از 4,06 </u>
Total	25,731	26,053	<u> </u>	40,780	40,912	37,536	57 , 697	63,230	59,141	65,634	63,789	63,713
												┢╺╶┈╾
												f
												<u>ا</u>
BUNKERS												F
1.Gas, fuel, diesel	3,975	4,642	4,466	8,413	5,266	7,506	<u>8,988 ک</u>	. 9 . 797	6,023	6,312	9,425	12,556
2.Aviation Spirit				917	1,160	990	986	1,084	1,596	<u>1,866</u>	1,793	2,165
Total	3,975	4,642	4,466	9 , 33)	6,426	8,456	10,974	10,881	8,719	8,178	11,218	14,721
							an and a star and a star and a spectrum.					
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INTERNAL CONSUMPTION	21,756	21,411	33,250	31,450	<u>34,486</u>	29,050	46,723	. 52 . 345	49,422	57,456	_ <u>52</u> _571	43,997
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1950	1951		1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
 			<u></u>						• •-•			······································			
2,7	18 62	:6	3,947	9,459	845	2,246	5,019	2 , 397	2,232	2,290	2,176	2 , 645	3,015		
1	25 <u> </u>	4	1,831	\$62	3,323	876	167	794	676	658	689		868	ar, 1 ya 1 kata ya 1 kata ya 1 kata ya 1	.
 				-	2,814	5,716	3 , 415	3 , 418	4,591	<u> </u>	4,682	5,013	6 ,0 55		
4	25 9	75		315	241	253	246	268	261	261	295	400	467	-) • [
3,8	68 89	15.	<u>5,828</u>	10 , 656	7,223	9,091	8,847	6,877	7,760	7,040	7,842	8 , 835	10,405		
4 							n.a. 1991 n. n. e. a						- 		-
4,2	32 <u>.</u> 5,75	;3	6,335	4,413	6,924	8,680	10,855	11,481	13,900	13,561	15,139	16 , 900	18 , 934		n far seiner and F anfan an in filme
<u> </u> 1,2	<u>35: 1,40</u>	7	a	753	1,297	1,229	1,388	2,158	1,748	2,205	2,243	2,538	2,683	 	
2,6	01 3,27	2	a	1,072	3,471	2,311	4,282	5,264	<u>3,75</u> 1	7,098	6,577	<u>7,895</u>	6,469		
	a e	1	a	723	629	94C	658	771	735		1,092	1,033	1,209		
ر و ع [68 10,47	52	6 , 335	6,961	12,321	13,969	17,183	19 , 674	20 , 134	23,607	25 , 051	28,366	29 , 295		
+	p					18, 44, - 28, 44, 19, 57, 57, 58, 18, 18, 18, 18, 18, 18, 18, 18, 18, 1	-ar parameter (n. 22 alemania) (n.	n (5. man, 9. t. t. t.							-
22,9	19 24,84	15	················	28,645	27,251	30,005	31,332	32 , C21	32 , 335	<u>34,929</u>	<u>39,349</u>	36 , 760	10,425		
10,3	23 10,14	16		13,337	13,754	14,498	16,863	17,371	18,429	19,104	19 , 131	20 , 357	16,523	 	
18,4	90 24,22	27		27,657	34,202	38,019	<u>46,371</u>	54,131	66,138	66,720	<u>61,9</u> 33	. 75 . 461	31,059		
3,0	41 2,98	34		4,132	3,703	4,34C	5 , 210	5,819	6,028	6,656	7 <u>,</u> 175	7 , 093	6,130		
	46	27		37	26	30	52	47	40	38	69	80	n.a.		,
	29. /	11		20	29	28	68	24	31	27	<u>56</u>	38	n.a.	1 	
1,3	٤8 2,2	<u> 96</u>		1,712	3,451	3,176	<u>3 P93</u>	5,242	8,939	6,025	4,716				
56,2 Surve	36 64,5 ys Stati		al Sum	75,540 arv				-				142,058			
	ozambique		All th	iree teri	ritories	should 1	nave bun	ering,	out no d	ata avai	lable				

	SUMMARY FOR SUB-REGION PETROLLUM PRODUCTS IMPORT = CONSUMPTION													
n na ser an	rearolleura roducto impunt = consumption													
			•	v ar er a teriarian	e dru nar i san -tafindikumar nam isa	-		1	з - а н. алта. «алта.		and the second second second second			
2 4	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961		
			* * * * * * * * * * *		nan an	ang ang malan lani ng malang	χα ιφουσφικά η 'Α 3μ. η δ β β β β β β β β β β β β β		. Annii Marana, an	διαμεία (π. τ.	a an an an an an ar a' ar a'	¶u - _M - ∞ - ∞ - ∞ }		
1.Ethiopia	40,930	38,727	46,940	65,64 0	8 2,076	66,323	77,925	101,985	112,190	127,116	124 ,03 8	132,657		
2.Somalia	12,000	* *******	****	5 4 4 5 6 6 80.00, 1			() 				19,712	19,838		
3.henya ö	416,247	598,452	672,302	595,107	659,120	737,252	804,367	806,534	748,002	778,062	821,212	801,089		
4.Tanzania	120,063	107,599	130,580	134,135	151,680	204,478	239,548	275,704	294,441	260,231	302,905	282,383		
5.Uganda	-71,050	66,106	76,843	102,914	96,862	115,856	117,904	126,141	136,446	127,392	128,214	131,754		
6.RVANDA	12,000.				1			· · · · · · · · · · ·	1	* * *	- 25,000	4 		
7. burundi	an kanan −an can an ku ku ku ku	مرد	a a a a			مىسىمەرىمەرىمەر بەر دۆت كىپ 10-			New and the same of the answer			(
J.Zamlia	42,383	52,928	63,482	68,642	and the second second second second	an ang ang ang ang ang ang ang ang ang a]] 	-					
9.Malawi	15,558	15,226	18,558	18,745	334,439	378,516	459,700	486,705	520,247	511,739	534,458	542,247		
1C.S.Rhcdesia	141,367	177,558	196,056	186,423			€	ą r r o e monecularija	⊊ ₹ ≹angen ange ange en geween ange ange	i Talan Talan ang ang ang ang ang ang ang ang ang a		i A A Antonio (m. 1941), m. 1941 A Antonio (m		
11.Madagascar	50,000	60,300	73,000	88,665	. 93 <u>,</u> 720	105,438	115,615	120,361	122,916	121,719	125,953	123,483		
12. Mauritius	25,731	26,053	. 37,716	40,780	40,912	37,536	57,697	67,230	58,141	65,634	63,789	63,718		
Total	947,349	industry with an extension of the	د م مەربولورىغ بىغانىشىمە مەربو	است. است. است. است. ا	ent server a morent second	and and a construction of the second				l Laura ante manecar	2145,281			
-			naak 2 40° - 16 - 1966, gage - agg - 1880/3880	an and an an set of the active	a dan menjadi menja menjar Mili dalam berengan dan]		an analysis, an an anglasis.		
1.French Somaliland	<u>3,86</u> 0	<u> 995</u>	5,828	10,656	7,223	<u> 2,021</u>	9.847	6,877	7,760	<u></u>	7,842	8,835		
2.Reunicn	2,068	10,432	6,335	6,961	12,321	13,967	17,183	19,674	20,134	23,607	25,051	28,366		
3.Mczambigue	56,236	64,566	70,000	75,540	82,416	90,112	103,789	115,265	131,940	133,459	152,429	145, 05 8		
Tctal	68,172	75,893	64,163	93,157	101,960	113,172	129,619	141,816	159,834	164,146	185,322	182,259		
Grand Total	1,015,521		د. م ورب رسم رس عبد مسر م	در بر بر بر است.	-			· · · · · · · · · · · · · · · · · · ·	an, madel particular contractions (states - states		2330,603	· · · · · · · · · · · · · · · ·		
Source: see Tables 1 to 9								er, no. of the hypothesumerout	-) 				
For Rwanda, Burun 1	Bangue d	Emissicr	Nc.5 =]	962: fc	<u>1950 au</u>	nđ 1960.	estimate]] 		 		* 		
	9 9			ar				Í	<u>}</u>	1				

Table 10

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E/CN.14/INR/79 Annex 1

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Table 11 PROJECTION OF CONSUMPTION All Petrcleum Products

Long tons

													Long to	ns
Pepula	tion	GDP Ann	ial Growt	h Rate	Refinery	PETR CON	IS Ann G	owth Rate	Petrel	Preiuct	s Consum	ption	Petr Cor	s per ita
1960	1975	Actual 1950/60	Planned 1960/70	Estim. 1970/75	Capacity 1967			Estim. 1965/75	Actual 1950	Actual 1960	Estim. 1965	Estim. 1975	1960	1975
in mil	i•ne	per o	ent	an in analysis and souther	th.tons,	Ø	er cent.	* ********	the	usands .	ong ten	مى يىلىمى دىرى مىلىكى تىلىكى مىلىكى تىلىكى تەرىپىرىكى تەرىپىرىكى تەرىپىرىكى تەرىپىرىكى تەرىپىرىكى تەرىپىرىكى ت تەرىپىرىكى تەرىپىرىكى تەرىپىرىكى تەرىپىرىكى تەرىپىرىكى تەرىپىرىكى تەرىپىرىكى تەرىپىرىكى تەرىپىرىكى تەرىپىرىكى تە	Kge	Kgs
20.0	26.3	3.4	4.3		500	12.0	12.0		41	124	220	520	6.5	20.
2.0	2.7	0.6	5.0	ide mainten de la destruction de la composition de la compositio	9400 - Hun the sea and sea and	5.0	11.0	٥.٩	12.	_20		99	10.0	30.
8.1	11.8	9.2	5.2		2,000	7.0	3.0	4.5	416	821	950	1,450	88.0	160.
9.5	13.0	4.6	6.7	i i innune, a su su surviva a	500	9.6		2.•	120	303	380	900	32.●	60.
6.7	9.0	5.9	4.5			6.0	5.0	8. 0	71	128	160	350	19.5	40.
2.5	3.3	2.4	3.0	1 5 6	la anna anna anna anna anna anna anna a	2				* *] 	1 1 1		
2.4	3.7	2.7	3.0) é Émir Miccard III, III, III, III, III,		7.2	7.0	8.0	12	* 25	35	**	5.5	11.
3.2	4.9	7.•	6.5			12.0	6.5	12.0	42	130	180	<u>55</u>	40.0	115.
2.8		6.0	5.6		and We have prove the second	8.2	8.0	7.0	16	34	50	100	12.5	20.
3.6	- 5.5	9.2			1,000	10.0	4.0	0.3	141	370	450	95•	105.0	175
5.4	6.8	5.8	5.5	مۇر <i>\</i> رىندۇسىغ ۋەر بىرىنىۋ.	600	10.0	5.0	10.0	50	126	160	420	25.0	- 63.
0.6	1.0	2.8	<u>5.5</u> 5.4		***	10.0	<u>9.5</u> 5.0	7.0	26	64	100	200	80.0	
66.8	93.3	5•4	5.4	6. ē	4,600	8.7	5.0	7.6	947	2,145	2,720	5,600	32.0	60
0.1	0.1	wan an an an an an an a	φ ² /ψ φ ² φ ₁ φ ₂ φ ₂ μ. 36. 38. 38	in the second			5.0	7.0	4		10	20	8000	200
0.3	0.5						7.0	7.4	8	25	35	70	83.0	140
6.5	8.5	1.3			600	9.8	8.0	6.5	56	152	220	410	23.0	48
6.9	9.1			a antar a sua da su Suba- a da subatar sua da subatar sua da sua da sua da s	600		7.0	6.6	68	185	265	500	27.0	55
73.7	102.4	5.4		6.0	5,207	8.7	5.5.0	7.6	<u>1,015</u>	2,330	2,985	6,100	32.(60
e of Grev	rth = Tai	les Eas	. Africa	n Surver	by ECA		1				the state ==#(= they the state) = the 1 mil			

e Ð COUNTRY **19**51 1950 1952 1953 1954 1955 1956 1957 196 1958 1959 1961 1. Ethiopia 2,500 4,467 5,400 5,689 5,194 7,047 8,882 7,515 5,686 5,396 2. Somalia 🏓 350 i 6001 **4**50 • 693 · 676 3. Kenya 6,612 4,767 16,199 6,066 8,267 13,106 8,900 9,565 13,680 2,307 9,776 15,218 4. Tanzania 🔮 5,658 5,252 9,800 3,199 4,500 7,646 5,733 5,090 6,823 5,392 6,822 6,698 5. Uganda 2,001 2,589 2,700 2,509 3,819 4,398 3,994 3,540 4,084 <u>5</u>4,070 4,090 3,846 6. Rwanda . . - 350 ~ 450 - -600 - 750-7. Burundi 18 3,337 3,072 3,874 88. Zambia 2,421 9. Melawi 🔹 907 829 17,655 20,755 19,497 20,330 20,730 20,398 22,284 19,331 826 1,070 10. S. Rhodesia 7,232 9,001 12,345 0 6,342 11. Madagescaf 3,500 2,662 3,886 5,158 5,436 5,800 4,764 5,009 5,575 3,985 12. Mauritius 1,278 1,498 1,658 1,683 1,803 1,420 1,574 1,553 1,683 1,592 1,888 2,212 Total 32,809 45,006 52,403 57,564 13. French Somaliland 425 95 315 241 253 246 2691 261 261 295 400 14. Reunion 500 723 629 940 658 771 735 1,092 743 1,033 15. Mczambique 2,934 0 3,041 4,132 3,703 4,348 5,210 5,819 6,028 6,656 7,175 7,093 Total 3,966 с. С 5,170 4,573 5,541 6,114 6,85E 7,024 7,660 8,562 Grand Total 35,775 49,579 59,261 66,126 Scurce: Tables 1 to 9

Table 12 LUBRICATING OIL and GREASES IMPORT = CONSUMPTION

E/CN.14/INR/79 Annex 1

Table 13 PROJECTION fer LUBRICANTS

(Consumption Actual and Estimated)

			OLEUM PR	ODUCTS					LUBRICA	TING OII	S AND GR	EASES		
Ann.Cons	ump.Grev	th rate		Quant	ity		Ann.Cons	sump.Grew	th rate		Q	uantity		
Actual	Estim.	Estin.	Aota		Estim		Actual	Estim.	Estim.	Actu		Estima		
<u>1950/60</u>	1960/65	<u>1965/75</u>	1950	1960	1965	1975	1950/60	1960/65	1965/75	1950	1960	1965	1970	1975
P	er cent.	f	the	usands]	ong tons			er cent.			theusan	ds long.	tons .	
12.0	12.0	9 •C	41	124	220	520	8.8	2.0	3.0	2,5	5•7	6.0	7.0	8.0
5.0	11.0	8.0	12	20	35	60	5.8	7.0	7.0	0.4	0.7	1.0	1.5	2.0
7.0	3.0	4.5	416		<u>950</u>	1,450	4.5	2.5	<u> </u>	6.6	9.8	11.0	14.5	19.0
9.6	4.5	9.0	120	303	380	900	2.0	3.0	5.0	5•7	6.0	8.C	11.0	13.0
6.0	5.C	8.0	71	128	160	350	7.8	4.:	4.5	2.0	4.1	5.0	6,0	7.5
7.2-	7.0-	8.0	12-	25-	35-	s o		7.0		0.3-		<u>].</u> (1.5-	2.0
12.0	6,5	12 . C	42	130	180	550	11.0	3.0	4.5	2.4	7.C	0.5	10.0	12,0
8.2	6.3	7.0	16	34_	50	100	2.0		7.C	0.9	1.0	1.0	1.5	2.0
10.0	4.0	8.0	141	370	4.50	950	7.0		3.0	7.2	14.3	14.0	16.0	19.0
10.3	5.0	10.0	50	126	160	420	5.C	4.5	2.5	3.5	5.6	7.C	8.0	.9.0
10.0	<u> </u>	7 <u>•</u> 0	26	64	100	200	<u>4.</u>	6.0	6.0	1.3_	1.9	2_5	<u> </u>	4.5
C.7	5.C	7.6	947	2,145	2,720	5,600	6.0	2,5	4.2	32.8	57.6	64.5	80.0	97.0
	5.0	7.0	4	0	13	20		<u>8.</u> C	7.0	0.4	0.3	0.5	C.7	1.0
	7.0	7.0	6	25	35	70	8.0	2.0	5.0	0.5	1.1	1.2	1.5	2.0
	0.0	6.5	<u> </u>	<u> 152 </u>	220	410	9.2	2.0	2.5	<u>3.0</u>	<u>7.1</u>	7.8	3.3	<u>10.0</u>
	7.0	6 .6	<u>60</u>	105	265	500	8.5	2.5	3.0	3.9	8.5	9.5	11.0	13.0
<u> </u>	<u>5.0</u>	<u>7.6</u>	<u>1,015</u>	2,330	_ <u>2,985</u>	6,100	6.5	2.5	<u>4.</u> 0		66.1	<u>74•C</u>	<u>91.0</u>	110.0
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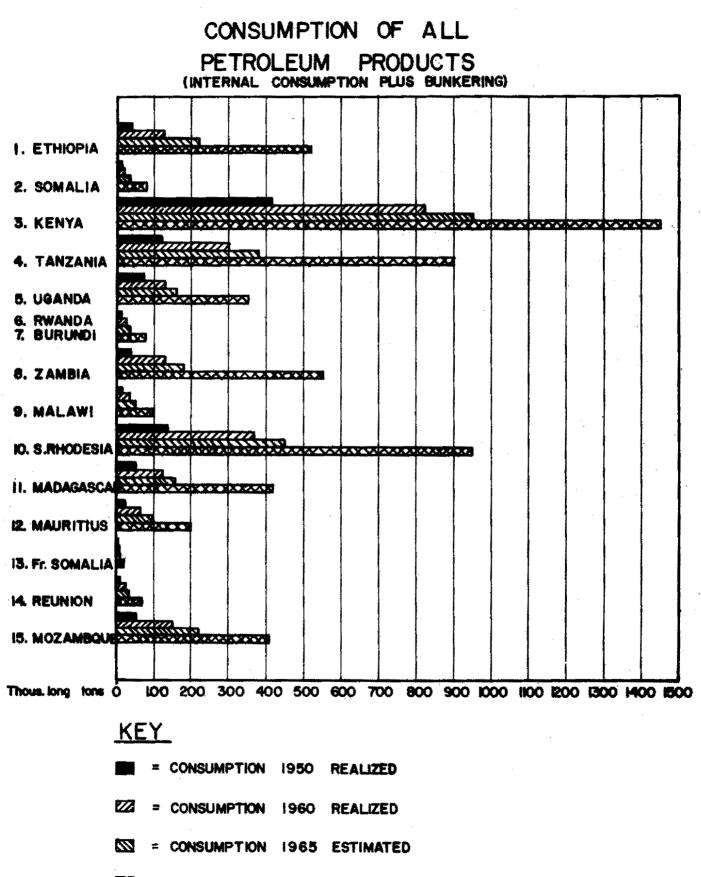
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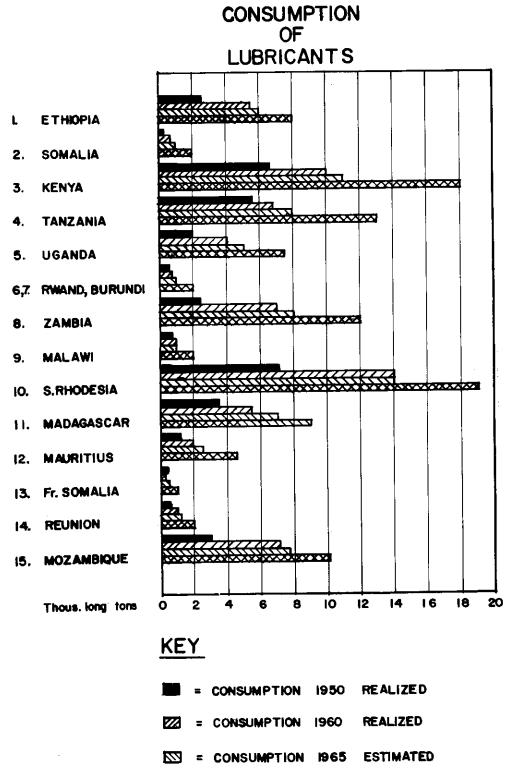
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E/CN. 14/INR/79 Annex II



EST = CONSUMPTION 1975 ESTIMATED

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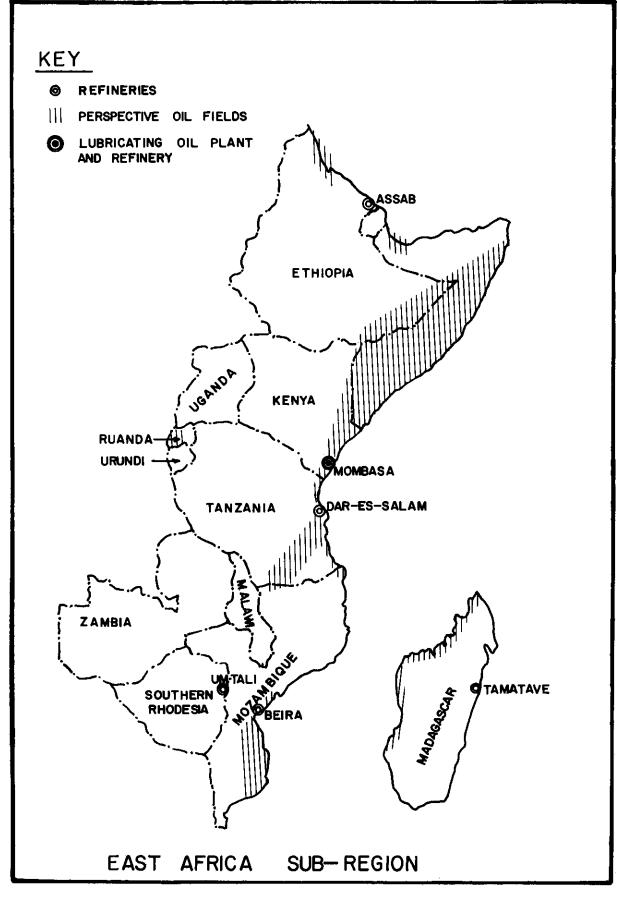
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