

ENERGY PROFILE: TANZANIA

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1. INTRODUCTION

This report is one of a series summarizing the energy situation in sub-equatorial Africa. The purpose of the series is to analyze the energy position for those organizations trading or intending to trade with those countries, or for organizations entering into joint ventures with those countries. It is also the intention to use the individual reports to determine the possibility for energy interchange in the region and the potential for energy supply and demand in the region.

Use has been made of a number of sources for the statistical information and the various sources do not always agree because of differences in definitions used for the various components of energy and national accounts. Therefore a perfect match in the resultant data should not necessarily be expected.

This series of reports has been solicited by the National Energy Council and their technical and financial assistance with the preparation of this report is gratefully acknowledged. However, the data presentation and comments made in this report are due to the authors and do not necessarily reflect the opinions of the National Energy Council.

2. COUNTRY PROFILE

2.1 Introduction^(1,7)

The United Republic of Tanzania is situated on the East African coast and is bordered by Kenya, Uganda, Rwanda, Burundi, Zaire, Zambia, Malawi and Mozambique. It was formed in 1964 by the Union of the Republic of Tanganyika and the regime in the former island Sultanate of Zanzibar.

In the nineteenth century the Sultan of Oman transferred his capital to Zanzibar. The caravan trade was extended from Zanzibar into the interior as far as the eastern Congo and Buganda. This long distance trade nurtured the militarization and enlargement of many African Polities, and more important the Swahili

language of the coast became the commercial lingua franca over all of Tanganyika and beyond. Islam also spread along these trade routes and the porters from inland tribes established what was to become a tradition of inter-tribal mobility.

In 1885 Germany declared a protectorate over a limited area of the mainland, but after a joint Arab and African uprising the German Government took control of what was to be called German East Africa. Their rule was finally secured in 1898 after the death of Chief Mkwawa of the Hehe people. In 1890, in reaction to the German acquisition of 'Tanganyika', Britain proclaimed a protectorate over Zanzibar. The Germans faced the resilient trans-tribal Maji Maji uprising which covered almost the entire country from 1905-1906. German rule was ended by the First World War. However, they had established African commercial agriculture, and Swahili was in widespread use, having been encouraged by the official education policy.

After the war the territories now known as Rwanda and Burundi were detached from former German East Africa and were occupied by Belgium. The remaining area became known as Tanganyika, over which Britain was given a League of Nations mandate. In 1925 the British instituted a system of 'Indirect Rule' by tribal chiefs. After the Second World War the mandate was replaced by a UN trusteeship and intensive efforts were made to stimulate the economy. These efforts included the introduction of strict land usage rules in the African areas and white farming was encouraged.

In many areas African peasants resisted these policies. A focus of protest was provided by the Tanganyikan African Association which had been established in 1929 and to which many local groups were affiliated. Its president, Dr Julius Nyerere, converted it into the Tanganyika African National Union (TANU) in 1954. In TANU's quest for unity it was aided by the wide use of Swahili and the absence of dominant ethnic groups.

Tanganyika held its first election in 1958/59, at which TANU gained a sweeping victory. After independence was achieved on 9 December 1961, TANU's basic weakness was exposed. Democratic local government was ill developed due to the policies of 'Indirect Rule' and the institutional vacuum had to be filled from limited party resources. Tanganyika became a republic on 9 December 1962, while remaining a member of the Commonwealth.

Following the overthrow of the sultan of Zanzibar in 1964, a treaty of unity was signed with Zanzibar and the two countries became the United Republic of Tanzania. Zanzibar, while being represented in the National Assembly and Government, has its own president, cabinet, assembly and administration. Abied Karume, leader of Zanzibar's Afro-Shirazi party, became Zanzibar's President and Tanzania's Vice-President. He was assassinated in 1972 and replaced by Aboud Jumbe.

In February 1965 TANU was declared the sole legal party. In 1967 TANU adopted a new programme known as the Arusha Declaration. The two main themes were egalitarianism and self-reliance. Thus Tanzania began to move along its chosen socialistic path. The mainland party, TANU, and Zanzibar's Afro-Shirazi party merged in 1977 to form Chama Cha Mapinduzi (CCM) with President Nyerere as Chairman.

In 1984 a system of two Union vice-presidents was introduced. The first vice-presidency is held by a mainlander and the second vice-presidency by the President of Zanzibar.

In October 1985 Ali Mwinyi, who had succeeded Jumbe as the President of Zanzibar in 1984, was elected President of Tanzania as President Nyerere had stepped down. Nyerere continued as Chairman of the CCM and as such exercised influence over the countries' political and economic strategy. In August 1990 Nyerere resigned his chairmanship and retired from political life.

Under President Mwinyi the direction of economic policy was changed, and the increasing acceptance of the IMF's proposals on budgeting, removal of subsidies, and the devaluation of the shilling has gained favour with donors.

The key principles of Tanzania's foreign policy have always been non-alignment and opposition to colonialism and apartheid. Tanzania provided active support to the exiled South African liberation movement, as well as those in Angola, Mozambique, Namibia and Zimbabwe.

During 1978 and 1979 Tanzanian troops and Ugandan exiles fought a border war against Uganda, eventually invading the country and overthrowing the Amin regime. Although a moral as well as a military triumph, the war cost Tanzania in excess of \$500 million.

Tanzania is a member of the Southern Africa Development Co-ordination Conference and the Preferential Trade Area of East and Southern Africa.

2.2 Demography

The United Republic of Tanzania which has a land area of 945 000 km² is situated in eastern Africa. The Republic incorporates mainland Tanganyika and a number of offshore islands including Zanzibar, Pemba, Latham and Mafia. In 1988 its population was estimated at 24 million⁽²⁾, of which 670 000⁽³⁾ were resident in Zanzibar. This gives a population density of 25,4 per km².

Figure 1 shows the population over the period 1955 to 1988. In 1981 11% of the population was urban⁽³⁾ and by 1989 it was estimated that urbanization had increased to approximately 16%⁽¹⁾. With the exception of the coastal areas, the urban population lives in towns which are relatively remote from each other. Most of the rural population tend to live in scattered individual homesteads rather than nucleated villages.

Most of Tanzanian population is African, with Swahili being more widely spoken than elsewhere in East Africa. English is spoken in government and business circles. There is a large Asian (mostly of Indian and Pakistani ancestry) and expatriot population. None of the 120 ethnic groups dominate the others by numbers and Tanzania has largely avoided conflict between ethnic groups.

2.3 Economy

The Tanzanian leadership officially put the country on a course of 'socialism and self-reliance' in 1967. The Government then proceeded to extend the State's role to all spheres of the economy and proceeded to nationalize the banking and insurance systems and large trading companies were appropriated. The

industrial sector became dominated by mixed companies in which the Government had a majority shareholding. Some companies are owned outright and controlled by the National Development Corporation. Importing was confined to State trading companies.

However, several years of severe economic decline since the late 1970's brought the country to a condition of economic collapse and, in order to secure extended aid specifically from the IMF, in the mid-1980's the Government adopted measures to redress the economy.

The poor performance of Tanzania's economy in the 1980's is largely the result of the second oil price shock of the 1970's, the subsequent world recession, and the consequent deterioration of the prices of major export commodities. This was compounded by the financial burden of the Ugandan war, repeated droughts, the breakup of the East African Community in 1977, and the disruptive effects of the Ujamaa Villagisation Programme.

This led to an acute shortage of foreign exchange and by 1982 the balance of payments problem was so desperate that President Nyerere suspended all development projects. In June 1982 a Structural Adjustment Programme (SAP) prepared jointly by the Ministry of Planning and Economic Affairs and the World Bank was announced. The World Bank loan in support of the SAP was conditional on agreement being reached with the IMF. After the Government's economic reform programme was implemented, agreement was finally reached with the IMF in 1986.

The subsequent economic recovery has been constrained by the inability of the export base to generate sufficient foreign exchange. However, the export base is highly import-dependent and this has resulted in a vicious circle of low production and industrial capacity, and insufficient foreign exchange generation.

In 1988 the gross domestic product (GDP) was estimated at 311 478 million Tanzania Shillings (TS) or US\$ 3 137 million⁽²⁾. This equates to US\$ 130 in per capita terms. Figure 2 shows GDP in current and real 1985 values over the period 1965 to 1988. GDP in real terms showed a steady growth until the mid 1970's,

after which growth tapered off. From 1977 to 1985/6 the economy stagnated and was revived only in 1986/87 with the injection of aid from the World Bank and the IMF as well as by Government economic reform. This growth was also helped by improved coffee prices and favourable weather.

This trend is reflected in Figure 3 which shows the real GDP growth rate over the period 1967-1988. From 1967 to 1976 the average yearly growth rate was 4,5%. The growth rate decreased to 1% from 1978 to 1984 and averaged 2,5% over the period 1985-1988.

Figure 4 shows GDP in per capita terms. GDP per capita reached a peak of TS 6 712 in 1975, after which it declined steadily until 1985. Subsequently GDP growth has just kept pace with population growth. In 1988 GDP per capita was TS 5 453. GDP per capita in \$US has decreased rapidly from \$US 317 in 1985 to \$US 130 in 1988 mainly due to the devaluation of the Tanzania Shilling by the Government as part of its economic reforms.

Figure 5 shows the GDP components as a percent of the total over the period 1967-1987. Agriculture's contribution to GDP reached a low of 34% in 1974 at the height of the drought and has since increased to 53,7% in 1987 and 57,2% in 1988. Conversely, industry's contribution has declined from 16,9 % in 1977 to 6,9% in 1987 and 6,5% in 1988. This can mostly be attributed to the lack of foreign exchange and the related low productivity and industrial capacity.

Figure 6 shows the ratio of agriculture to industry and manufacture with respect to their contribution to GDP. It can be seen that the economy is swinging increasingly towards agriculture as a result of the lack of foreign exchange as well as successive increases in producer prices since 1983 as a result of the economic reform programme.

3. ENERGY GENERAL

3.1 Introduction

Tanzania's commercial energy sector is highly dependent on imported petroleum products which account for 60% of foreign exchange earnings⁽⁵⁾. This puts considerable strain on the economy which is desperately short of foreign exchange.

Tanzania has large and diverse energy resources which have not been systematically explored and exploited. It has large hydro potential, gas and coal reserves which could be used to substituted for imported energy.

A major problem facing Tanzania is the depletion of its forests and the consequent desertification resulting from the fact that sustainable supply is well below demand.

An attempt is being made at reducing dependence on imports and substituting for the use of fuelwood via an integrated electrification masterplan.

3.2 Energy Institutions⁽³⁾

Several Ministries are responsible for energy supplies. The Ministry of Water, Energy and Minerals (MWEM) is entrusted with hydrocarbons, electricity, coal and uranium. The Ministry of Natural Resources and Tourism (MNRT) handles fuelwood, via its Forestry Directorate, and the Prime Minister's Office is involved in the development of village woodlots and village electrification.

These Ministries are responsible for overall policy formation in their sub-sectors. They present options to the Cabinet and arrange financing for large projects. They also supervise the various parastatals under their authority.

The Tanzania Electricity Supply Company (TANESCO) was founded as a private company in 1931 and procured by the Government in 1964. It is a State-owned enterprise supervised by MWEM.

The Rufiji Basin Development Authority (RUBADA) was created by the Rufiji Basin Development Authority Act of 1975 to develop the catchment area covered by the Rufiji River. Much of its activities have been concentrated on the development of hydro-electricity. The relationship between RUBADA and TANESCO has been tense and inefficient duplication of scarce technical and managerial resources has taken place.

The Tanzania Petroleum Development Corporation, supervised by MWEM, was established in 1969 under the Public Corporations Act. Its objectives are:

- (a) To develop an adequate industrial base for the oil industry
- (b) To explore for and develop petroleum resources
- (c) To carry out the normal activities of an oil company
- (d) To acquire interests in projects associated with the exploration and production of petroleum energy
- (e) To hold exploration and production rights
- (f) To contract for, hold equity in or participate in oil concessions, franchises and licenses
- (g) To manage parastatals or other legal entities transferred to the Corporation.

An agreement between the Italian company AGIP and the Tanzania Government in 1961 to construct an oil refinery in Dar-es-Salaam resulted in the Tanzanian-Italian Petroleum Refining Company (TIPER) being incorporated in 1963. The Government acquired 50% of the shares from AGIP in 1967.

The State Mining Corporation (STAMICO) was created in 1972 to take over the mining companies which had been nationalized. STAMICO is responsible for the development and exploration of the country's mineral resources and it trades in the mineral markets on behalf of its six operating subsidiaries.

The Forestry Directorate within MNRT is responsible for the development, protection and conservation of forests. Five divisions report to the Director of Forestry who is in charge of the Forestry Directorate:

- (a) Forest Industries
- (b) Village Afforestation
- (c) Management and Development
- (d) Research and Training
- (e) Survey and Inventory

The World Bank⁽³⁾ identified a lack of central co-ordination in the energy sector as well as a lack of co-ordination between the various energy agencies. The need for an institutional framework to rapidly and effectively develop Tanzanian natural gas resources was also highlighted by the World Bank⁽³⁾. The major difficulty in solving these problems is the lack of adequately qualified and experienced staff.

4. ENERGY RESOURCES

4.1 Fuelwood

Tanzania has forestry resources covering 40% of the country. Of this, 43,2 million hectares is covered with natural forests, 950 000 ha with closed tropical forests, 29 000 ha with planted trees in woodlots, 60 000 ha with softwoods, and 6 000 ha with hardwood⁽³⁾.

Table 4.1 shows the sustainable fuelwood supply, consumption and deficit for 1983. Theoretically a production of 20 million m³ is possible from Tanzania forests, although in practice the sustainable supply is of the order of 16 million m³.

Table 4.1 Sustainable fuelwood supply, consumption and deficit for 1983 (thousands of m³ per annum)⁽³⁾

Miombo Forest	Woodlots	Total Supply	Consumption	Deficit
15 064	524	15 593	39 103	23 510

This can be attributed to three factors. Firstly, a large proportion of the forests are remote from population areas. Secondly, industrial plantation and associated industries were traditionally located in thinly populated areas which make the wood residues produced unexploitable for use as domestic fuelwood. Lastly, the village afforestation programme made a slow start and in particular communal woodlots were unsuccessful due to a lack of interest.

The deficit of 23 510 m³ per annum means that the country is cutting two and a half times more fuelwood than the forests can supply on a sustainable basis. This is leading to serious deforestation at a rate of 0,5 million ha per year. Environmental degradation is visible around many communities and it has been estimated that households are on average spending 20% of their time in the collection of fuelwood⁽¹⁾.

4.2 Petroleum

Sedimentary basins with hydrocarbon potential have been identified in the inland Rift Valley basins and in the eastern coastal basins. No oil discoveries have yet been made, which could be due to the low level of exploration which has taken place and the fact that the volume of completed work is low. Further exploration in various parts of the Rift Valley and coastal sedimentary basin is required before the potential for indigenous petroleum resources can be assessed.

4.3 Coal

Tanzania's coal resources are estimated at 1,9 billion tons, of which 304 million tons are considered proven. Table 4.2 shows a breakdown of coal reserves and the respective coal fields.

Table 4.2 Coal Resources (millions of tons)⁽³⁾

Field	Measured	Inferred	Total
Ketewaka- Mchuchuma	186,6	495,0	681,6
Songwe-Kiwira	35,0	595,0	615,0
Galula	-	53,0	53,0
Njuga	-	126,0	126,0
Liweta	-	34,0	34,0
Ngaka	-	152,0	249,7
Mbamba bay	-	29,0	29,0
Mhukuku	-	19,0	19,0
Ufipa	-	17-57	17-57
Total	319,3	1520-1560	1824-1864

Coal is presently being exploited at the Songwe-Kiwira mine in the south which has a capacity of 100 000 t/y and at the Ilima mine in the Songwe-Kiwira field which has a capacity of 20 000 t/y.

4.4 Hydro-electricity

Tanzania has a relatively large hydro-electric potential estimated at 6000 MW⁽⁴⁾ and 20 000 GWh per year⁽³⁾. Installed hydro-electric capacity is presently 333 MW⁽⁵⁾.

A notable feature of the hydropower potential is the concentration of major sites on the Rufiji and Ruhindji Rivers, the limited number of medium-size sites, and the many potential sites for mini-hydropower.

A hundred sites for hydro-electric plants have been identified. A further sixty mini-hydro potential sites have been identified with a total installed capacity of 66 MW or 300 GWh per year. The distribution of these sites is such that 77% have a potential of less than 1000 kW and 23% have a potential of between 1000 and 2000 MW. In 1987 there were about 20 mini-hydro-electric plants in operation, with a total installed capacity of approximately 4000 kW⁽⁶⁾.

4.5 Gas

Gas has been discovered at Songo-Songo on Kilwa Island, at Mnazi Bay and at Kimbiji. Table 4.3 shows the natural gas reserves in Tanzania.

Table 4.3 Natural gas reserves (billion m³)^(1,3)

	Songo-Songo	Mnazi Bay	Kimbiji	Total
Proven	32,77	0,65	130	163,42
Probable & possible	10,12	16,59	-	26,71
Total	42,89	17,24	130	190,13

These reserves have not yet been utilised, The Songo-Songo reserves are too distant from the energy-consuming market of Dar-es-Salaam, and the reserves at Kimbiji, 40 km south of Dar-es-Salaam, have only recently been confirmed. A study into the viability of using natural gas from Songo-Songo to generate electricity has been ordered⁽⁴⁾.

4.6 Biomass

Tanzania has considerable biomass resources in the form of forest residues, wood processing wastes, surplus softwoods, agricultural residues, animal wastes, and sugar industry residues.

Utilization of softwoods for timber and pulp is well below the annual allowable cut and the proportion which could be economically used for fuelwood amounts to some 23 000 toe per year. However, these softwood plantations are remote from areas where over-cutting of forests for fuelwood is taking place.

It was estimated that in 1980 the 120 000 ha of coconut plantations along the coast and on the islands of Zanzibar, Pemba and Mafia, had a potential for coconut shells and husks of over 28 500 toe⁽³⁾.

Cashew nut shells and husks are also potential fuels, as well as maize residues. The conversion of dung into biogas fuel is potentially an extra fuel resource for Tanzania. The World Bank⁽³⁾ estimated that the potential for production from this resource would be about 46 000 toe. In 1984 there were already 300 biogas installations in institutions and community centres.

Bagasse, a by-product from Tanzania sugar mills, is used to fuel the mill boilers. At present there is no excess available for electricity generation, although improvements to the mills could result in excess bagasse. Molasses is another by-product of the sugar industry. Of the total molasses production 34% ends up as waste and could be used in an anhydrous ethanol plant. This possibility was investigated by the government, but further work has been postponed due to lack of foreign exchange and the marginal viability of the intended project.

4.7 Solar and Wind

The Tanzanian climate offers good potential for solar and wind energy. In the short to medium term their applications are more limited than biomass. Apart from the use of a few photovoltaic panels mainly used by the Tanzanian Posts and Telecommunications Corporation, there is no significant use of solar energy. In 1984 some hundred small water pumping windmills had been installed throughout the country and the exploitation of wind energy appears to be more practical than solar energy.

4.8 Geothermal

Although there is evidence that Tanzania has geothermal potential, its large hydro potential and gas reserves make its development unfeasible.

5. ENERGY SUPPLY AND DEMAND

5.1 General

In 1988 Tanzania's total final energy consumption (TFC) was 12,936 million toe, of which 95% was in the form of traditional fuel and 4% in the form of oil products. According to SADCC data⁽⁹⁾, households accounted for 74% of TFC, followed by agriculture (21%), industry (14%) and transport (4,6%). The overall per capita consumption was 515 kgoe.

Tanzania's total final commercial energy consumption was 581,2 thousand toe in 1988⁽⁸⁾. Figure 7 shows TFC of commercial energy over the period 1950 to 1988. Consumption increased until 1980, after which there was a sharp decline which was arrested in 1983. From 1983 to 1988 there has been a slow decline in consumption. Figure 8 shows the commercial energy components as a percentage of TFC of commercial fuel. In 1988 oil accounted for 88,5 % of commercial energy consumption, followed by electricity (11,2%) and coal (0,3%). Figure 9 shows the sectorial TFC of commercial energy in percentage terms. In 1988 the transport sector accounted for 40,4% of commercial energy consumption, followed by industry (33,5%), households (14,3%), and agriculture (6,5%).

Figure 10 shows the growth rates of final consumption of commercial energy and real GDP in a 3-point moving average form. They both display similar trends, with TFC lagging 1-2 years behind GDP. From the late 1970's onwards the trend is complicated by the lack of foreign exchange as well as the Government's economic reforms and the agreement with the IMF in 1986. Figures 11 and 12 give the agricultural and industrial sector economic and energy growth rates.

The contribution of traditional energy appears to be increasing, as is shown in Figure 13 which gives the ratio of commercial to traditional energy over the period 1971-1988. This can be partially attributed to the shifting of the economic mix towards agriculture. This is supported by the fact that the commercial energy intensity is declining, as shown in Figure 14.

Per capita consumption of commercial energy has declined from a high of 48 kgoe in 1980 to 24 kgoe in 1988. Figure 15 shows the relationship between GDP and total final consumption of commercial energy on a per capita basis.

5.2 Fuelwood

Total final consumption of fuelwood in 1988 was estimated to be 12,4 million toe⁽⁹⁾. This equates to 476 kgoe per capita. The household sector accounts for 90% of fuelwood consumption⁽³⁾.

According to the World Bank⁽³⁾, in 1981 the estimated annual demand was 23 million m³ per year and the estimated sustainable supply only 16 million m³ per year. This resulted in 26 million m³ of forest being lost by overcutting. Further, this exploitation reduced the productivity of the forests by 1,8%. The problem is further complicated by competing claims on the land for agriculture and livestock.

5.3 Petroleum products

Total final consumption of oil products, as shown in Figure 16, amounted to 514 100 toe in 1988, which was down from the high of 829 600 toe in 1980. The sudden decline in consumption since 1980 has been ascribed to a lack of foreign exchange, oil price increases, reduced economic activity, and the under-utilization of available capacity in the transport and industrial sectors⁽³⁾.

Oil product consumption by sector is shown in Figure 17 over the period 1971-1988. In 1988 the transport sector accounted for 46% of final consumption, followed by industry (29%), residential (13%) and agriculture (7%).

Figure 18 shows the consumption of oil products by type. In 1988 diesel accounted for 39% of consumption, followed by residual fuel (23%) and petrol (15%). The relatively high consumption of residual fuel (fuel oil) can be attributed to its use for the generation of electricity. (All Tanzania's thermal stations are oil-powered.)

Tanzania has no indigenous supply of petroleum and imports all of its requirements. In 1981 petroleum imports accounted for 50% of 'free' foreign exchange (not tied to a particular project) and thus puts a large strain on an economy already short of foreign exchange and this has resulted in a depressed supply of petroleum products. In 1990 petroleum imports accounted for 60% of all foreign exchange earnings.

The Tanzanian-Italian Petroleum Refinery is the country's only refinery and is located near Dar-es-Salaam. It was designed to produce 700 000 t/y of refined products using Iranian or Iraqi crude. The yield pattern of the plant is not in balance with the demand profile, and resulted in deficits in the lighter products and an excess of residual fuel. This has resulted in the need to import large quantities of light refined product and export excess residual fuel at depressed prices. In the late 1970's the refinery switched to lighter crudes in order to reduce the surpluses of residual fuel which had to be exported at reduced prices. Although the surplus decreased, as reflected by the reduction in exports shown in Figure 19, the imbalances have persisted. This has also reduced the plant capacity to 670 000 t/y. The output of the refinery was 485 000 tons in 1987⁽⁷⁾.

This inefficiency is complicated by the fact that the refinery was designed to minimise capital costs at the expense of high energy consumption. These inherent inefficiencies are being added to by the lack of spare parts and maintenance materials due to foreign exchange constraints. This has resulted in high consumption of oil by the refinery compared to refineries of similar configuration. Figure 20 shows the consumption of oil by the refinery over the period 1971-1988. The consumption of oil by the refinery as a percentage of total final consumption of oil has been increasing steadily since 1985, although total final consumption has been decreasing.

A lubricating oil blending plant was added in 1987 and a bitumen plant was due to be completed in 1990. The refinery is to be rehabilitated during 1990-1993 at a cost of \$ 18 million⁽⁷⁾.

5.4 Electricity

Electricity consumption in Tanzania was 65 300 toe in 1988. Production totaled 879 GWh (75 700 toe) in the same year. Figure 21 shows electricity production and consumption over the period 1950 to 1988. The reduction in consumption since 1980 is a result of the deepening economic crises. Prior to 1980 electricity consumption displayed an exponential growth except for the effects of the drought which ended in 1975. This is emphasized by Figure 22 which shows electricity intensity over the period 1965 to 1988. The similarity in trends between real GDP and electricity consumption growth rates is shown in Figure 23.

The sectorial consumption of electricity from 1971 to 1988 is shown in Figure 24. In 1988 the industrial sector's consumption amounted to 64,17% of total consumption, while the residential sector accounted for 26% and the agricultural sector 2%. In 1983 it was estimated that only 7% of the population had access to electricity and that rural electrification was progressing slowly⁽¹⁾. This is reflected in the low per capita consumption of 32 kwh per capita per year in 1988. By 1990 only 45 of the 75 mainland districts had been electrified.

The power supply system of the Tanzania Electricity Supply Corporation (TANESCO) consists of an interconnected system and an isolated system. The connected system is extensive and is situated mainly in the east and north-east of the country. Almost 95% of the grid production is based on hydro sources and the hydro installed capacity is 333 MW⁽⁵⁾. The Kidata Dam project which has an installed capacity of 280 MW makes up 84% of this installed capacity. It supplies Dar-es-Salaam via a single circuit 220 kV transmission line passing through difficult terrain and its vulnerability is a cause of concern. Maximum demand on the grid was 250 MW in 1990, up from 118 MW in 1982. Dar-es-Salaam had a maximum demand of 150 MW in 1990. The isolated system depends mostly on diesel-powered generators, many of which are in poor condition due to lack of spare parts and operate at limited load factors due to lack of fuel.

Total installed capacity was 370 MW in 1981 and increased to 401 MW in 1986. In 1990 the total installed capacity was 519 MW, of which 333 MW was based on hydro and 186 MW on fuel oil. Hydro production accounted for 70% of production in 1988 and thermal stations the remaining 30%. Electricity production by thermal and hydro plants is shown in Figure 25. The peak in thermal production in the mid 1970's was due to the drought of that period and the related inability of hydro plant to meet the increasing demand.

Electricity losses in the past have been high (19,2% in 1982⁽³⁾) and the failure of many institutions to pay for consumed electricity, together with other economic and political problems, has meant that TANESCO has been unable to invest in the expansion of generating equipment or the grid until recently.

Tanzania has recently launched a major project to generate more electricity, extend its grid, and improve reliability of supplies through an electrification masterplan. This plan aims to develop additional energy sources, namely, gas (Songo-Songo), coal, geothermal and other renewables, as well as the significant further development of hydro power resources. It also aims to provide every region with electricity by 2001, and a rural electrification programme has been set up which aims to use mini-hydro generators to replace diesel generators. Only 10% of townships are presently supplied with hydro-electric power⁽⁵⁾. The plan includes the rehabilitation of the Dar-es-Salaam distribution system, as well as the extension of the grid.

Funds have come from the Japanese International Co-operation Agency, the World Bank, and Finland's FINNIDA.

5.5 Coal

Coal plays a relatively minor role in Tanzania, with a total final consumption of 1 800 toe in 1988, although there are vast reserves. The industrial sector is the only consumer of coal, and consumption is confined to the Mbeya region where the coal deposits are situated, due to supply constraints and limited distribution facilities. The start of production at the 100 000 t/y Songwe-Kiwira mine in early 1989 should change the consumption pattern.

A potential use for coal is in pithead electricity generation. However, the abundance of hydro potential and gas makes coal a less attractive option. The potential for exporting coal is limited.

6. PRICING AND MARKETING⁽³⁾

6.1 General

Up-to-date information on energy pricing in Tanzania is scant and the following discussion on energy pricing is based on data obtained by the World Bank⁽³⁾ of the pricing position in 1983.

6.2 Petroleum Products

Petroleum products are marketed by five companies, namely, (market share in 1981) BP (48%), AGIP (26%), ESSO (11%), Caltex (9%), and Total (6%). The Government owns a 50% share in BP and AGIP via the Tanzanian Development Corporation (TPDC), whereas the remainder are totally foreign owned. Since 1976 TPDC has been responsible for importing all crude oil and refined product supplies.

Petroleum product prices appear to be revised frequently. Relative product prices show significant distortions between diesel and petrol, with petrol exceeding diesel by more than 100%. The Government effectively levies a substantial tax on petroleum products and petrol in particular.

Retail prices vary to some degree from location to location. However, prices are uniform at the 16 major regional distribution centres. Transport costs are thus not fully recovered, and the freight and equalization funds are used to pay for actual transport cost differentials.

6.3 Electricity

The electricity tariff structure, shown for 1983 in Appendix D, is the same throughout the country. The result is that users in the interconnected system substantially subsidise users in the isolated system. The World Bank⁽³⁾ suggests that tariffs aimed at satisfying income-distribution objectives should be limited to so-called 'life-line' rates (minimum supplies) and the remaining consumers tariffs should reflect the actual local costs to promote an economically efficient regional allocation of power-using activities. TANESCO's tariff schedule is shown in Appendix A. Overall, these tariffs and revenues were insufficient to cover either the long-run incremental costs of supply or TANESCO's financial requirements.

7. DISCUSSION

Tanzania is one of the many developing countries in Africa whose economies have been crippled by the rising oil prices and a prolonged shortage of foreign exchange. This is exacerbated by Tanzania's heavy reliance on imported petroleum for almost its entire commercial energy needs.

Tanzania has abundant and diverse natural resources which unfortunately have not been explored and exploited systematically. Commercial energy resources include large hydro-electric potential, substantial coal deposits and natural gas resources. These can play a useful role in the Government's attempts to reduce Tanzania's dependence on imported petroleum.

In the medium term fuelwood will continue to be the most important resource for the country's overall energy needs. Due to the lack of a sustainable supply, deforestation will continue and even escalate. Although there is much opportunity to exploit non-conventional energy in the form of agricultural residues, they will only be able to substitute for fuelwood to a minor extent.

Thus demand management, in the form of sound economic pricing of energy and energy conservation especially in industries and households, and the systematic exploitation of Tanzania's energy resources hold the solutions to the country's energy and economic plight.

8. REFERENCES

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- (9) SADCC Energy Statistics Yearbook 1988, Luanda.

APPENDICES

TABLE A : ECONOMIC DATA COUNTRY : TANZANIA
CURRENCY : TANZANIAN SHILLINGS (TS)
 Millions of currency units unless indicated

YEAR	POPULATION MILLIONS	GROSS DOMESTIC PRODUCT AT MARKET COST, TANZANIA SHILLINGS.								GDP DEFLATOR	GDP AT 1985 MARKET PRICES	GDP/CAPITA		EXCHANGE RATE, TS PER US DOLLAR	GDP (US\$) AT CURRENT MARKET PRICES	GDP PER CAPITA (US\$)
		AGRICUL- TURE	INDUSTRY					OTHER SERVICES	TOTAL			CURRENT	REAL 1985			
			TOTAL INDUSTRY	MINING QUARRY	MANUFAC- TURE	ELEC, WTR GAS	CONSTRUCT- ION									
1950	8,31	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7,143	NA	NA	
1951	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7,143	NA	NA	
1952	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7,143	NA	NA	
1953	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7,143	NA	NA	
1954	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7,143	NA	NA	
1955	9,21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7,143	NA	NA	
1956	NA	NA	NA	NA	NA	NA	NA	NA	3098	NA	NA	336,37	7,143	433,71	47,09	
1957	9,6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7,143	NA	NA	
1958	9,83	NA	NA	NA	NA	NA	NA	NA	3418	NA	NA	356,04	7,143	478,51	49,84	
1959	10,08	NA	NA	NA	NA	NA	NA	NA	3522	NA	NA	358,29	7,143	493,07	50,16	
1960	10,33	NA	NA	NA	NA	NA	NA	NA	3752	NA	NA	372,22	7,143	525,27	52,11	
1961	10,58	NA	NA	NA	NA	NA	NA	NA	3920	NA	NA	379,48	7,143	548,79	53,13	
1962	10,85	NA	NA	NA	NA	NA	NA	NA	4102	NA	NA	387,71	7,143	574,27	54,28	
1963	11,11	NA	NA	NA	NA	NA	NA	NA	4454	NA	NA	410,51	7,143	623,55	57,47	
1964	11,39	NA	NA	NA	NA	NA	NA	NA	4932	NA	NA	443,92	7,143	690,47	62,15	
1965	11,67	NA	NA	NA	NA	NA	NA	NA	6030	NA	NA	529,41	7,143	844,18	74,12	
1966	11,96	NA	NA	NA	NA	NA	NA	NA	6140	9,9	62020	526,14	7,143	859,58	73,66	
1967	12,26	2870	1130	NA	570	NA	NA	NA	7042	10,0	70420	588,80	7,143	985,86	82,43	
1968	12,59	2990	1170	NA	650	NA	NA	3343	7343	10,1	72703	598,94	7,143	1028,00	83,85	
1969	12,93	3080	1270	NA	740	NA	NA	3714	7874	10,3	76447	625,42	7,143	1102,34	87,56	
1970	13,27	3380	1420	NA	830	NA	NA	3921	8271	10,6	78028	639,68	7,143	1157,92	89,55	
1971	13,63	3490	1560	NA	850	NA	NA	4373	9173	11,1	82640	691,26	7,143	1284,19	96,77	
1972	14,00	4020	1800	NA	1140	NA	NA	4764	9814	11,4	86088	720,03	7,143	1373,93	100,80	
1973	14,37	4540	2110	NA	1260	NA	NA	5352	11172	12,1	92331	798,00	7,143	1564,05	111,72	
1974	14,76	5440	2410	NA	1480	NA	NA	6453	13103	13,8	94949	911,83	7,021	1866,26	129,87	
1975	15,31	7010	2760	NA	1770	NA	NA	8144	15994	16,5	96933	1083,60	7,135	2241,63	151,87	
1976	16,41	9050	4130	NA	2810	NA	NA	9241	19011	18,5	102762	1241,74	7,367	2580,56	168,55	
1977	16,92	11130	4890	NA	3290	NA	NA	11239	24419	22,3	109502	1488,06	8,377	2915,01	177,64	
1978	17,44	12510	5400	NA	3860	NA	NA	12848	28868	25,6	112766	1706,15	8,289	3482,69	205,83	
1979	17,98	14730	5660	NA	3870	NA	NA	14259	32169	27,8	115716	1844,55	7,712	4171,29	239,18	
1980	18,58	16640	6350	NA	4100	NA	NA	15893	36283	30,9	117421	2017,96	8,217	4415,60	245,58	
1981	19,17	20340	6840	NA	4500	NA	NA	19128	42118	35,6	118309	2266,85	8,197	5138,22	276,55	
1982	19,78	26450	6910	NA	4360	NA	NA	21922	49102	42,0	116910	2561,40	8,284	5927,33	309,20	
1983	20,41	32740	6880	NA	4870	NA	NA	24866	58226	49,1	118587	2943,68	9,283	6272,33	317,10	
1984	21,06	41290	8480	NA	5930	NA	NA	30380	70000	59,8	117057	3429,69	11,143	6281,97	307,79	
1985	21,73	61230	10500	NA	6660	NA	NA	37330	87100	73,5	118503	4135,80	15,292	5695,79	270,46	
1986	22,46	84150	13240	NA	7420	NA	NA	48870	120600	100,0	120600	5549,93	17,472	6902,47	317,65	
1987	23,22	120940	15520	NA	9040	NA	NA	63810	161200	131,9	122214	7177,20	32,698	4929,97	219,50	
1988	24,00	178250	20340	NA	11030	NA	NA	88640	225100	174,2	129219	9694,23	64,260	3502,96	150,86	
1989	NA	NA	NA	NA	NA	NA	NA	112888	311478	238,0	130873	12978,25	99,292	3136,99	130,71	
1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	143,377	NA	NA	

TABLE B: FINAL ENERGY CONSUMPTION DATA

YEAR	COMERCIAL ENERGY FORMS TOTAL FINAL CONSUMPTION 000'S TOE						ENERGY/GDP kg OE / GDP (1985)		TRADITIONAL ENERGY 000'S TOE	COMM/ TRADIT	TOTAL ENERGY TRAD+COM 000'S TOE	ENERGY PER CAPITA (kg OE PER CAPITA)		
	COAL	OIL	HYDRO	GAS	ELECT	TOTAL	1PT	3PT MA				COMMERCIAL	TRAD	TOTAL
1950	35,7	104,0	0	0	3,2	143,0	NA	NA	NA	NA	NA	17	NA	NA
1951	32,6	92,0	0	0	4,5	129,2	NA	NA	NA	NA	NA	NA	NA	NA
1952	44,9	107,0	0	0	5,0	157,0	NA	NA	NA	NA	NA	NA	NA	NA
1953	35,7	115,0	0	0	6,2	157,0	NA	NA	NA	NA	NA	NA	NA	NA
1954	33,2	121,0	0	0	6,8	161,0	NA	NA	NA	NA	NA	NA	NA	NA
1955	3,7	167,0	0	0	7,8	178,5	NA	NA	NA	NA	NA	19	NA	NA
1956	4,9	198,0	0	0	8,7	211,6	NA	NA	NA	NA	NA	NA	NA	NA
1957	1,2	236,0	0	0	9,4	246,6	NA	NA	NA	NA	NA	26	NA	NA
1958	0,6	251,0	0	0	10,1	261,7	NA	NA	NA	NA	NA	27	NA	NA
1959	1,2	212,0	0	0	10,7	223,9	NA	NA	NA	NA	NA	22	NA	NA
1960	1,2	257,0	0	0	11,6	269,8	NA	NA	NA	NA	NA	26	NA	NA
1961	1,8	216,0	0	0	12,2	230,0	NA	NA	NA	NA	NA	22	NA	NA
1962	2,5	233,0	0	0	13,6	249,1	NA	NA	NA	NA	NA	23	NA	NA
1963	1,8	248,0	0	0	14,7	264,5	NA	NA	NA	NA	NA	24	NA	NA
1964	0,6	326,0	0	0	16,0	342,6	NA	NA	NA	NA	NA	30	NA	NA
1965	1,2	366,0	0	0	18,4	385,6	6,2E-03	NA	NA	NA	NA	33	NA	NA
1966	2,5	396,0	0	0	21,7	420,2	6,0E-03	6,672E-03	NA	NA	NA	35	NA	NA
1967	1,2	544,0	0	0	24,3	569,5	7,8E-03	6,595E-03	NA	NA	NA	46	NA	NA
1968	2,5	428,0	0	0	27,0	457,5	6,0E-03	7,317E-03	NA	NA	NA	36	NA	NA
1969	1,8	602,0	0	0	30,9	634,7	8,1E-03	6,850E-03	NA	NA	NA	49	NA	NA
1970	2,5	495,0	0	0	34,1	531,6	6,4E-03	7,170E-03	NA	NA	NA	40	NA	NA
1971	1,8	558,4	0	0	37,6	597,8	6,9E-03	6,710E-03	6080,00	0,098	6677,8	44	446	490
1972	1,8	581,3	0	0	40,4	623,5	6,8E-03	6,989E-03	6250,00	0,100	6873,5	45	446	491
1973	1,2	646,1	0	0	42,9	690,2	7,3E-03	7,058E-03	6445,00	0,107	7135,2	48	449	497
1974	1,2	646,4	0	0	45,6	693,2	7,2E-03	7,007E-03	6760,00	0,103	7453,2	47	458	505
1975	1,3	629,0	0	0	47,9	678,2	6,6E-03	6,758E-03	7087,00	0,096	7765,2	44	463	507
1976	0,6	665,5	0	0	48,2	714,3	6,5E-03	6,406E-03	7300,00	0,098	8014,3	44	445	488
1977	0,6	636,2	0	0	50,5	687,3	6,1E-03	6,466E-03	7519,00	0,091	8206,3	41	444	485
1978	1,3	726,7	0	0	56,7	784,7	6,8E-03	6,392E-03	7764,00	0,101	8548,7	45	445	490
1979	1,3	676,1	0	0	62,4	739,8	6,3E-03	6,899E-03	8000,00	0,092	8739,8	41	445	486
1980	1,3	829,6	0	0	70,0	900,9	7,6E-03	6,738E-03	8250,00	0,109	9150,9	48	444	493
1981	1,3	663,5	0	0	71,7	736,5	6,3E-03	6,431E-03	8512,00	0,087	9248,5	38	444	482
1982	1,3	568,5	0	0	67,9	637,7	5,4E-03	5,623E-03	9289,00	0,069	9926,7	32	470	502
1983	5,0	532,8	0	0	70,1	607,9	5,2E-03	5,236E-03	9624,00	0,063	10231,9	30	472	501
1984	6,8	529,7	0	0	72,2	608,7	5,1E-03	5,123E-03	9975,00	0,061	10583,7	29	474	503
1985	10,5	523,0	0	0	74,4	607,9	5,0E-03	4,992E-03	10324,00	0,059	10931,9	28	475	503
1986	3,8	517,7	0	0	65,1	586,6	4,8E-03	4,792E-03	10400,00	0,056	10986,6	26	463	489
1987	3,1	518,0	0	0	64,8	585,9	4,5E-03	4,592E-03	10434,00	0,056	11019,9	25	449	475
1988	1,8	514,1	0	0	65,3	581,2	4,4E-03	NA	12355,00	0,047	12936,2	24	515	539
1989	NA	NA	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1990	NA	NA	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE C: SECTORIAL DISTRIBUTION OF TOTAL COMMERCIAL FINAL CONSUMPTION (PERCENTAGE)

YEAR	COAL	OIL						ELECTRICITY						TOTAL COMMERCIAL ENERGY						
		INDUSTRY	INDUSTRY	TRANSPORT	AGRICUL- TURE	RESIDEN- TIAL	OTHER	TOTAL	INDUSTRIAL	TRANSPORT	AGRICUL- TURE	RESIDEN- TIAL	OTHER	TOTAL	INDUSTRY	TRANSPORT	AGRICUL- TURE	RESIDEN- TIAL	OTHER	TOTAL
1971	100.0	31.1	44.8	3.7	11.1	9.2	100.0	71.8	0.0	1.3	14.6	12.2	100.0	33.9	41.9	3.5	11.3	9.4	100.0	
1972	100.0	30.7	46.3	4.3	11.8	6.9	100.0	72.3	0.0	1.5	14.4	11.9	100.0	33.6	43.2	4.1	11.9	7.2	100.0	
1973	100.0	32.2	43.5	4.2	12.2	8.0	100.0	72.3	0.0	1.6	14.9	11.2	100.0	34.8	40.7	4.0	12.3	8.2	100.0	
1974	100.0	31.1	45.4	4.3	12.0	7.1	100.0	72.4	0.0	1.8	14.3	11.6	100.0	33.9	42.3	4.2	12.2	7.4	100.0	
1975	100.0	30.6	48.0	4.5	9.2	7.8	100.0	71.8	0.0	1.9	15.4	10.9	100.0	33.6	44.5	4.3	9.6	8.0	100.0	
1976	100.0	26.5	53.4	5.6	8.0	8.4	100.0	71.8	0.0	1.9	15.4	11.0	100.0	29.6	49.8	5.3	6.7	8.6	100.0	
1977	100.0	26.9	47.2	5.2	11.7	8.9	100.0	71.1	0.0	2.0	15.8	11.1	100.0	30.2	43.7	5.0	12.0	9.1	100.0	
1978	100.0	27.5	44.0	5.8	13.7	8.9	100.0	70.4	0.0	1.9	16.9	10.8	100.0	30.7	40.8	5.6	13.9	9.0	100.0	
1979	100.0	24.7	48.2	5.8	12.6	8.7	100.0	68.9	0.0	1.9	18.1	11.1	100.0	28.5	44.0	5.5	13.0	8.9	100.0	
1980	100.0	26.2	46.1	8.4	11.1	8.3	100.0	67.3	0.0	1.9	19.3	11.6	100.0	29.5	42.4	7.8	11.7	8.5	100.0	
1981	100.0	28.6	44.6	6.1	13.0	7.7	100.0	67.9	0.0	2.0	20.1	10.0	100.0	32.6	40.2	5.7	13.7	7.9	100.0	
1982	100.0	33.4	42.6	5.5	10.7	7.8	100.0	64.7	0.0	2.2	22.4	10.8	100.0	36.9	38.0	5.1	11.9	8.1	100.0	
1983	100.0	33.6	42.6	4.7	11.3	7.9	100.0	64.5	0.0	2.1	22.7	10.7	100.0	37.7	37.3	4.3	12.5	8.2	100.0	
1984	100.0	34.4	43.3	4.5	11.9	5.9	100.0	64.3	0.0	2.2	22.7	10.8	100.0	38.7	37.6	4.2	13.1	6.5	100.0	
1985	100.0	33.2	43.6	4.4	12.3	6.6	100.0	64.1	0.0	2.3	22.6	11.0	100.0	38.1	37.5	4.0	13.3	7.0	100.0	
1986	100.0	33.5	45.0	5.0	11.4	5.1	100.0	64.2	0.0	2.0	26.1	7.7	100.0	37.3	39.7	4.6	13.0	5.3	100.0	
1987	100.0	29.3	45.8	7.0	12.4	5.5	100.0	64.4	0.0	2.0	26.1	7.6	100.0	33.6	40.5	6.4	13.9	5.7	100.0	
1988	100.0	29.4	45.7	7.0	12.9	5.0	100.0	64.2	0.0	2.1	25.9	7.8	100.0	33.5	40.4	6.5	14.3	5.3	100.0	
1989	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

APPENDIX D - Table D: Tariff Schedule

TANZANIA ELECTRIC SUPPLY COMPANY LIMITED
TARIFF SCHEDULE EFFECTIVE JANUARY 1, 1983TARIFF NO. 1 DOMESTIC

Applicable to premises used exclusively for domestic and private residential purposes.

Step: 1 First	0-10 kWh minimum charge Shs 13	= US\$1.07
2 Next	90 kWh: @ 50 cents per kWh	= ₡4.1/kWh
3 In excess of 100 kWh	@ 0.75 per kWh	= ₡6.2/kWh

TARIFF NO. 2

Applicable to premises where business or trade is conducted where consumption is less than 10,000 units.

Step: 1 First	0-15 minimum charges Shs 50	= US\$4.11
2 Next	485 units @ 2.50 per kWh	= ₡20.5/kWh
3 In excess of	500 units @ 1.75 per kWh	= ₡14.4/kWh

TARIFF NO. 3

Applicable to premises engaged in production of any article or commodity or industrial process where consumption is less than 10,000 units.

Step: 1 First	0-100 kWh minimum charges	
	Shs. 150/	= \$12.32
2 Next	900 kWh @ 1.10 per kWh	= ₡ 9.0/kWh
3 In excess of	1000 kWh @ 1.00 per kWh	= ₡ 8.2/kWh

TARIFF NO. 4

Applicable to premises as in Tariff No. 3 but where the consumption is more than 10,000 units per meter reading period.

Maximum Demand Charges

For the first 0-80 KVA, minimum charge: Shs 6,000	= \$492.61
In excess of 80 KVA @ Shs. 75 per KVA	= \$6.16/KVA

Unit Charge

All kWh @ 0.70/kWh	= ₡5.7/kWh
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TARIFF NO. 5 COMMERCIAL

Applicable to premises as in Tariff No. 2 where consumption is more than 10,000 kWh per meter reading period.

For the first 0.120 KVA, minimum charge: is Shs. 9,600.00	= \$788.18/KVA
In excess of 120 KVA Shs. 80 per KVA	= \$6.57/KVA
Unit Charge	
All units @ 0.75 per kWh	= \$6.2/kWh

TARIFF NO. 6

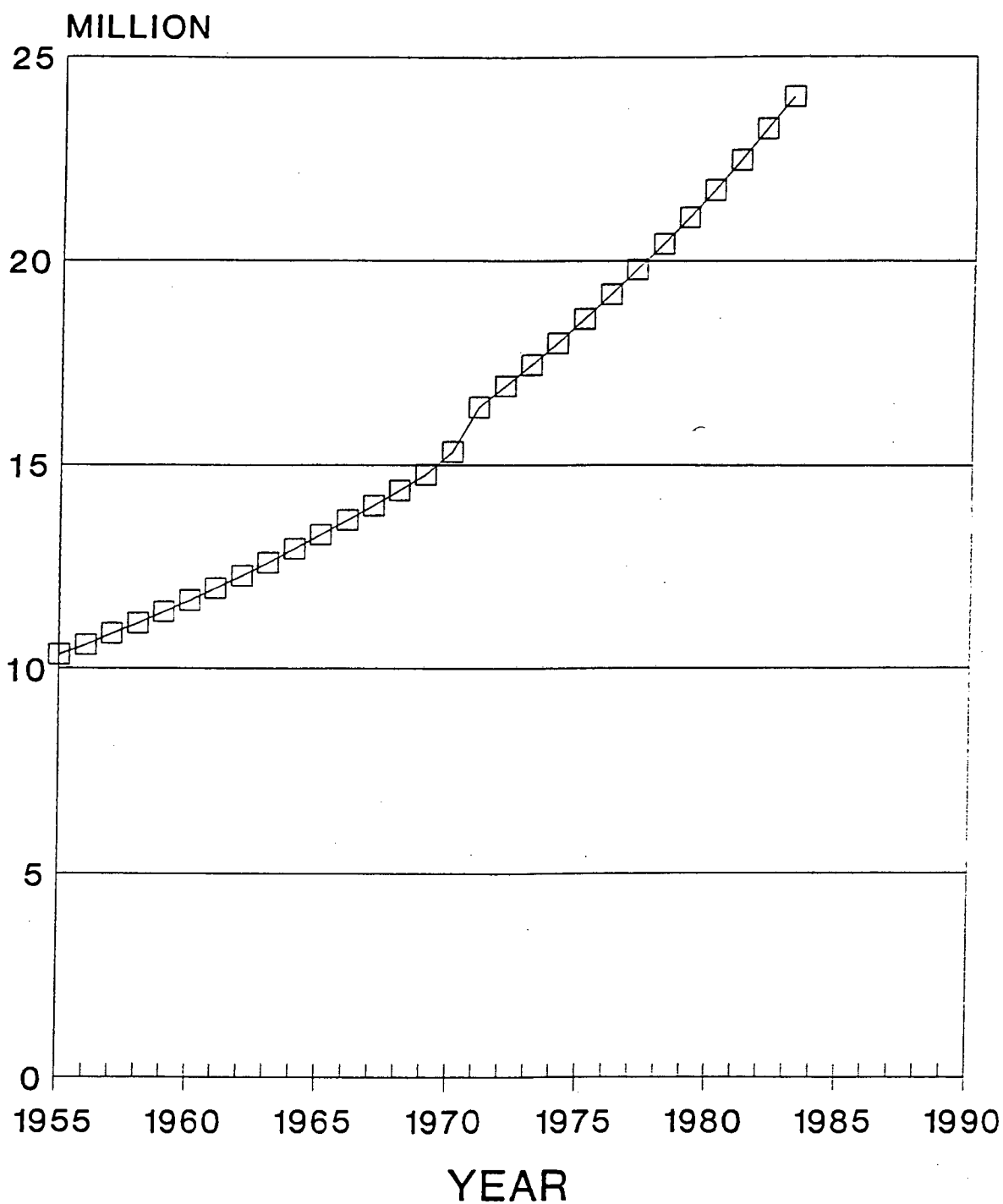
Applicable to Street Lighting, Religious Organization like Mosques, Churches, Temples etc. and other charitable organizations.

All units @ 0.90 per kWh	₤7.4/kWh
Exchange Rate: US\$1.00 = T.Sh. 12.18	

Note: A sales tax of 5% was superimposed on all tariffs in July, 1983.

FIGURES

FIGURE 1. POPULATION



TANZANIA/2018/POPULATION

FIGURE 2. GROSS DOMESTIC PRODUCT (MARKET PRICES)

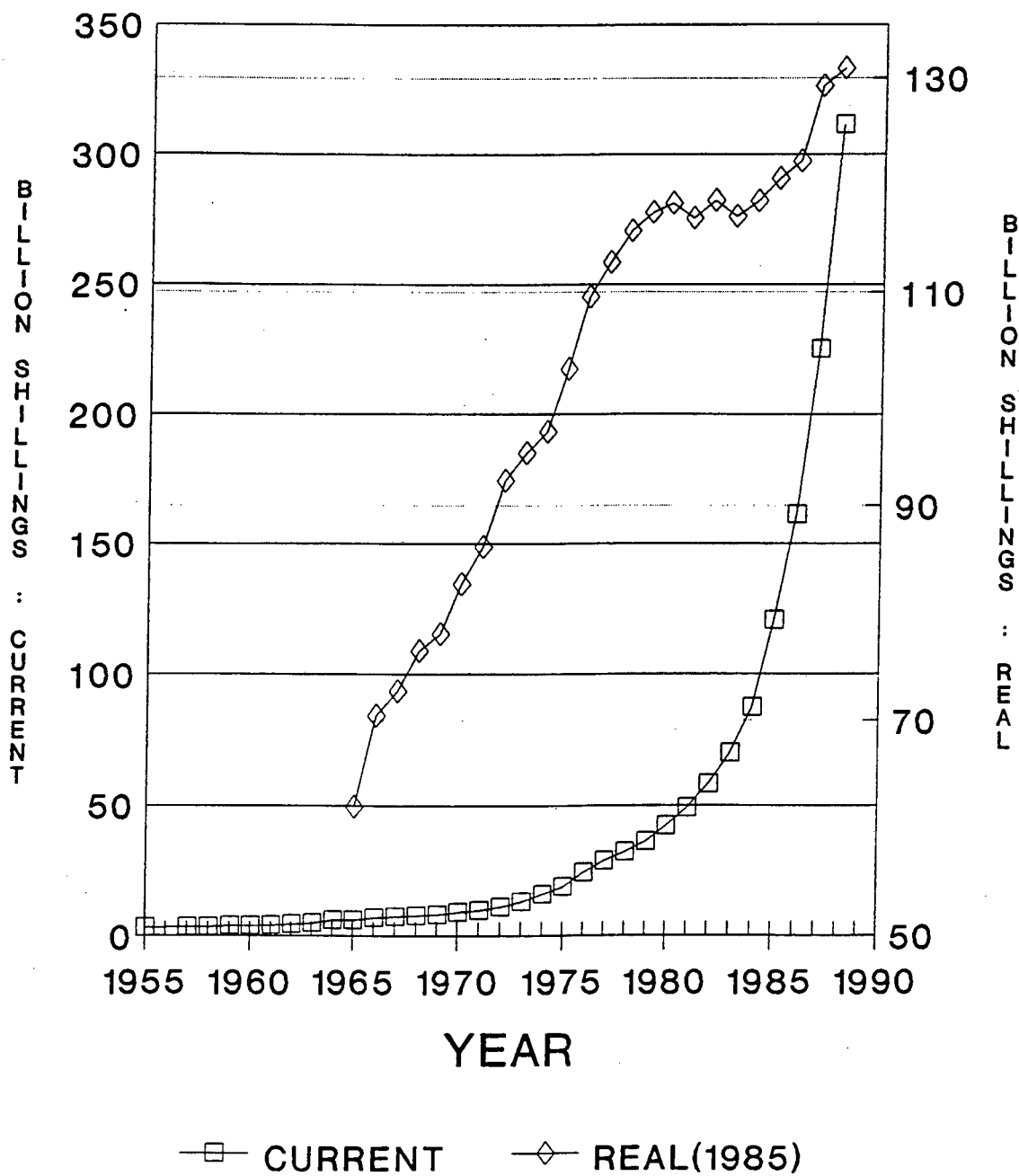


FIGURE 3. GROSS DOMESTIC PRODUCT GROWTH RATE (REAL 1985)

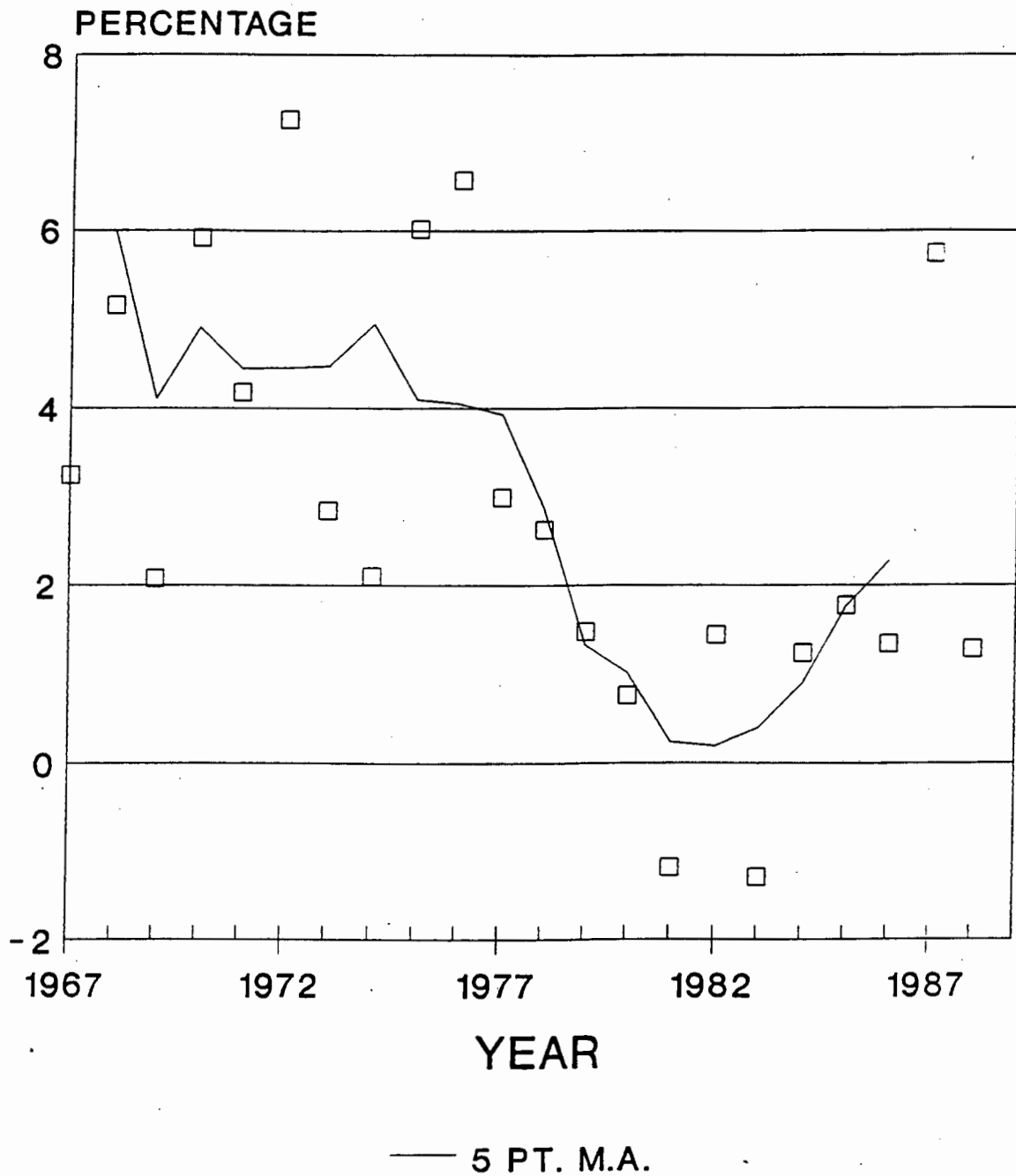


FIGURE 4. GDP PER CAPITA

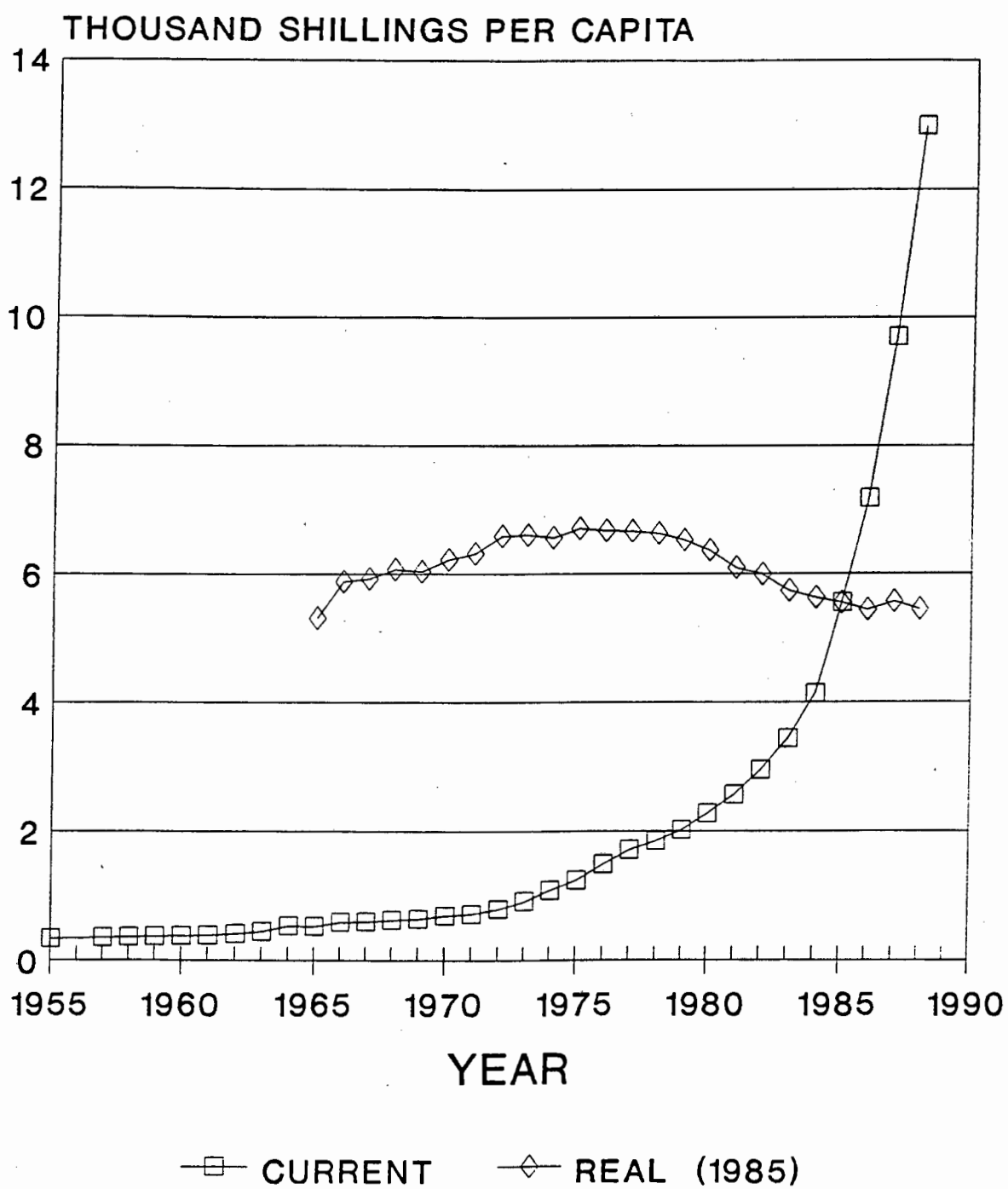


FIGURE 5. GDP COMPONENTS
AS A PERCENTAGE OF TOTAL

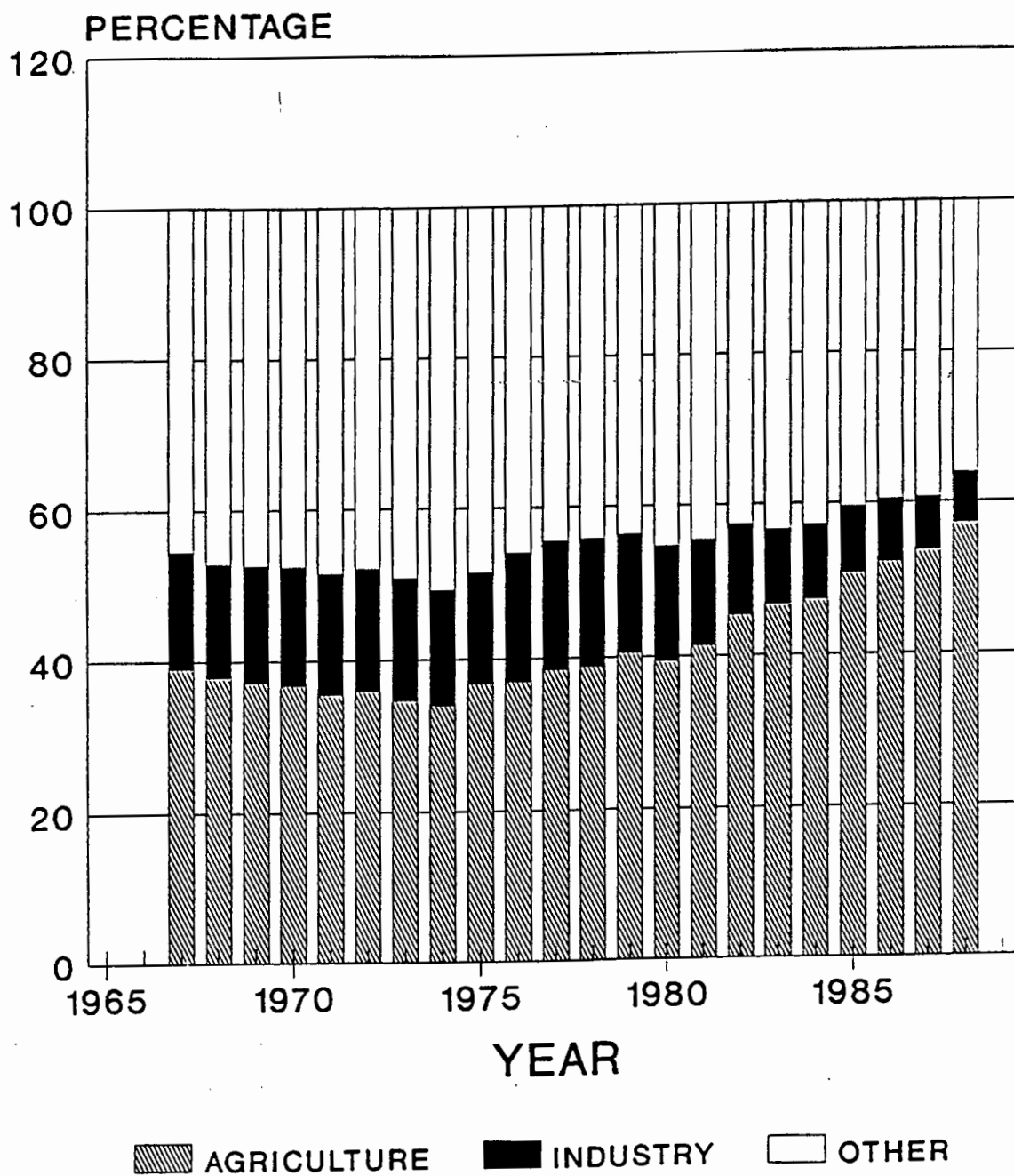
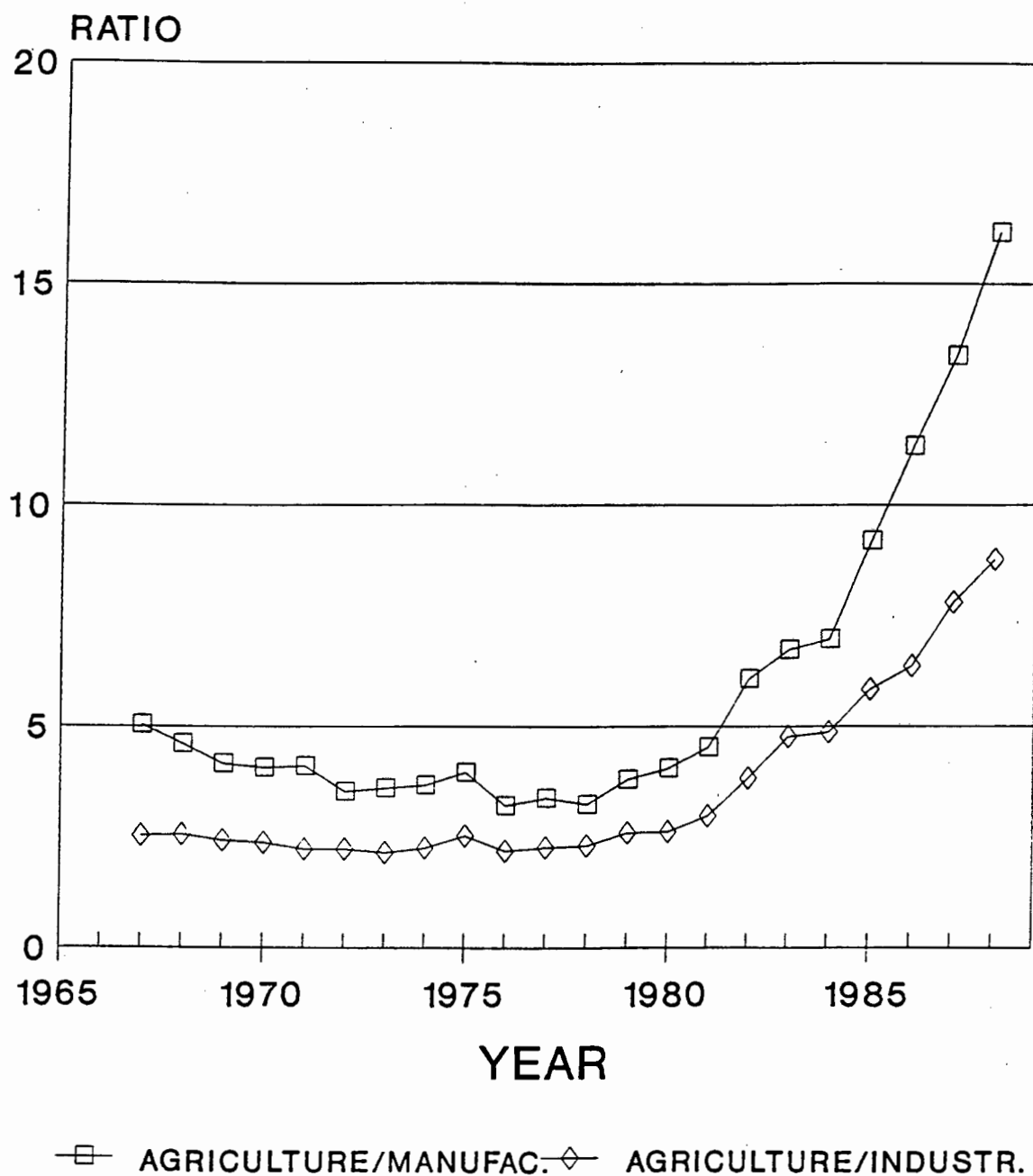


FIGURE 6. RATIO OF CONTRIBUTION TO GDP



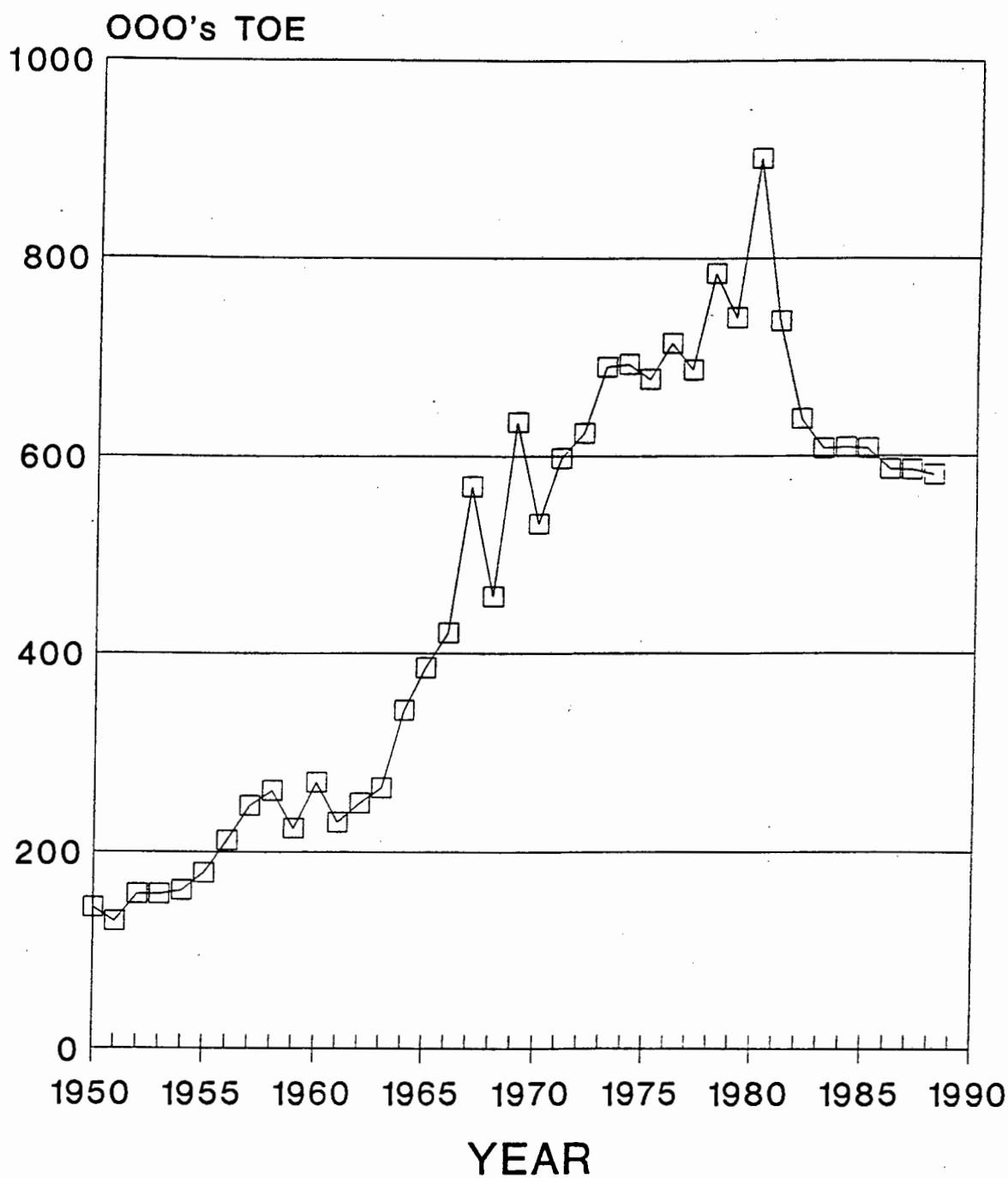
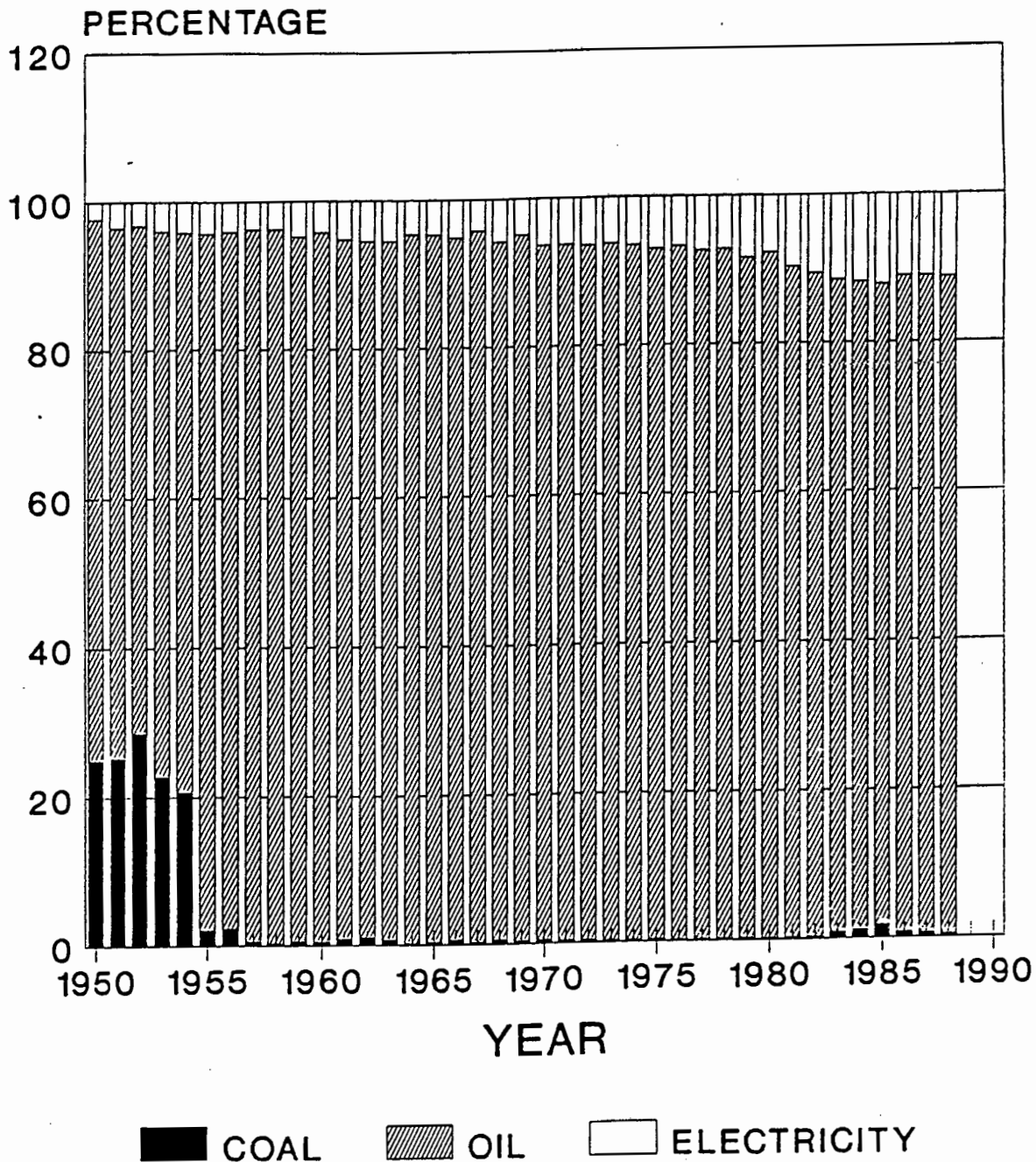
**FIGURE 7. TOTAL FINAL CONSUMPTION
OF COMMERCIAL ENERGY**

FIGURE 8. TFC COMPONENTS AS A PERCENTAGE OF TOTAL



**FIGURE 9. TOTAL FINAL CONSUMPTION
SECTORIAL BREAKDOWN
(COMMERCIAL ENERGY)**

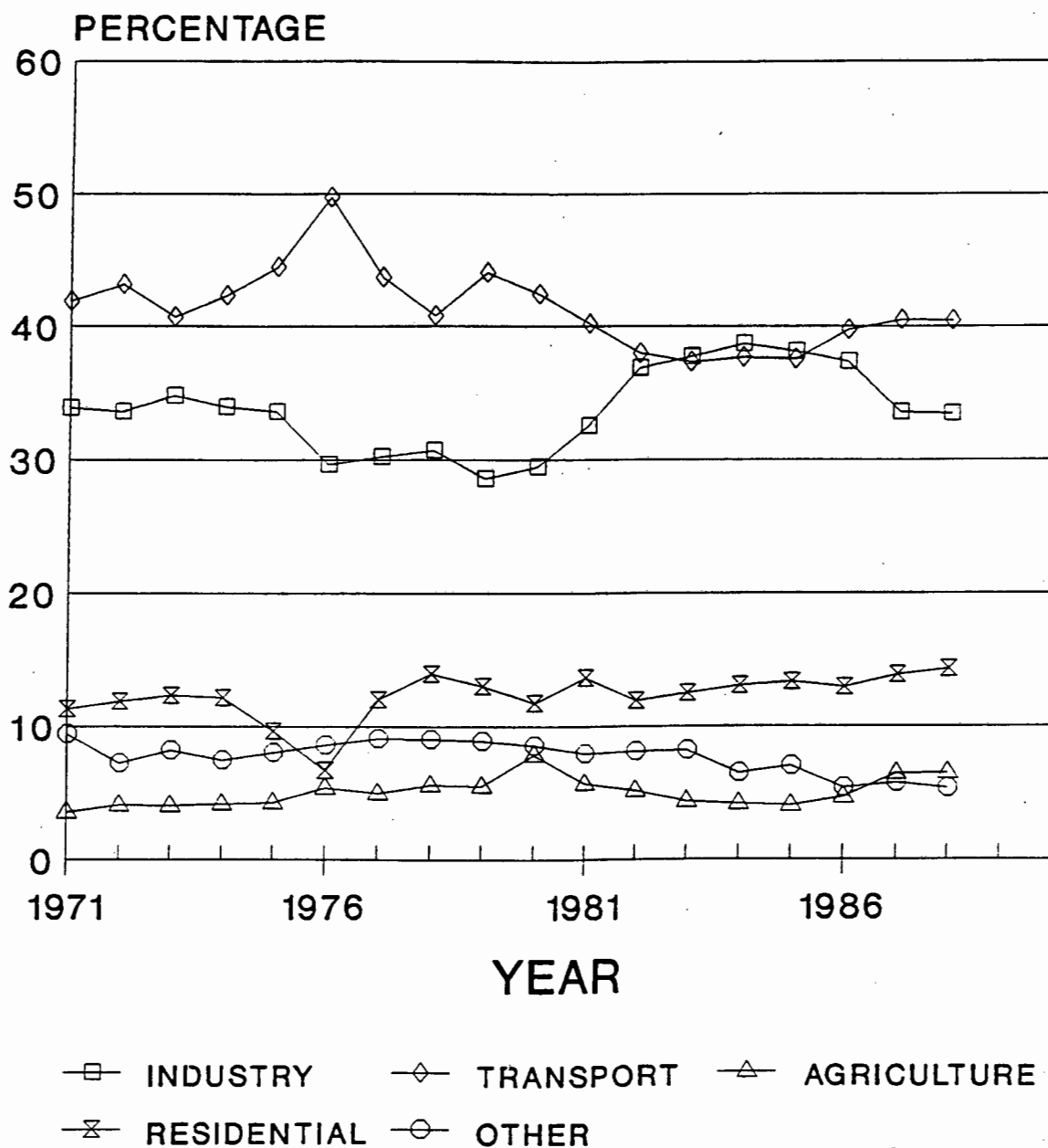


FIGURE 10. TFC AND GDP GROWTH RATES
3 PT. M.A.

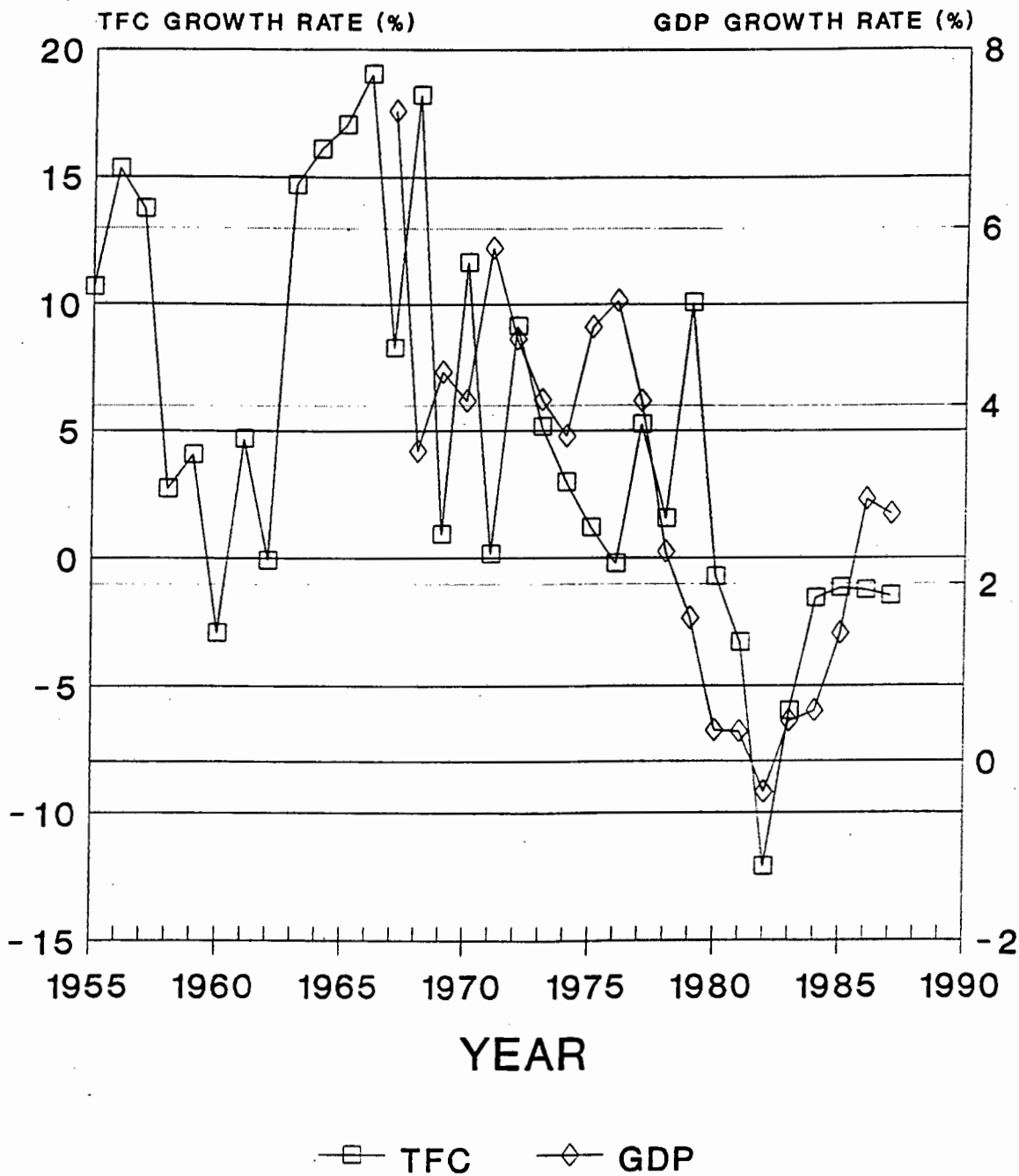


FIGURE 11. AGRICULTURAL SECTOR GROWTH RATES (PERCENTAGE)

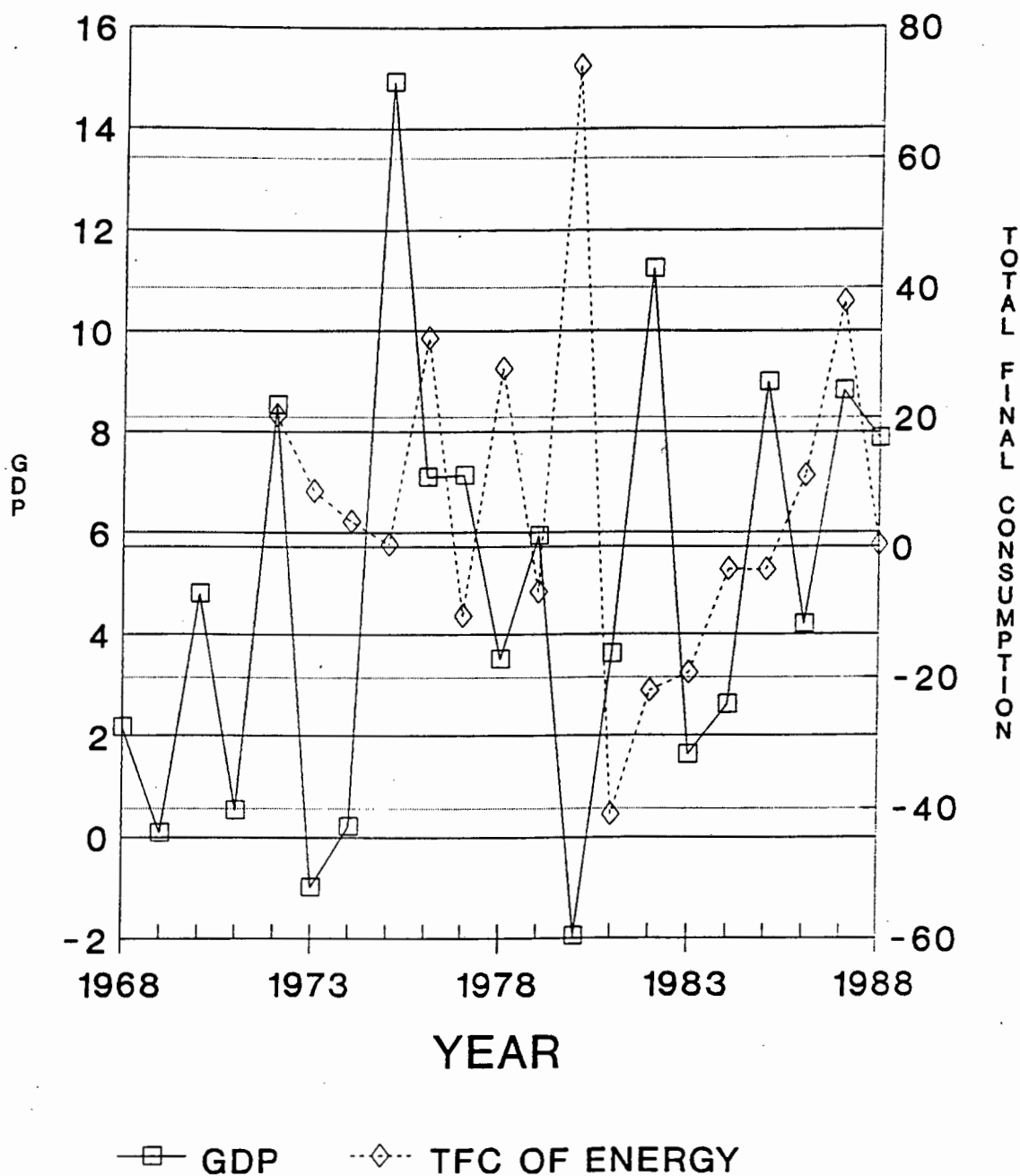


FIGURE 12. INDUSTRIAL SECTOR GROWTH RATES, PERCENTAGE (3 PT. M.A.)

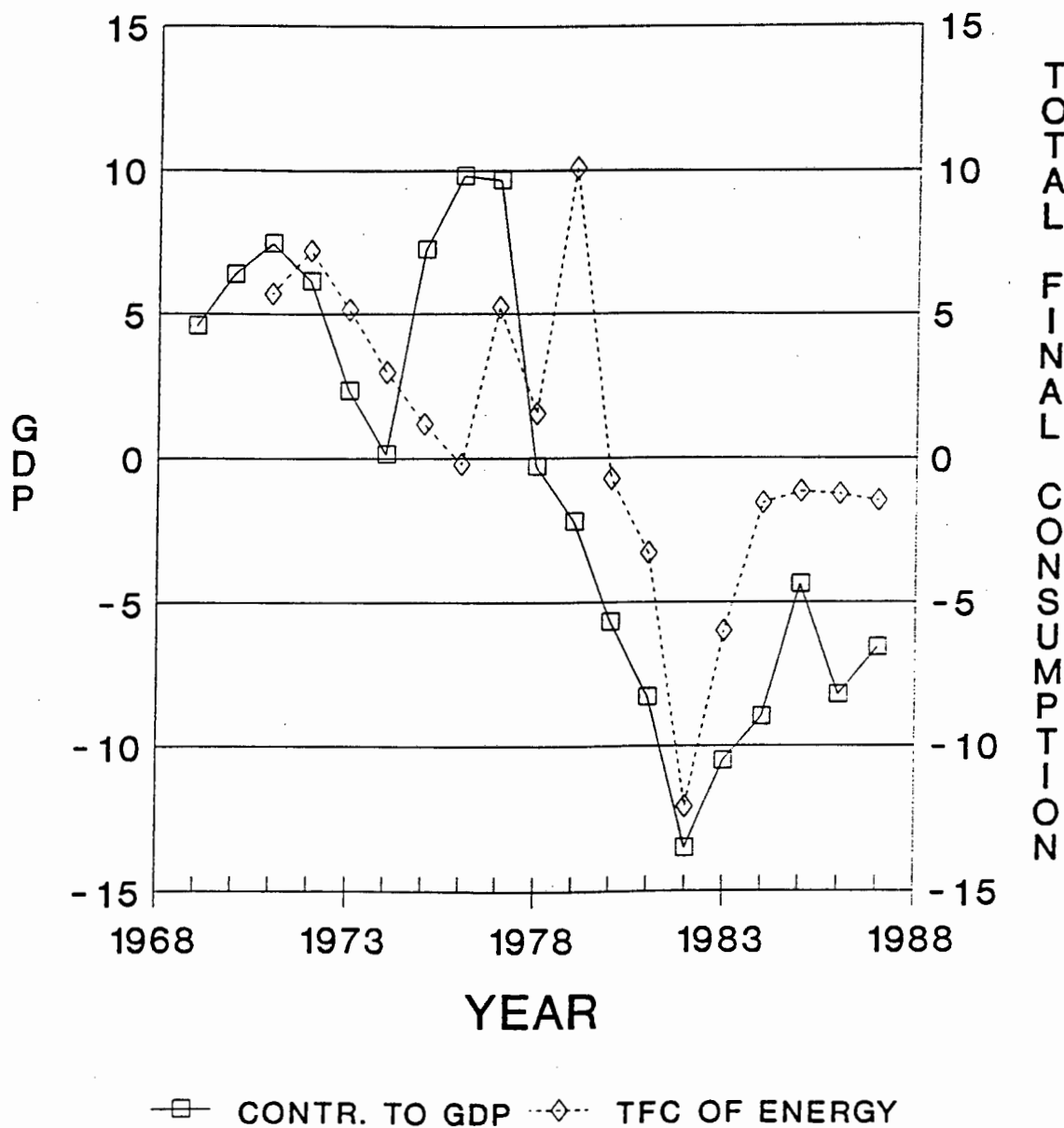


FIGURE 13. RATIO OF COMMERCIAL TO TRADITIONAL ENERGY CONSUMPTION

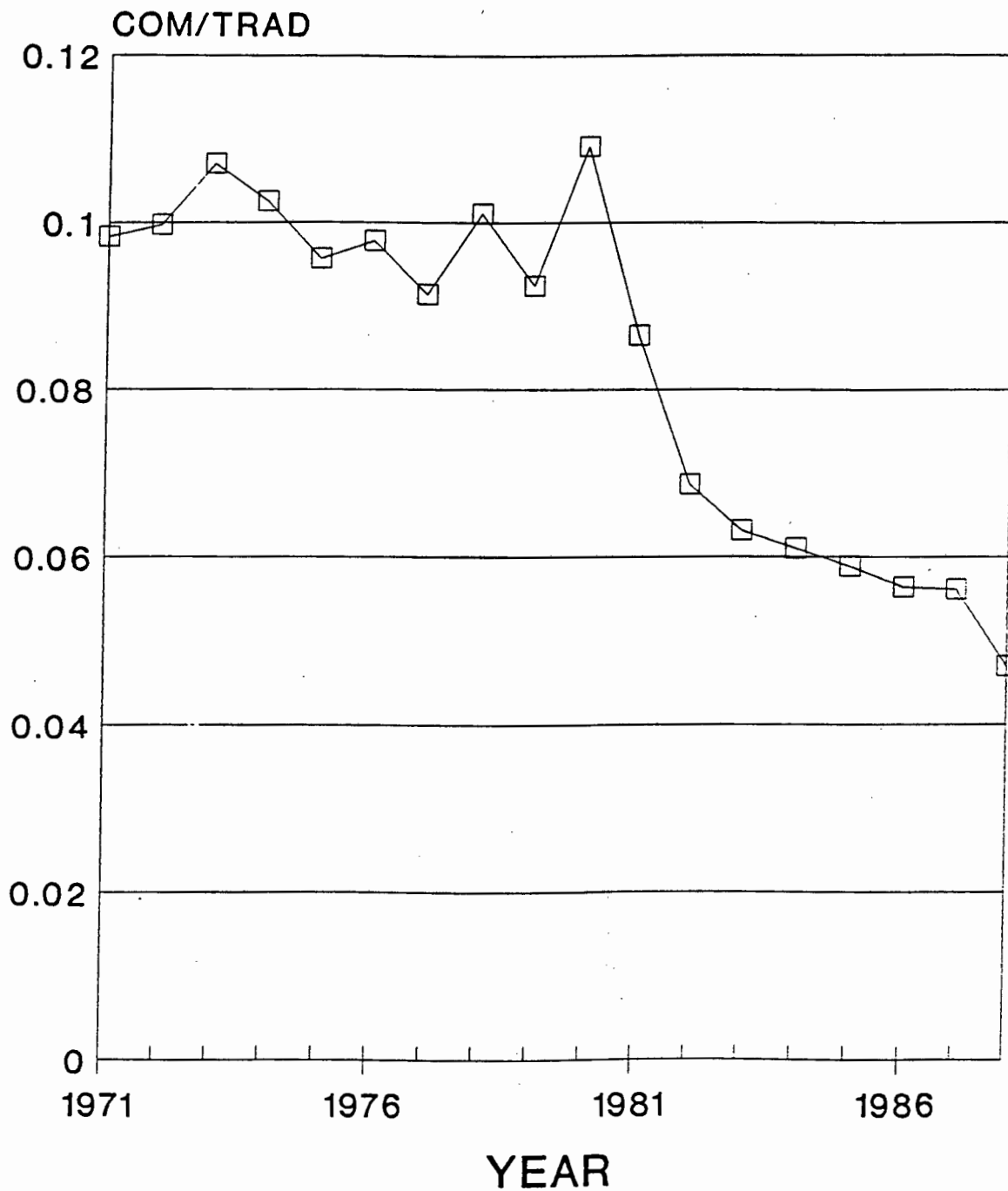


FIGURE 14. ENERGY INTENSITY
TFC(COMMERCIAL ENERGY)/GDP(real 1985)

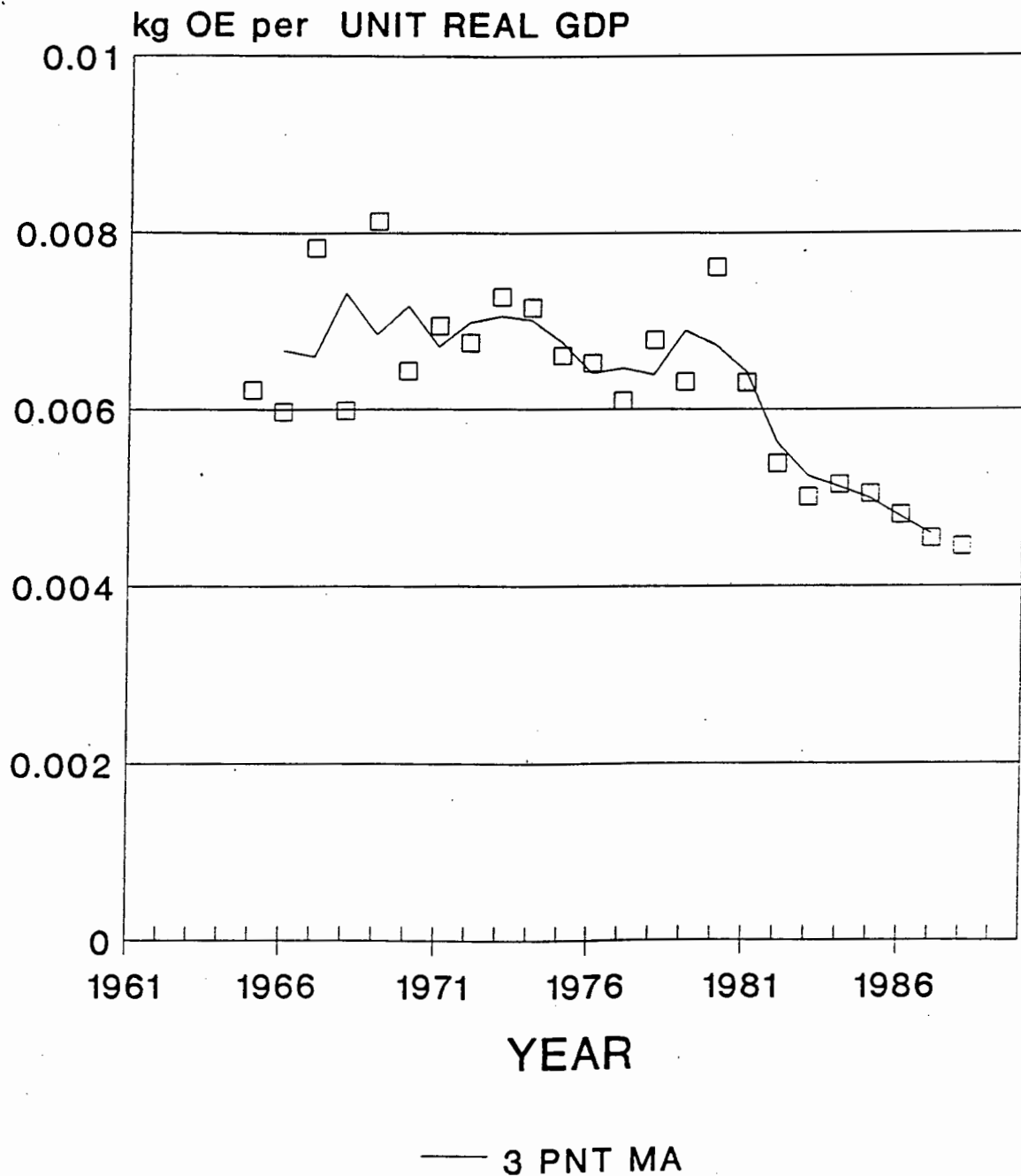


FIGURE 15. TFC/CAPITA vs GDP/CAPITA
(COMMERCIAL ENERGY)

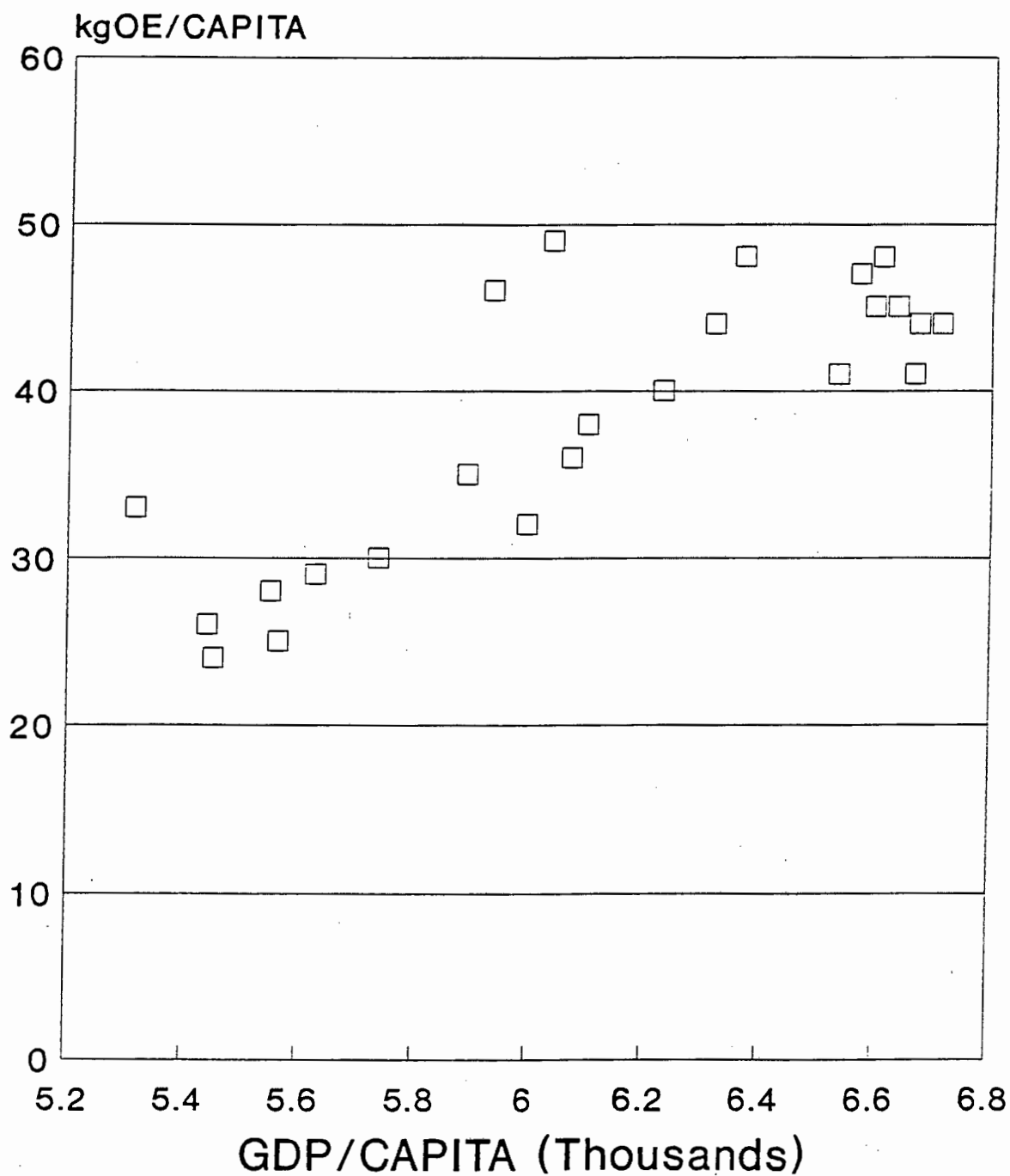
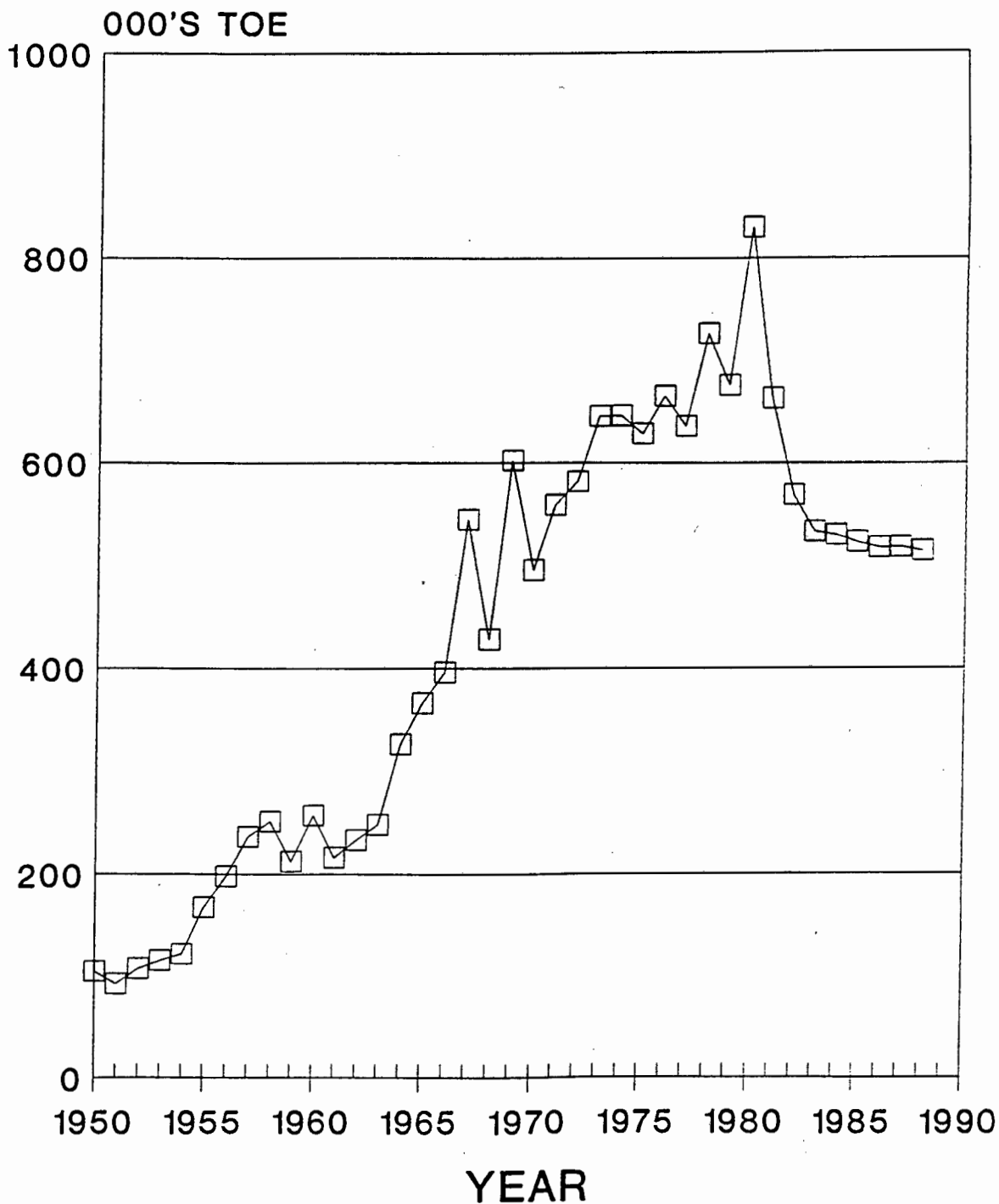


FIGURE 16. OIL: TOTAL FINAL CONSUMPTION



TANZANIA/2018/OILTFC

FIGURE 17. TFC OF OIL
SECTORIAL BREAKDOWN

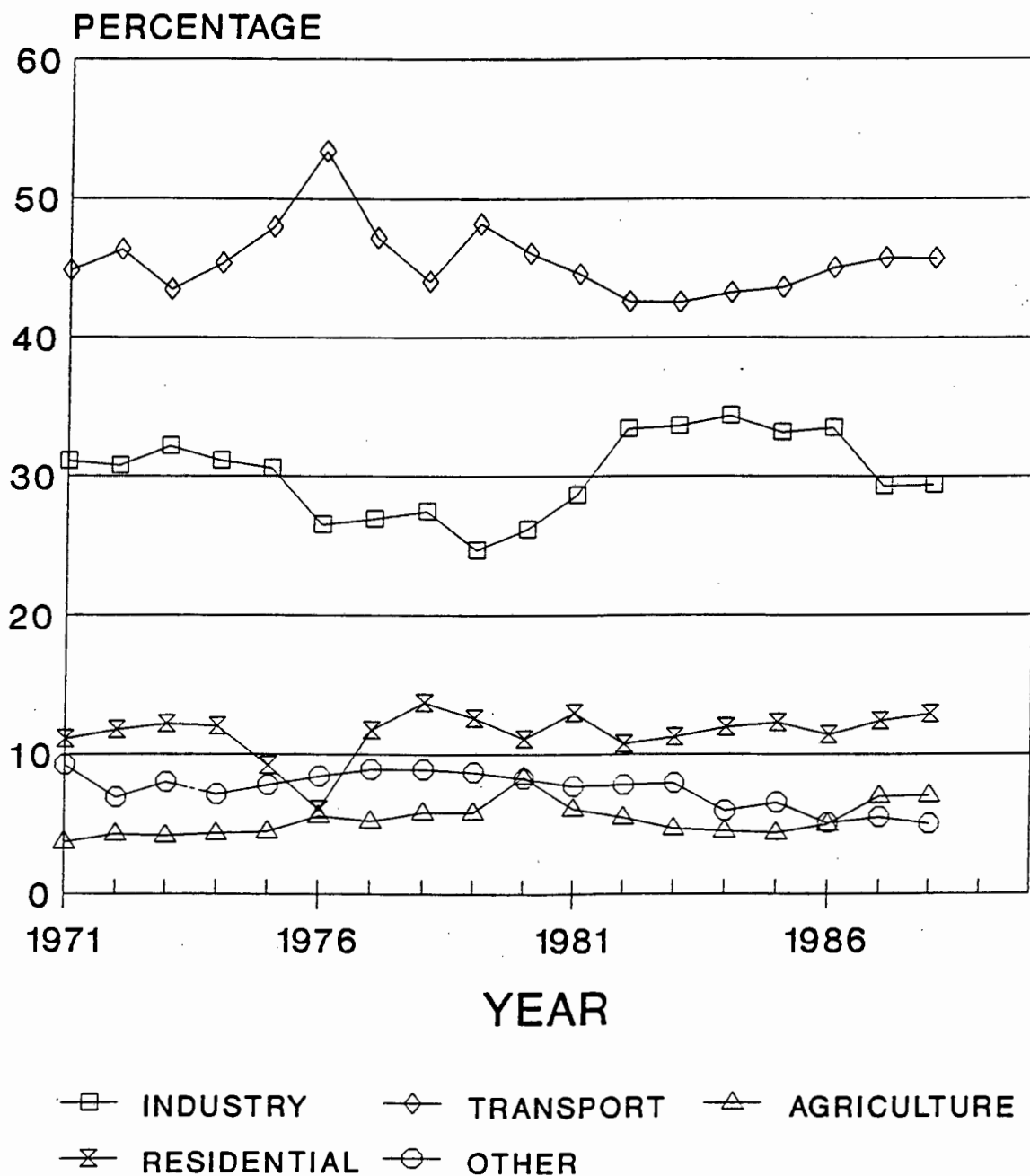


FIGURE 18. OIL PRODUCT CONSUMPTION

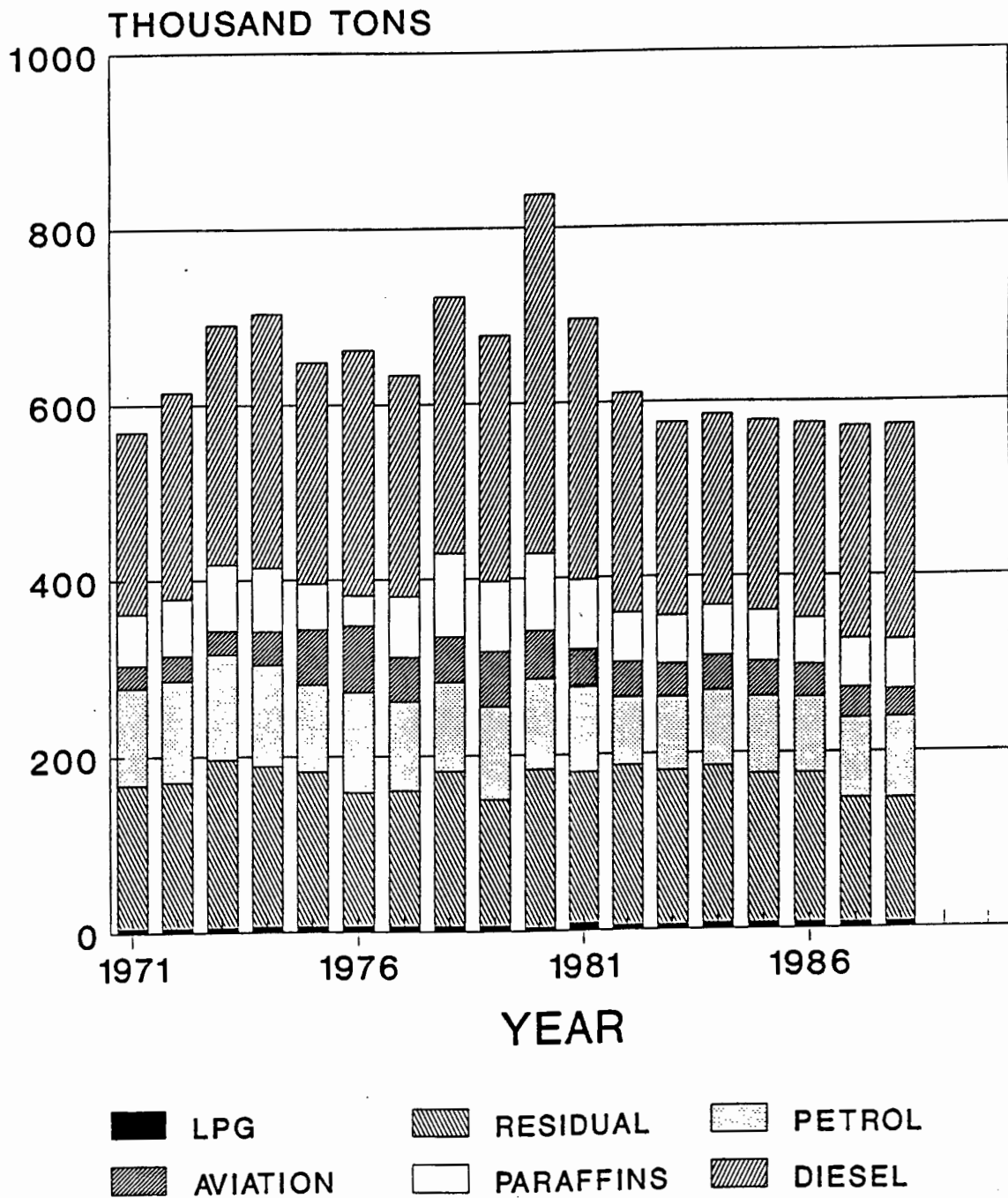
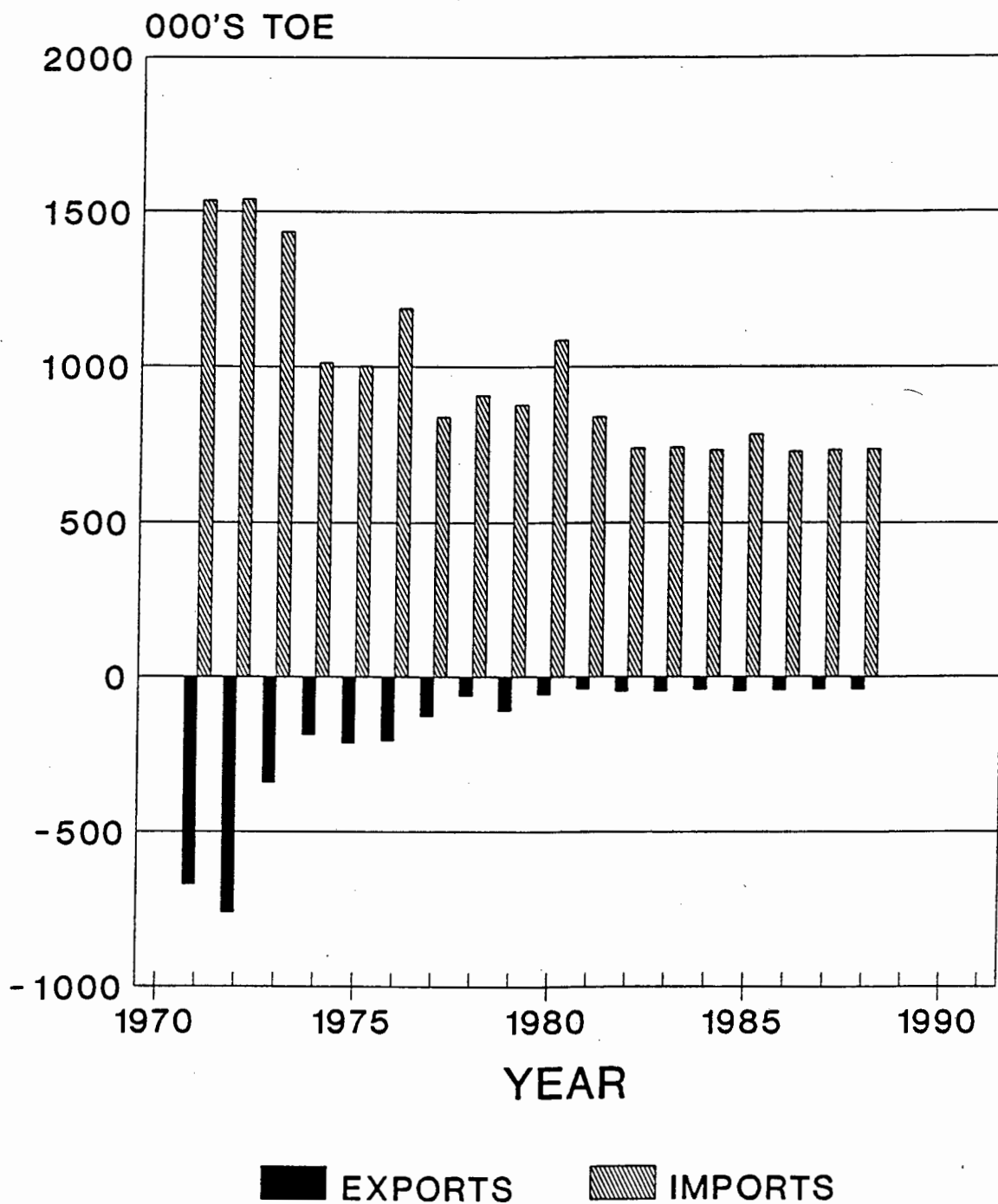
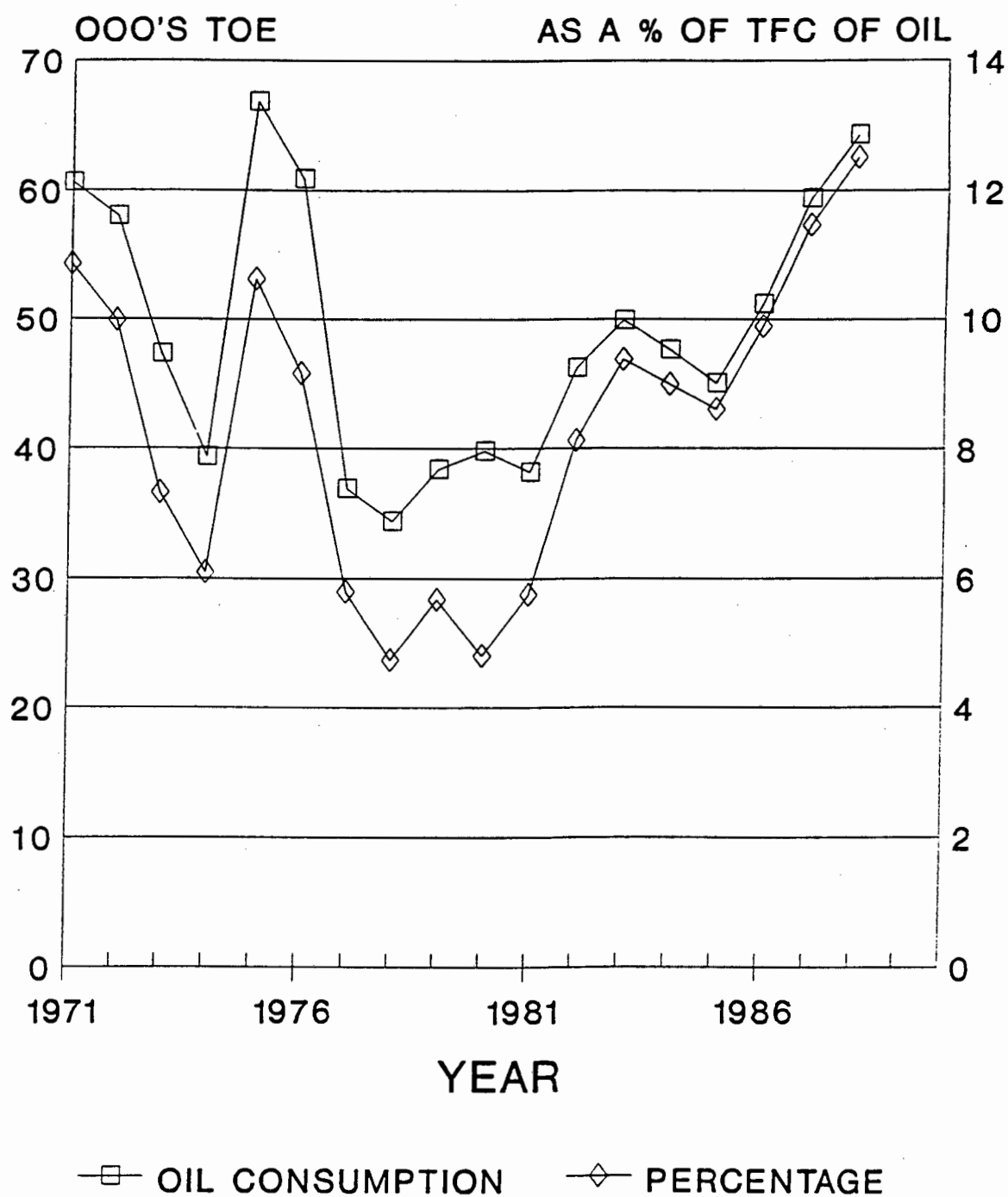


FIGURE 19. OIL: IMPORTS AND EXPORTS



TANZANIA/2018/OIL1A

FIGURE 20. OIL REFINERY CONSUMPTION



TANZANIA/2018/OIL0A

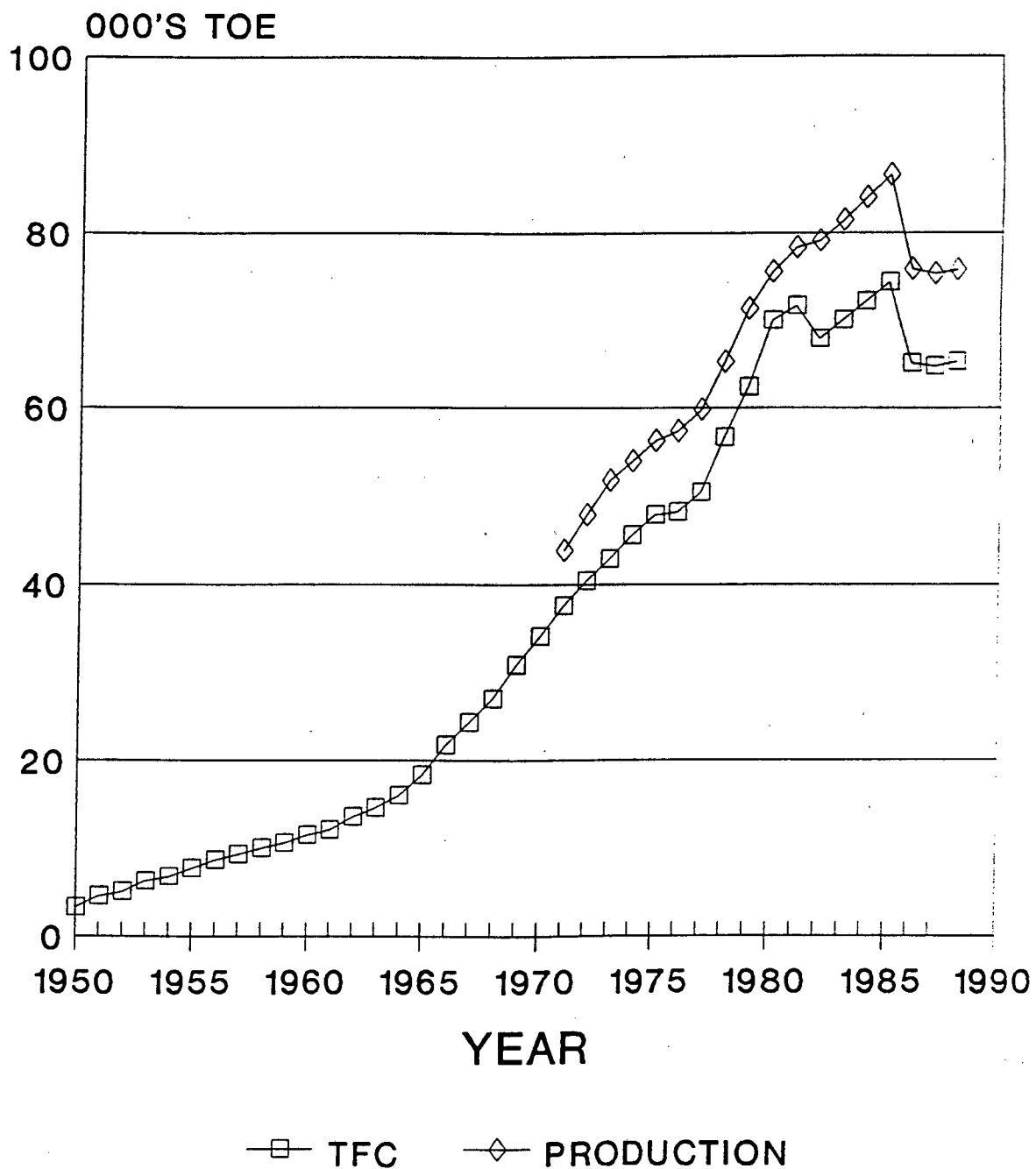
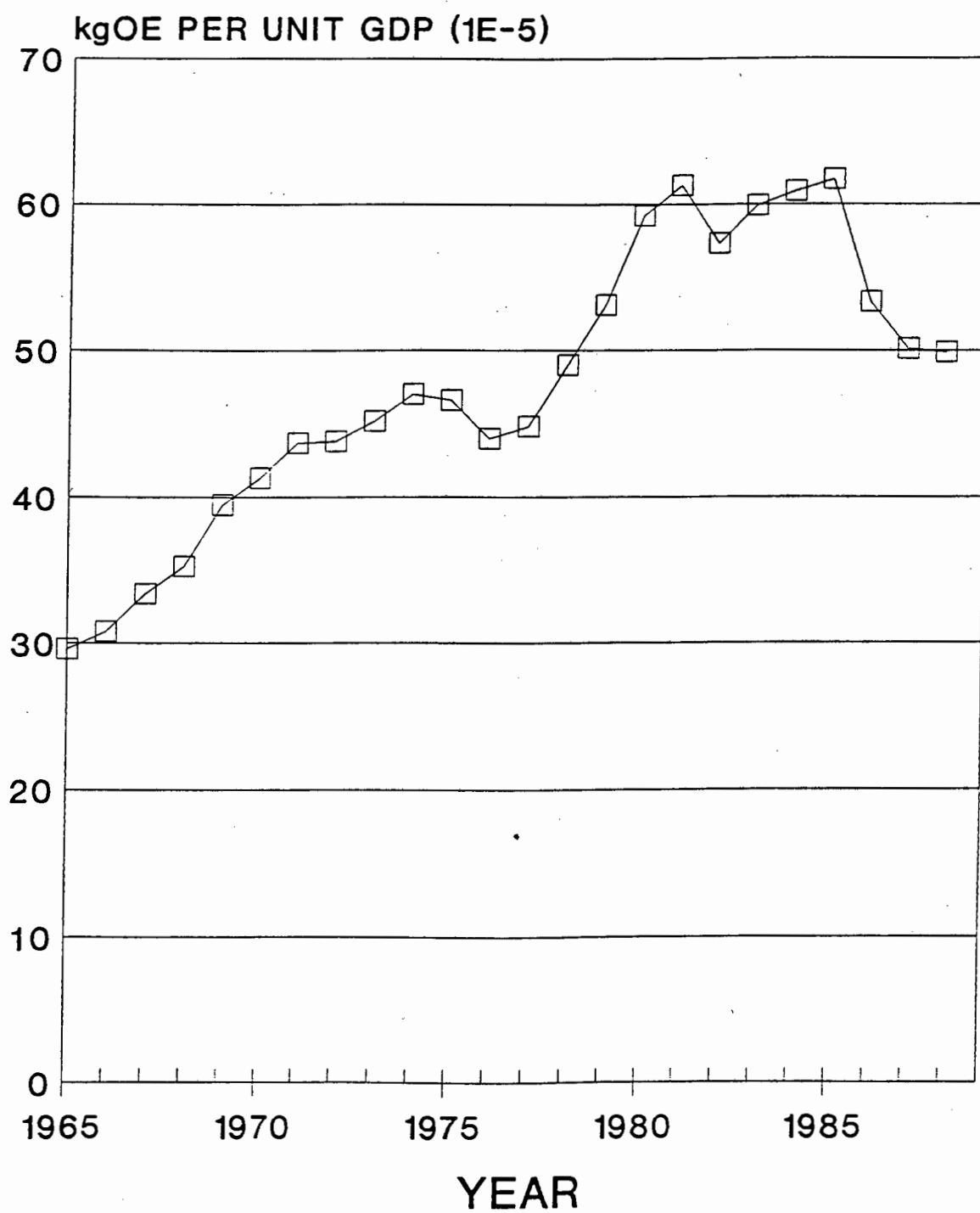
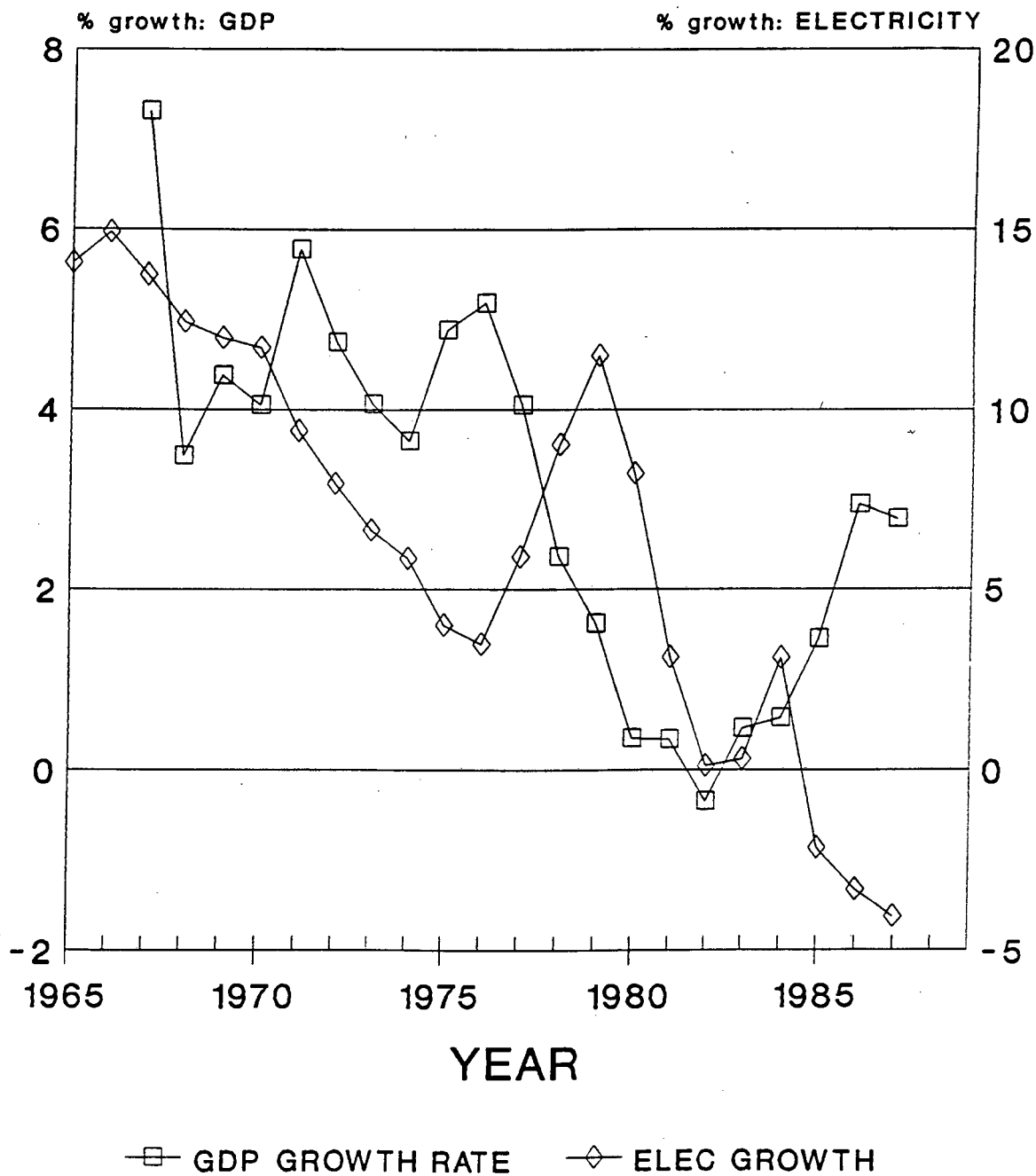
FIGURE 21. ELECTRICITY PRODUCTION AND TOTAL CONSUMPTION

FIGURE 22. ELECTRICITY INTENSITY



TANZANIA/2018/ELEC7

FIGURE 23. GDP AND ELECTRICITY TFC GROWTH RATES (3 PT M.A.)



TANZANIA/2018/ELEC3

**FIGURE 24. ELECTRICITY : TFC
SECTORIAL BREAKDOWN**

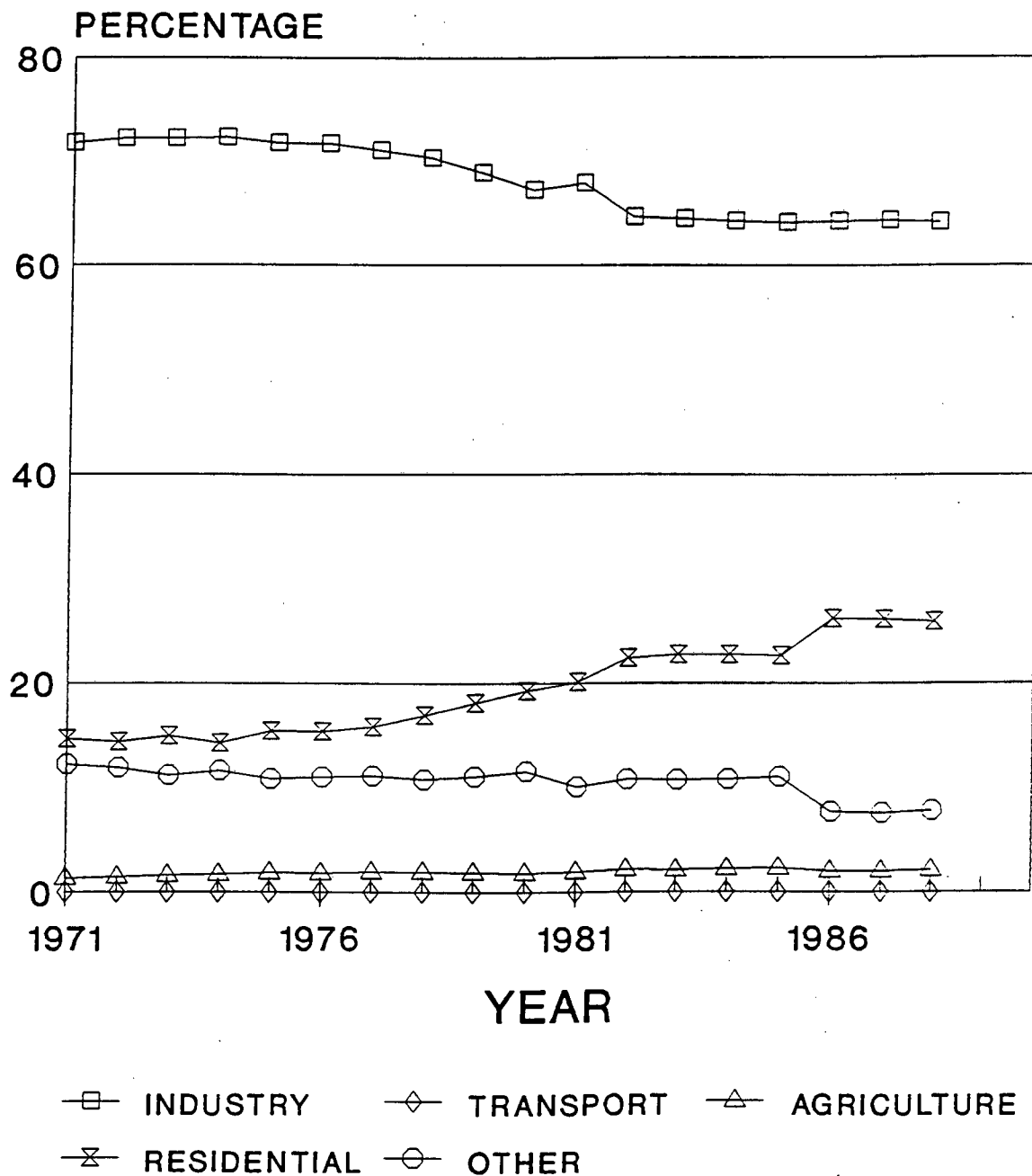
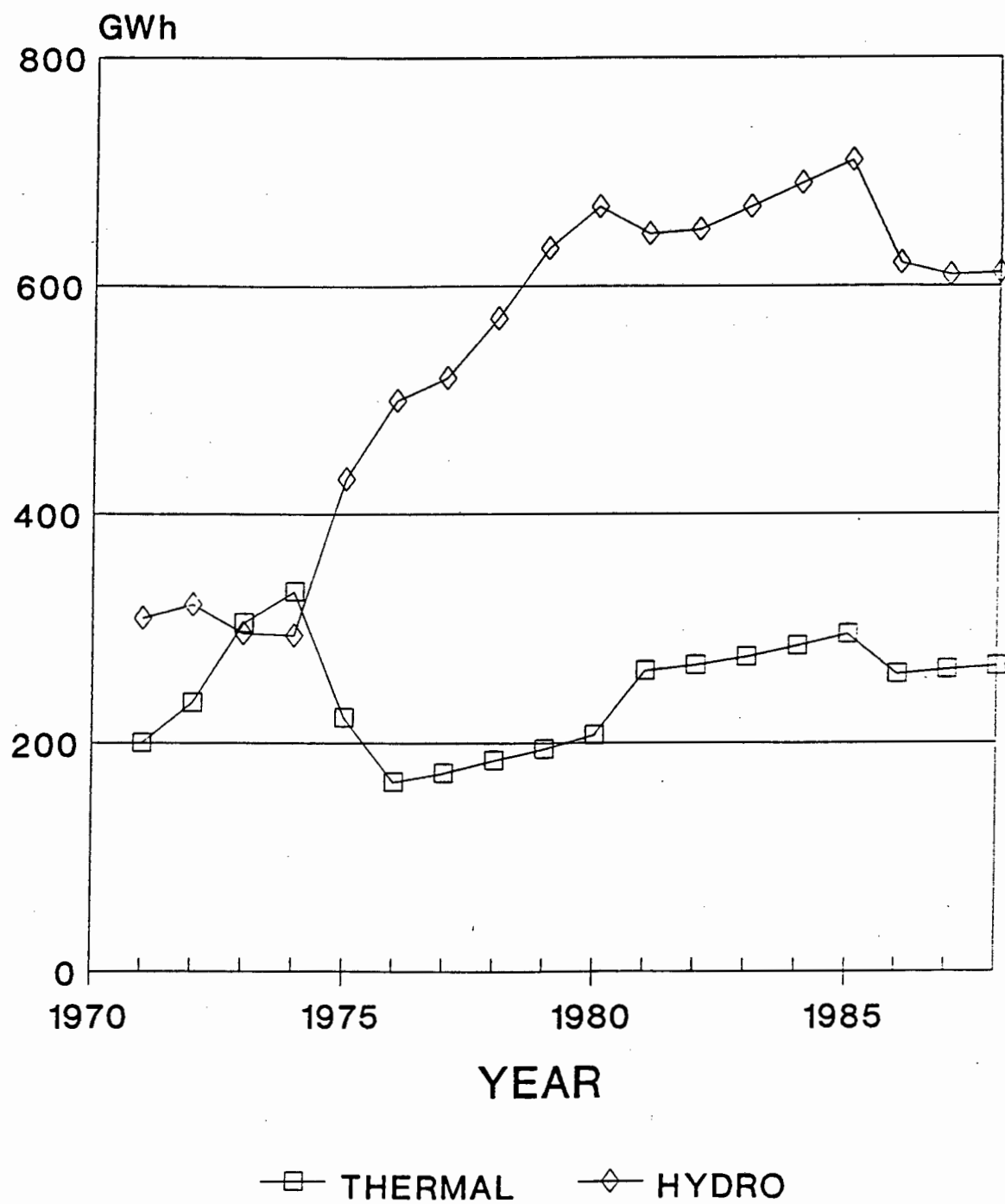


FIGURE 25. ELECTRICITY PRODUCTION



MAPS

