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The development of dairy imports in Nigeria

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PREFACE

The LPU series of Working Papers is usually reserved for presenting the work of the staff of ILCA's policy/economics group or of its direct consultants. The author of this paper, Dr. S.G. Nwoko of the Department of Agricultural Economics, University of Ibadan, Nigeria, is neither a member of ILCA's staff nor its consultant, but the topic of the paper - The Development of Dairy Imports in Nigeria-is so close to those of other papers by Dr. von Massow in these series (i.e. LPU Working Papers nos. 4 and 8) that it seemed desirable to bring it to the attention of the same audience.

We are grateful therefore to Dr. Nwoko for allowing us to circulate his paper in these series, but, as with all our working papers, the views and interpretations in this document are those of the author and should not be attributed to ILCA.

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INTRODUCTION

1.01 A review of Nigeria's economy between 1961-70 (Federal Ministry of Agricultural and Natural Resources, 1974) showed that the rate of growth in the domestic production of essential food items was lower than the rate of growth in demand for every food item with the exception of seeds of leguminous crops and cashew nuts. The average food deficiency for all food items was 65% with a range of 13 to 83%. Looking ahead, all major food items are expected to be in short supply by 1990 (Olayide, 1980).

1.02 A chronic shortage in domestic food supply can in the long-run be tackled with policies such as input subsidies, price support programmes or the introduction of technological innovations. Nigeria has resorted to massive food imports as a short-term measure for augmenting local food supply while employing the above measures in an effort to achieve a permanent solution. Food imports policy is a crucial variable in the economic development of any food deficit developing nation. Though crucial, food imports are also highly sensitive because of (1) the competition between food and capital goods imports in the allocation of scarce foreign exchange resources of most developing nations, (2) the contributory effect of food imports to (i) adverse balance of payments, (ii) government revenue, (iii) rate of inflation and (iv) income redistribution.

1.03 In Nigeria, the level of foreign exchange reserves, which is an indicator of the capacity to finance imports, declined steadily from N 342.7 million in 1960 to N102.0 million in 1968, then increased steadily to N 5462 million in 1980. Since 1980, the foreign exchange reserves have been on the decline again. With the exception of 1972, the balance of payments was favourable between 1970 and 1975. But since 1977, the nation has experienced a steadily worsening balance of payments position.

1.04 The population of Nigeria increased, at an estimated rate of growth of 2.5% per annum, from 57.8 million in 1960 to 91.4 million in 1983. This means that the foreign exchange reserves per caput fluctuated during the same period --declining in the sixties, increasing in the early seventies and declining in both late seventies and early eighties. These fluctuations coupled with the adverse balance of payments situation would probably necessitate restrictive food import policies.

1.05 Since most food imports are taxed at a fixed rate of duty, fluctuations in food imports cause fluctuations in the revenue collected by the government. Income distribution between the low and the high income classes is also affected through the effects of food imports on relative prices (Mellor, 1978). The low income earners spend a smaller proportion of their income on food when there is a general deflation of food prices relative to other prices due to increased food supply arising from increased domestic production or increased food imports or both. This is a welfare component of food import policy which Nigerian government policy makers have recognised (Federal Ministry of Finance, 1960).

1.06 But because the change in relative prices of food items has been small compared to the general rise in price levels, the real income of all categories of workers in Nigeria has been on the decline. With 1960 as base year, the urban food price index in 1983 was about 14 times of what it was in 1960. The composite cost of living index in 1983 was 9 times the base year value of 1960. There was thus an adverse welfare effect of inflation on the lower income group who spent relatively more on food items. In order to avoid this effect, the government would have to increase food imports or help increase domestic production or both. Increased domestic production and supply of food can hardly be stimulated in the short-run. Also, the effects of high urban consumer prices for food are not likely to boost production since the transmission of urban price signals to rural areas is low (Olayemi, and Olatunhosum 1974/75). The solution in the short-run is thus to increase food imports.

1.07 The movement of macro economic variables, however, points to possible conflicts in food import policies. Whereas the desire to improve the welfare of the masses in the face of rising domestic food prices and of domestic food shortages indicates the need for more food imports, the adverse balance of payments as well as the worsening foreign exchange reserves situation would call for restrictive food import policies.

IMPORTS OF DAIRY PRODUCTS

2.01 The annual value of dairy imports into Nigeria during the Second World War, at current market prices, ranged between N 70,000 and N 107,000. Between 1945 and 1950 the value of dairy imports increased by about 5 times. The post independence (1959) current market value of dairy imports was 15 times that of the import value in 1951. The estimated value of dairy imports in 1983 was 22 times that of the import value in 1959. The data are graphed in Appendix 12.

2.02 Appendix 1 shows the composition of dairy imports (in value terms). It can be observed from this table that, with the exception of 1968, condensed and evaporated milk (sweetened and unsweetened) accounted for over 50% of the annual value of total dairy imports. Imports of butter fluctuated between 1.2 and 6% of the total value of dairy imports while the import values of cheese and curd and fresh or cream and sour milk ranged between 0 and 2.1%, and 0 and 4.3% respectively. Powdered milk accounted for up to 43% of the total value of dairy imports but in some years for much less.

OBJECTIVES OF THE STUDY

3.01 The overall objective of this paper is to analyse the development of dairy imports and its impacts on domestic dairy production in Nigeria. Specifically, we shall examine:

a) Dairy import policy objectives, import control measures and their effectiveness;

b) Local dairy production systems, dairy marketing systems and government policies which affect both local production and marketing.

The aim then is to make possible the formulation of alternative policies concerning dairy imports and domestic milk production for Nigeria.

POLICY OBJECTIVES, POLICY INSTRUMENTS AND THEIR IMPACTS ON DAIRY IMPORTS

Policy Objectives

Maximum Imports with Maximum Export Earnings

4.01 The view that "The Nigerian Government did not show any serious concern over the foreign sector of the economy before 1964" (Fajana, 1977) is highly debatable. Prior to 1964, Governments in Nigeria were motivated by welfare considerations of the Nigerian public in their external trade policy. They had to secure the maximum goods possible with the foreign exchange at their disposal and with the greatest ease. The case of procurement of imports was determined by the interchangeability of the domestic currency, that was the convertibility of the pound (Federal Government of Nigeria, 1961). The currency was thus easily exchangeable in the sterling areas as defined in the Exchange Control Ordinance of 1950 (Nigerian Government, 1950).

4.02 The sterling areas were the British Commonwealth (except Canada), any colonies or Trusteeship Areas under Her Majesty's Dominion, British Protectorates, Ireland, Iceland, Burma, Jordan and United Kingdom of Libya. Importing goods and services from within such areas was similar to domestic purchases of goods and services since the pound sterling was the unit of account. The next best trade area in terms of interchangeability of currency was the group of O.E.C.D. (Organisation for Economic Cooperation and Development) countries. In this area there were "... special arrangements through which members settle their current import/export transactions with minimum foreign exchange difficulties" (Federal Government of Nigeria, 1961). Since the United Kingdom was a member, all commonwealth countries shared the benefits of the membership of the United Kingdom in the O.E.C.D. Since 1960, when Nigeria attained its independence, the concept of interchangeability of currency that had been valid throughout the colonial era was abandoned and the conservation of foreign exchange became the top priority. This is evident from Central Bank publications (Central Bank of Nigeria, 1963) and budget speeches (Oluleye, 1978).

Revenue Collection and the Protection of Infant Industries

4.03 The infant industry argument, a classic in international trade theory (see Haberler, 1959, for a review), involves protecting young domestic industries from foreign competition so that the domestic industries can nurse their productive

strength to full capacity. The idea became popular in Nigeria after independence (Fajana, op. cit. p. 111). As more new industries got established, the cry for protection got louder. Consequently, protection has been one of the prominent objectives concerning Nigeria's international trade policies. Before the emergence of the infant industry argument, the colonial government pursued the related policy objective of increasing its revenues by taxing imports. The effects are the same: higher import taxes by discouraging imports increase the shelter to infant industries. As a side effect, however, they may increase inflationary pressure.

Import Measures

4.04 It is expected that different import policy objectives are pursued by different import control measures. The number of such measures will depend on their effectiveness. Where a single measure is exhaustively and exclusively effective, there is no need loading the administrators with additional measures aimed at the same objective. The import control measures which have been used in Nigeria are:

a) Open general import licenses
b) import prohibition
c) import duties and,
d) foreign exchange allocation

Open General Import License

4.05 An open general import license is defined as "... a notice published in the official gazette which permits an importer to order and bring into Nigeria any of the goods covered by the license from any of the countries mentioned therein" (Federal Government of Nigeria, 1961). Such a license places restrictions on the types of goods to be imported and the countries from where they can be imported. The system of open general import licenses became legalized with the definition of the sterling areas in 1950. It was revoked by the Military Government in 1984. Dairy products, like other essential commodities, have always been subject to the open general import license. Only fresh milk was occasionally excluded from the open general import license (Federal Republic of Nigeria, 1978).

4.06 Prior to 1959, open general import licenses applied to the sterling areas, the O.E.C.D. countries and the overseas possessions of the members of O.E.C.D.

countries. In the case of dairy imports, it can be observed that, with the exception of dairy imports from Hungary in 1948 and 1949, imports of dairy products from Eastern European countries who were not covered by the open general import license only started in 1959, on the eve of Nigerian independence. Up to 1979, Nigeria increasingly imported dairy products from the European Community (EC), the commonwealth countries and the United States of America.

4.07 Imported goods which do not fall under the open general import license are further regulated. Importers of these restricted goods require special numbered import licenses which specify the quantity of goods to be imported and the countries from which such goods can be imported. Prior to 1959, payments in non-sterling currencies were not allowed for restricted imports (Federal Government of Nigeria, 1961). Since 1959, payments can be made in any currency provided the commodity is imported with a license. The distinction between the open general import license and the restricted import license disappeared in 1984. The Federal Military Government has decreed that all imports are subject to a restricted license. This means that dairy products have since lost their preferential import position.

Import Prohibition

4.08 Another measure to control imports is prohibition. The reasons why imports of some products are prohibited are:

a) to build the spirit of self reliance by producing the good domestically,
b) to ensure the safety of the Nigerian public,
c) to preserve the local market for domestic products and,
d) to save foreign exchange.

4.09 There were several import prohibition orders like those, for example, of 1959 and 1976 (Federal Ministry of Information, 1965 and Federal Republic of Nigeria, 1978). It was only the 1976 prohibition order that banned imports of fresh milk and the exports of fresh milk from the country.

Import Duty

4.10 The extent to which import duties have been used in the control of dairy imports is shown in Table 1. Specific duties were imposed on butter and cheese and curd during the Second World War of 1939-1945. The rate of duty on butter has varied from 8.8 kobo/per kilogram in 1958 to 50 kobo per kilogram in 1983. The same range of duty also applied to cheese and curd over the same period of time.

4.11 Milk, fresh and sour (not concentrated or sweetened), was duty-free until 1965 when a 40% ad valorem tax was imposed on cream and sour milk. The rate of duty varied over the years until the product became duty-free once more in 1975. Since 1976 when the import of fresh milk was banned, a duty of 20% has been in force for the other items under this classification. Similarly, dry milk and cream were duty-free for the same years as fresh milk and cream. But the rates of duty on the former were lower during the period 1969 to 1974. Condensed and evaporated milk, sweetened and unsweetened, was similarly duty-free up till 1966 and also from 1975 to 1977. From 1970 onwards, the rate of duty on condensed and evaporated milk was lower than the duty on other dairy products.

4.12 Appendix 2 shows the amount of duty collected from dairy imports from 1942 to 1983. There was a jump in the aggregate revenue from duties from the pre-independence peak of N 32,500 (1958) to N 134,000 in 1960. The highest recorded aggregate revenue from duties on dairy products was N 27 million in 1983. As a source of revenue, import duties on dairy products do not account for any significant percentage of the Nigerian Government's revenue. Between 1960 and 1979, the highest percentage attained (in 1978) was .003% of total current revenue. In the same year, duty from dairy products accounted for 1.3% of customs and excise revenue.

Foreign Exchange Allocation

4.13 Since 1979, three systems of foreign exchange allocation for imports have been in practice: The Comprehensive Import Supervision Scheme (C.I.S.S.), advance deposit (Central Bank of Nigeria, 1979) and direct foreign exchange allocation for imports.

4.14 The C.I.S.S. involved "... a pre-shipment check on the prices, volume and quality of imported goods worth over N 20,000". This system which was initiated to combat fraud in the import sector affects all commodities and all importers provided the import bill falls within the specified range. Dairy products are subject to the inspection as long as the import bill is over N 20,000. The advance deposit ranged from 50 to 200% of the value of imports and was compulsory for a list of import items including dairy products. It was abolished in 1984 with the inception of specific duties for all visible imports (Federal Republic of Nigeria, 1984).

Table 1: Tariffs on dairy imports into Nigeria, 1958-1983

Year	Butter	Cheese & curd	Cream & sour milk	Condensed & evaporated milk	Powdered milk	Fresh milk	Babies' milk
	----- (Kobo/kg) ---		(%)	(%)	(%)	(%)	(%)
1958	8.8	8.8	Free	Free	Free	Free	Free
1959	18	8.8	Exempted	Exempted	Exempted	Exempted	
1960	22	22	Free	Free	Free		
1961	22	22	Free	Free	Free		
1962	22	22	Free	Free	Free		
1963	22	22	Free	Free	Free		
1964	35	35	Exempted	Exempted	Exempted	Exempted	
1965	35	35	40%	Free	40%		
1966	35	35	40%	Free	40%		
1967	35	35	40%	40%	40%		Free
1968	33	35	40%	40%	40%	Free	
1969	33	35	33.3%	33.3%	20%		33.3%
1970	44	35	20%	20%	10%		
1971	44	35	20%	10%	10%		
1972	44	22	40%	10%	10%	40%	
1973	44	33	40%	10%	10%	40%	
1974	44	33	10%	5%	5%	10%	
1975	30	33	Free	Free	Free	Free	
1976	30	33	Free	Free	Free	Banned	40%
1977	30	33	Free	Free	Free	Banned	40%
1978	50	50	20%	10%	20%	Banned	40%
1979	50	50	20%	10%	20%	Banned	40%
1980	50	50	10%	10%	20%	Banned	40%
1981	50	50	20%	10%	20%	Banned	40%
1982	50	50	20%	10%	20%	Banned	40%
1983	50	50	20%	10%	20%	Banned	40%

Note : From 1976 onwards imports of fresh milk were banned with the exception of fermented milk like buttermilk, whey, kephir or yoghurt

Source: Laws of Nigeria; Federal Republic of Nigeria, Official Gazette and Nigerian trade Journal (various years).

4.15 The allocation of foreign exchange is done on an annual basis. The allocation for all dairy imports for 1984 was N 200 million (Federal Republic of Nigeria 1984, p. 7). The fund is revolving in the sense that grants which are made in foreign exchange are paid back in local currency. The overall allocation is further reallocated among various items of imports on the basis of national need. The immediate effects of the foreign exchange allocation are a general import restriction or delays of imports and consequently rises in domestic prices.

Effects of Import Control Measures on Dairy Imports

4.16 To determine the responsiveness of dairy imports to import control measures we can look at the policy objectives and see how far they have been achieved or we can look at imports of dairy products and assess the effects of policy measures on them. The former is difficult because the policy objectives have never been quantified. The latter will produce a unique quantitative effect because different policy measures will have different directional effects. Whereas the open general import license has the tendency to favour dairy imports over imports of other restricted commodities, the other measures are expected to exert restrictive effects on the quantity of dairy products imported.

4.17 Imports of butter and cheese and curd have always been subject to specific import duties whereas all other dairy products had no form of specific or ad valorem duties until after 1965. So any efforts to determine the effects of aggregate policy measures on dairy imports should start with 1959 which was chosen because it marked the beginning of a liberal trade policy in Nigeria.

4.18 For comparative purposes, all dairy products imports into Nigeria have been converted to whole liquid milk equivalents (LME) using the conversion factors given in Appendix 3. The quantities of dairy imports in product weight and the resultant dairy imports in LME are shown in Appendix 4 and 5 respectively. Appendices 6a-f are graphical representations of imports (in LME) of butter; cheese and curd; condensed and evaporated milk; fresh, cream and sour milk; powdered milk; and their aggregate respectively. They are visually correlated with the inception of different levels of duties and other import control measures.

4.19 Appendix 6a shows that the high import duties on butter had noticeable, though temporary effects, on the quantities imported. The increase in the rate of duty from 8.8 kobo to 18 kobo per kilogram in 1959 had the immediate effect of reducing

the quantity of butter imported in 1959. Thereafter the shock disappeared. Again in 1978, the increase in duty from 30 kobo to 50 kobo had an immediate effect on butter imports.

4.20 In the case of cheese and curd (Appendix 6b), the reduction of the rate of duty from 35 kobo to 22 kobo in 1972 had the inverse effect of immediately reducing cheese imports. This unexpected effect which does not correspond with later reactions of cheese imports to changing duty may be due to other factors which we could not investigate in the present study. The increase in the rate of duty from 33 kobo in 1977 to 50 kobo in 1978 had a one-year lagged reducing effect on cheese and curd imports.

4.21 From Appendix 6c it emerges that the inception of an import duty on condensed and evaporated milk in 1967 had a one-year lagged reducing effect. Due to the reduction of the duty in 1969 and 1970, the quantity imported jumped above the pre-duty historical level of 40,513 metric tons LME. The decline in the rate of duty from 20% in 1970 to 5% in 1974 continually stimulated imports of condensed and evaporated milk. These increased further after the lifting of duty in 1975. The reappearance of duty at the rate of 10% in 1978 immediately reduced the imports of condensed and evaporated milk for two consecutive years. Thereafter, the strong demand again raised imports even at 10% duty, to the highest level ever of 380,000 metric tons LME in 1983.

4.22 Imports of fresh milk, cream and sour milk (Appendix 6d), responded with a three-year lag to the increase in duty in 1972 and immediately to the increase in duty in 1978. The 1978 ban on imports of fresh milk had an immediate though negligible effect on import of those category of dairy products because fresh milk only constituted a negligible proportion of imports in this category.

4.23 Imports of dry (powdered) milk (Appendix 6e) showed a one-year lagged response to the imposition of import duty in 1965. Thereafter, the quantities imported bounced back to the pre-duty import level. The reduction of the rate of duty and finally the lifting of the duty in 1975 accelerated imports of dry milk. The subsequent reimposition of the duty in 1978 had a two year-lagged effect on the quantity of dry milk imported.

4.24 Although the different categories of dairy imports do not show similar lagged or immediate responses to the imposition of duties, butter and cheese and curd did

respond similarly to the civil war shock of 1968 and 1969. The response of condensed and evaporated milk was short-lived and for only one year - while that of fresh, cream and sour milk was staggered and prolonged to 1972. This might be due to the combined effects of a high duty and the civil war shock. Imports of dry milk did not seem to be affected by the war. The reason may be that some of the dry milk imports were not obtained from commercial channels, but were donated by relief agencies. Such donations were not segregated in Nigerian statistical reports.

4.25 As can be expected the aggregation into total dairy imports (Appendix 6f) irons out the fluctuations in the single components due to the imposition of duties. Three definite aggregate responses to import control measures did persist. Firstly, the trade liberalization policy of 1959 was reflected in high aggregate dairy imports in the same year. Secondly, the introduction of import duties for all categories of dairy products in 1965 showed a one year lagged effect on aggregate dairy imports. Thirdly, the reimposition of duties on all types of dairy imports in 1978, together with the all time high rate of duty on butter and cheese and curd, also had a one-year lagged effect on aggregate dairy imports. It can therefore be asserted that the import policy measures were temporarily effective in reducing dairy imports. At the same time we can assert that the effects of these policy measures were always short-lived. The pressure of domestic demand generally overwhelmed the reducing effects of the various policy measures on dairy imports into Nigeria.

DOMESTIC MILK PRODUCTION, PROCESSING AND MARKETING

5.01 Local milk production is undertaken in three different systems, i.e. indigenous Fulani herdsmen, organised government dairy reconstitution plants and private sector plants.

Milk Production From Traditional Fulani Herds

5.02 There are various estimates of the population of cattle managed by the Fulanis in Nigeria. Their share in the total national herd ranges from 90 to 97% (Ekpere, 1978; World Bank, 1981). According to the World Bank (1981), the estimates of the total cattle population in Nigeria vary depending on the agency issuing the data. The Federal Office of Statistics estimated 5.6 million heads for 1973, the Federal Department of Agriculture 10.9 million for 1974, the Nigerian Livestock and Meat Authority 8.5 million for 1973, and the Federal Office of Statistics 8.9 million for 1981. Other estimates are 8.5 million for 1978 (David-West, 1978), and 8.3 million for 1977 (Ikpi, 1980). The last estimate is based on a herds population map of Nigeria produced by the Federal Livestock Department and showing cattle densities in different parts of the country. We base our estimate of total milk production on this cattle population map and our estimates of indigenous milk production on a cattle population of 8.5 million as at 1978, an estimate made by the Director of the Federal Livestock Department (FLD) that can be taken as the official and, as such, most reliable estimate.

5.03 As a general practice among Fulani Herdsmen, the milking is done between the third and the sixth months of lactation. Until the third month, the calves are left to consume the milk. Cows are only milked at night and since no milking is possible during the day the calf roams with the dam (Federal Ministry of Agriculture and Rural Development, 1980). Any variations to these general rules may be due to labour shortages restricting milking activities and to different types of herd ownership which determine whether milk is solely for domestic use or for both domestic use and market supply (Federal Ministry of Agriculture and Rural Development, 1980, p.48).

5.04 In estimating the quantity of traditional milk supply the following assumptions are made:

1) A cattle population of 8.5 million in 1978.

2) The traditional cattle herd is distributed in the ratio of 96.1% to 3.9% between the northern and southern states respectively. This distribution factor is derived from the cattle population map in the Federal Livestock Department (FLD).

3) A net rate of growth of cattle population of 3% in the north and 2% in the south as assumed by the FLD (World Bank, 1981 p.35). As at 1978, one half of the cattle population are assumed to be adult cows while one quarter of the adult cows are assumed to be in milk (de Leeuw, 1978). These proportions give a higher proportion of adult cows but a much lower proportion of cows in milk than the World Bank assumptions which are 34.5% and 56.6% respectively (World Bank, 1981).

4) An average milk yield from traditional production estimated at 180 kg per animal per lactation (de Leeuw, 1978). This yield figure appears more feasible - because it is an average of different breeds - than the yields for individual breeds given by Ngere (1978) which are:

White Fulani	930 kg
Red Fulani	480 kg
Sokoto Gudali	907 kg
Adamawa Gudali	821 kg
Others	611 kg

Our assumption of 180 kg per animal per lactation is also lower than FAO's recent assumptions for yield. These jumped from 180 kg in 1971/72 to 250kg in 1973 and then to 280 kg in 1976. They remained at 280 kg until 1979 and have been at 290 kg since 1980 (FAO, Production Yearbooks).

5) At any point in time, 97% of the cattle population is traditional while 3% is exotic (World Bank, 1981).

5.05 Based on these assumptions, milk supply from traditional herdsmen is given in Table 2 for the period 1970-83. The main defect of the milk supply estimates in Table 2 is the assumption of a constant yield figure. But there has not been any noticeable improvement in the cultural or management practices among traditional herdsmen that would warrant higher yield assumptions.

Table 2: Estimated milk supply from traditional herdsmen, 1970-83

Year	Production (000)MT
1970	145.8
1971	150.1
1972	155.0
1973	159.8
1974	164.3
1975	169.7
1976	174.8
1977	179.8
1978	185.6
1979	189.9
1980	196.7
1981	202.5
1982	214.9
1983	221.2

Source: see text

Non-Traditional Milk Production and Processing

5.06 Organised milk production and processing, with the exception of reconstitution of imported raw materials, is undertaken by state governments through parastatals or limited liability companies. A list of such establishments is shown in Appendix 7. This table points to the fact that organised milk processing under government control is very limited in both absolute and utilised capacity. Another important aspect of the table is the source of raw milk. More than half of the milk plants are attached to cattle ranches. Also more than half of the plants collect milk from local producers for processing, while over 40% of those plants collecting local milk for processing also use imported powdered milk. The proportion of plants which are attached to ranches and also collect milk from local farmers is 43%. In addition to government dairy plants, there are other ranches which are either dominantly for research or for beef production. Examples of the former are the University ranches in Ibadan, Ife, Ahmadu Bello or at the University of Nigeria in Nsukka. An example of the latter is Obudu ranch in Cross River State.

5.07 The estimated aggregate milk production from non-traditional sources is shown in Table 3. Estimates in this table were based on the following assumptions:

(1) At any point in time 3% of the national cattle herd is exotic.

(2) The average milk yield from exotic cattle is 2682 kg per lactation period (average, derived from milk yield of cows of different breeds given by Wilson et al, (1976)).

(3) The same proportion of adult cows in the herd and cows in lactation as for the traditional herd apply to non-traditional herds.

Table 3: Estimate of milk production from non-traditional herds

Year	Total non-traditional herd (million)	Adult cows (50% of the total) (million)	Cows in milk (25%) (million)	Milk production (at 2682 kg per cow) (1000 t)
1970	0.20	0.100	0.025	67.1
1971	0.21	0.105	0.026	69.7
1972	0.21	0.105	0.026	69.7
1973	0.22	0.110	0.028	75.1
1974	0.23	0.115	0.029	77.8
1975	0.23	0.115	0.029	77.8
1976	0.24	0.120	0.030	80.5
1977	0.25	0.125	0.031	83.1
1978	0.25	0.125	0.031	83.1
1979	0.26	0.130	0.033	88.5
1980	0.27	0.135	0.034	91.2
1981	0.28	0.140	0.035	93.9
1982	0.30	0.150	0.038	101.9
1983	0.30	0.150	0.038	101.9

Source: See text

Milk Reconstitution Plants of Private Companies

5.08 There are a few private companies, e.g. Samco, Foremost, Fan Milk and Palmalat, which reconstitute dairy products. Data on their output are not available. However, a market survey showed that the composition and distribution of output could be in the following proportions (Jensen, 1978):

Bulk packed milk	2%
UHT - market milk	25%

Table 4: A comparison of two estimates of total milk production in Nigeria, 1970-1983

Year	This study's estimate			FAO estimates
	Traditional milk output	Milk from exotic stock	Total production	
	(1000 tons)			
1970	145.8	67.1	212.9	405.0
1971	150.1	69.7	219.8	403.0
1972	155.0	69.7	224.7	278.0
1973	159.8	75.1	234.9	273.0
1974	164.3	77.8	242.1	284.0
1975	169.7	77.8	247.5	297.0
1976	174.8	80.5	255.3	316.0
1977	179.8	83.1	262.9	316.0
1978	185.6	83.1	268.7	330.0
1979	189.9	88.5	278.4	342.0
1980	196.7	91.2	287.9	357.0
1981	202.5	93.9	296.4	363.0
1982	214.9	101.9	316.8	365.0
1983	221.2	101.9	323.1	367.0

Source: FAO Production Year Books (various years); and see text.

Table 5: Estimated total milk supply in Nigeria, 1970-1983

Year	Total Domestic Milk Production	FAO Milk Production Estimates	Dairy Imports	Total Milk Supply	FAO Total Milk Supply	Rate of self-sufficiency	
						This study's estimate	FAO estimate
	(1000 tons)					%	
1970	212.9	405	225.5	438.4	630.5	48.6%	64.2%
1971	219.8	203	251.8	471.6	454.8	46.6%	44.5%
1972	224.7	278	244.6	469.3	522.6	47.9%	53.2%
1973	234.7	273	190.1	425.0	463.1	55.3%	59.0%
1974	242.1	284	200.3	442.4	484.3	54.7%	58.6%
1975	247.5	365	278.3	572.8	690.3	43.2%	52.9%
1976	255.3	389	320.1	575.4	709.1	44.4%	54.0%
1977	262.9	389	509.0	772.8	898.9	34.0%	43.3%
1978	268.7	405	613.2	881.9	1018.2	30.5	39.8%
1979	278.4	420	464.8	743.2	884.8	37.5%	47.5%
1980	287.9	439	672.4	960.3	1111.4	30.0%	39.5%
1981	296.4	446	659.6	956.0	1105.6	31.0%	40.3%
1982	316.8	449	650.6	967.4	1099.6	32.7%	40.8%
1983	323.1	439	795.4	1118.5	1234.4	28.9%	35.6%

From 1975 onwards FAO milk production estimates include the whole milk equivalent of butter and cheese production

Source: Table 4 and Appendix 5

UHT - Flavoured milk	11%
Yoghurt	55%
Ice Cream	7%

Since the private plants use imported dairy products which are already accounted for in imports, absence of data on their production means that we are only missing the value added. This cannot be too much since the plants are few.

5.09 Table 4 compares FAO and our own estimates of national milk production from 1970 to 1983. The FAO estimates are higher than ours because of two reasons:

(1) Annual milk yields of FAO are higher than our average yield assumption (see para 5.04 (a) above).

(2) The FAO's estimate of cows in milk (see Appendix 8) is slightly higher than our estimate. Although FAO gives milk production figures from 1964 onwards we could not use these estimates because they obviously reflect a change in methodology: milk production drops from 405,000 tons in 1970 to 203,000 tons in 1971. Rather, we have used a proportional factor of 1.9 between our estimates and those of FAO in 1970 in order to back-date our estimates to 1960 from FAO estimates. These backdated estimates with our current estimates will be used for further analysis in this paper.

5.10 The estimates of national milk supply, including imports, are given in Table 5 with the respective self-sufficiency ratios. The two series, FAO and our estimates, reveal a similar pattern. The self-sufficiency ratios increased in 1972, 1973, 1976, 1979, 1981 and 1982 but dropped dramatically in 1975, 1980 and 1983. During the entire period, the ratio ranged from 64.2% in 1970 to 35.6% in 1983. From the ratios it is obvious that Nigeria has become increasingly dependent on imports to meet the domestic demand for milk.

Milk Production Costs

5.11 It is difficult to isolate the cost of milk production in a traditional system because of the following reasons:

(a) Milk is regarded as a secondary rather than a primary product in cattle husbandry. The primary product, as far as the herdsman is concerned, is beef.

(b) Cattle are fed essentially through the free range system in communal grazing lands or on the stubble of harvested grain crops in farms which may not

necessarily belong to the owner of the cattle herd.

(c) Although direct labour input and the input of supplementary feed can be costed, the aggregate of such costs form a negligible fraction of total costs (CARD, 1981).

5.12 In addition to the problem of quantifying some of the cost of milk production, there is a minor problem about weight. Whole milk is generally measured in litres. One litre of milk may have different weights in kilograms depending on animal breeds, the treatment received and the nutritional and general health condition of the cow. At the University farm in Ibadan a standard conversion factor of 1 litre = 1.04 kilograms is used. This is the factor we are using in our costings.

5.13 The cost estimates are presented along three ecological zones which are:

Zone 1: The forest zone. It covers part of Oyo, Ogun, Ondo, Lagos, Bendel, Imo, Cross River and part of Anambra states.

Zone 2: Intermediate and Forest Savannah which include Kwara, Niger Plateau, Gongola, Benue, and parts of Oyo and Anambra states.

Zone 3: Dry Savannah. This covers Sokoto, Kaduna, Kano, Bauchi, and Borno states.

Table 6 shows cost estimates for milk production for the different zones. If all dairy imports (in LME) in 1981 were to be produced entirely by traditional herdsmen it would have cost N 317 (calculated from table 6 and transferred from litres to kg) per ton as against the import value per ton LME (c.i.f Lagos) of about N 274.40 (compare Appendix 11 f)[1/]. This means that domestic milk production from the traditional system is about 16% more costly than imported milk.

[1/]We are assuming that the existing cattle population could produce the quantity of milk which was imported in 1981. If herd expansion was required, then the unit cost would be much higher. The cost of packaging the milk is not included.

Table 6: Cost model of milk production on traditional farms, 1981.

	Zone 1	Zone 2	Zone 3
	(Naira/litres)		
1. Livestock depreciation	0.08	0.08	0.08
2. Dry season cotton seed cake, feeding crop residue and water	0.06	0.08	0.11
3. Medication (drugs, vaccine, and salt lick)	0.02	0.02	0.02
4. Housing from local materials	0.05	0.05	0.05
5. Equipment (ropes, calabashes etc.)	0.01	0.01	0.01
6. Labour	0.11	0.09	0.06
Total cost	0.33	0.33	0.33

Source: Derived from CARD, 1982, p. 96

Note : The conversion factor for fresh milk is 1.04 kg = 1 litre. Labour was valued at average market rates for each zone. The total cost would be considerably higher if a shadow price for communal grazing were included.

5.14 The unit cost of milk processing for different government dairy plants (Table 7) shows that the average cost of milk processing adds another N 0.35 (national average) to the cost of producing raw milk in the traditional way. If all milk imports in 1981 had been replaced by locally produced milk processed in the existing plants (without the necessity of plant or ranch expansion) the average cost, including processing, would have been N 634.62 per ton as against the import unit value (c.i.f.) of N 274.4. This means that processing fresh milk in local plants is 131% more costly than importing the same quantity. The high processing cost relative to the c.i.f. value of imported milk is an indication of a comparative cost disadvantage of domestic dairy production at its present level. This disadvantage is, however, inconclusive because only 5.5% of the domestic milk production is available for both local distribution and processing. Furthermore, the processed milk products from the plants are not the same as

the imported ones. The rather high processing cost per unit would be reduced if plant capacities were fully used.

Table 7: Cost of milk processing in experimental dairy plants, 1981

Zone	Plant name and location	Producer price	Processing cost	Total cost
		Naira/kg		
1	Oyo: Oyo Dairy Scheme	0.29	2.35	0.64
2	Kwara: Ilorin Urban Dairy	0.38	0.35	0.73
3	Plateau: Madara Ltd., Vom	0.13	0.35	0.48
	Kaduna: Nigeria Dairy Ltd	0.27	0.35	0.62
	Niger: LIBC Dairy Ltd., Minna	0.58	0.35	0.93
	Kano: Urban Dairy, Kano	0.21	0.36	0.57
	Average for zone 3	0.30	0.35	0.65
	National average for 3 zones	0.31	0.35	0.65

Source: Derived from CARD, 1982, p. 100

Note : The conversion factor for fresh milk is 1.04 kg = 1 litre.
Labour was valued at average market rates for each zone.
The total cost would be considerably higher if a shadow price for communal grazing were included.

Government Policies to Stimulate Milk Production and their Achievements

5.15 Over the years, the policies to increase domestic milk production have fallen under two categories, i.e. direct production activities and subsidizing milk production by traditional herdsmen.

5.16 Direct production policies in Nigeria[1/] have been expansionist, innovative and curative. Under the expansionist policy both the states and the Federal Government had programmes directed at expanding the existing dairy farms, and at expanding milk production from the existing dairy plants through milk collection system from traditional herdsmen and establishing new dairy plants.

1/The main sources of information for this section are the various National Development Plans from 1962 to 1980.

The innovative policy mainly consisted of a programme to introduce new cattle breeds into Government ranches. The curative policy involved the introduction of new rinderpest vaccination.

5.17 Concerning the achievements of these policies the following material acquisitions and project implementations are noteworthy, since they represent capital investments which might have long-term effects on domestic milk production.[2/]

1. British Friesian heifers and bulls were obtained for Vom ranch for cross breeding with local white Fulani breeds.
2. 52 Devons and 52 Friesians were purchased for the expansion of Agege dairy.
3. 140 cows were purchased for dairy units in Oyo State.
4. Additional 152 cattle were secured for Agege dairy.
5. A farm mill house was also constructed in the Agege dairy site.
6. The Manbilla dairy project in the Plateau State was started.
7. The Kurri ranch was acquired from the Livestock Meat Authority in the Plateau State.
8. A foundation stock of 50 cattle was purchased for the Birgu dairy project at Ilorin in Kwara State.
9. The Kano urban dairy was started.
10. A national course on milk processing was organised at Vom.
11. Ubiaja Dairy Ranch in Bendel State was expanded by 280 ha and 390 cows of Friesian stock were acquired.
12. The dairy plant in Sokoto was installed.
13. 82 Sokoto Gudali and 17 Friesian cows were acquired for Sokoto urban dairy project.
14. A pilot dairy project was set up in Benue State with 5 pure Friesian and Friesian/White Fulani cows.
15. 100 ha were acquired for the proposed dairy project at Ikot Efanga in Cross River State.
16. 90 animals were secured for an experimental dairy unit at Runka in Kaduna State.
17. Six centres for milk collection were established in Plateau State.

[2/]The listings here can be found in the various progress reports of the three past National Development Plans: 1962-68, 1970-75, 1975-80.

5.18 The programmes to stimulate traditional production can be classified as:

1. Improved livestock management programmes,
2. Input subsidy programmes,
3. Programmes to improve marketing system.

The management programmes include the eradication of tsetse-fly, the settlement of herdsmen, creating grazing reserves and improvement of local breeds and cross-breeds for better milk and beef production (Central Planning Office, 1970). Input subsidies are given for improved health packages (including monitoring of reproductive problems, worm treatment, 50% subsidy on drugs); for farmers setting up legume pastures (up to 4 hectares per household (FLD 1982)); for purchases of supplementary feed like cotton seed cake (50% subsidy); and for extension services. There is a core extension service team for every state. The team is made up of an animal health officer, an animal production officer and a dairy technician.

5.19 The dairy projects in the Second National Development Plan 1970-75, together with planned and actual capital expenditures, are shown in Appendix 9. Some of these projects like those concerning grazing reserves, stock routes and breeding investigations are not strictly dairy projects in nature because milk production is a secondary part of traditional cattle herding. The table shows that, as at 1973, the 1970-75 plan was executed by only 47.25% in terms of total planned expenditure. Furthermore, the planned expenditure was only 7.24% of the aggregate value of dairy imports during the same period.

5.20 Within the period of the 1975-80 Development Plan, there were four major new areas of emphasis in the dairy program. First, the urban dairy programme spread to other states like Ondo, Cross River and Ogun States. Information on the progress in these new urban dairy projects is not, however, available. Second, there were definite budget allocations for milk collection centres. In Plateau State, for instance, six cooling centres were established. Third, specific provisions were made for the recovery of pregnant cows from the roaming herds. Fourth, Oyo State started special rural dairy programmes. The dairy programmes and actual expenditures for the 1975-80 Development Plan are shown in Appendix 10. The item range management includes setting up grazing reserves, fodder conservation, range seeding and fertilizing. Expenditures on veterinary services have been excluded from the compilation since they also cover other livestock species.

Milk Marketing

5.21 There are four milk marketing systems in the country:

(1) Traditional milk marketing for direct consumption,

(2) Milk collection for processing plants,

(3) Direct sales to consumers of processed milk and dairy products,

(4) Wholesale and retail system of imported milk and dairy products.

The first marketing system is traditional and rural. The second is an interaction between urban centres and rural producers while the third and the fourth are essentially urban systems.

Traditional milk marketing for direct consumption

5.22 Wives of stock-owners selected milk cows between the 3rd and the 5th month of lactation (Federal Ministry of Agriculture and Rural Development, 1980, pp.120-121). The milk thus secured is for household consumption and direct sale to local consumers as fresh milk or as clarified butter fat or ghee or as sour milk, called fura nono by the Hausas or wara by the Yorubas. These are forms of curdled milk. The butter and sour milk are carried in calabashes, on head, from one local market to another where they are sold. There is a high price incentive to sell milk locally as can be seen from Table 8. This table shows that local milk prices are higher than the producer prices paid by dairy plants. There are, however, limitations of this marketing system:

- The local market area which is the area immediately surrounding the producing area is limited.
- The conversion factor is high to turn fresh milk into butter or sour milk which are the safest methods of milk preservation available to local milk producers.
- The market is segregated, which makes it difficult for local milk production to compete with imported milk in form and place of use.
- Clarified butter fat or ghee is wasteful because it is relatively low priced.

Table 8: Retail prices for fresh milk at the local level, 1978-1981

Location	1978	1979	1980	1981
		(Naira/litre)		
Funtua (Kaduna)	0.53	0.35	0.43	0.44
Gusau (Sokoto)	0.82	0.60	0.72	0.72
Gombe (Bauchi)	0.43	0.44	0.46	0.46
ABET (Kaduna)	-	-	0.31	0.31
Kurimin Buri (Kaduna)	-	-	0.39	0.39

Source: Derived from CARD, 1982

Note : The conversion factor for fresh milk is 1.04 kg = 1 litre

Milk collection for processing plants

5.23 The Government has recognised that a certain amount of milk is utilised in an economically inferior way by local producers because of low rates of exploitation, a low market supply and relatively low prices of locally processed dairy products like clarified butter fat or ghee. The Government's plan for improving the revenues of local milk producers is the provision of incentives to encourage milk producers to sell their milk to processors (Central Planning Office, 1970). The policy instrument is the establishment of a milk collection system for processing in urban dairies. There is, however, no guaranteed minimum price which processors should pay for fresh milk from producers.

5.24 The mobile milk collection system functions mainly during the rainy season when producers have more milk than they can sell or use locally. But during the dry season, when milk production is low and supply is scarce, milk producers do not, generally, deliver to the processing plants.

5.25 The milk collection programme is an area where a major policy failure has been recorded. The failure of the programme can be attributed to a number of reasons:

1. Low producer prices. With the exception of Minna dairy, the prices paid to producers are lower than the market price for fresh milk. This discourages producers from delivering to the milk collection centers. A comparison of producer prices paid by processing plants (Table 7) with production costs

(Table 6) and local prices (Table 8) reveals the low price incentive of the milk collection system.

2. Distant location of producers from processing plants. Because of a limited number of processing plants, milk collection is not possible from producers who are located far away from the plants. Where collection is possible from distant producers, it is made once daily instead of twice as is the case from producers who are located close to the plants.

3. Preference for imported powdered milk. The argument here is that processors prefer powdered milk to fresh milk because the former is cheaper (CARD, 1982, pp. 104-105). This argument is not supported by the unit cost (landed unit price) in Appendix 11 (c) and 11 (d).

4. Difficulty and tedium of organising local milk collection. Bad rural roads and scattered location of local producers coupled with the uncertainties of the quality of the milk tend to hinder an efficient milk collection system.

5. Seasonality of supply. Producers only have surplus milk to sell to the processing plants during the rainy season, but do not deliver any milk during the dry season.

Direct sales to consumers of processed milk

5.26 The market for this product is restricted to a few top civil servants and expatriates due to low quantity of output, difficulties of product preservation and higher product prices. Generally, buyers apply to the plant for allocation. If granted, home delivery can be made on specified days or the customer can pick up his allocation from the factory site. There are, therefore, two sets of retail prices, that is the factory gate price and the price for home delivery, the difference being the cost of delivery.

Wholesale and retail markets for imports

5.27 Milk importers sell to wholesalers who in turn sell to retailers. Urban retailers also sell to rural retailers. Within the same urban areas, there are neighbourhood retailers who buy milk from central market retailers or from departmental stores. Because of this chain of retailing, the general price level

for milk is very high in the neighbourhood stores, village markets and among central market milk hawkers. The retail prices for the brand milk "Peak" in Anambra State (1971-79), for instance, are shown in Table 9. A comparison with Table 7 shows that the 1979 retail price of "Peak" milk was double the 1981 factory-gate price for processed milk. The current (1984) retail price for "Peak" milk on the open market is N 1.00 per tin of 170 g or N 5.88 per kilogram.

5.28 In an effort to keep down the retail price level for milk the Government has initiated several programmes for direct milk sales to consumers through cooperative societies, government department stores and schools. Currently, the price level for these direct sales is N 0.33 per tin of 170 g. which is equal to N 1.94 per kilogram. This shows a price disparity of N 3.94 per kilogram of milk between the open market retail price and the price for direct sales. Prior to the direct sales programme, another effort which was made to control price levels in general, including that for milk, was the price control programme of 1970 as amended in 1971 and 1972 (Nigerian Government, 1971). By this regulation, the retail price of an imported commodity in Nigeria would be the import value (c.i.f.) plus transport costs plus a margin for the importer's profit. The price of "Peak" milk, for instance, was then N 0.51 per kilogram.

5.29 Inflation and unfulfilled demand have driven up the prices in Nigeria of imported dairy products. Changes in prices over time are attributable to five main sources: (i) general inflation in the countries of origin of Nigeria's dairy imports; (ii) relative changes between the prices of dairy exports and of other goods in these countries of origin; (iii) changes in the level of import duties and similar taxes on dairy commodities entering Nigeria; (iv) general inflation in Nigeria relative to inflation in the countries of origin of dairy imports; (v) specific factors affecting the markets for dairy commodities in Nigeria. These specific factors include: the relative availability of foreign exchange or licenses for the import of dairy commodities compared to other goods; changes in the degree of monopoly in the import and distribution of dairy commodities; and changes in domestic supply and demand for dairy products relative to other goods in general. In Tables 11(a) - 11(c) we present data on the value, c.i.f. and duty paid, for different dairy imports for the years 1960-1983, and these data cover changes attributable to sources (i)-(iii) above. Table 11a also shows the Nigerian cost of living index (base year = 1960). A limited amount of evidence suggests fluctuating and at times very high trading margins in Nigeria. For example the

c.i.f/duty paid unit cost ("landed price"), in 1983, of condensed and evaporated milk was equivalent to N.0.66 per kg. In 1984 the retail price of the "Peak" leading brand of evaporated milk was N. 5.88 per kg. Table 9 compares, for the years 1971 to 1979, the landed price of condensed or evaporated milk with the retail price of "Peak" milk. The landed price varies between 47% (1977) and 74% (1979) of the retail price during these years, compared to the 11% suggested by the 1983/84 figures.

Table 9: A comparison of the landed price[1/] of condensed and evaporated milk and the retail price of "Peak" brand in Anambra State, 1971-1979.

Year	Landed price of condensed and evaporated milk	Retail price of "Peak" brand	Ratio of landed to retail price
	(N/Kg)		
1971	0.33	0.51	.65
1972	0.37	n.a.	n.a.
1973	0.41	0.59	.69
1974	0.42	0.67	.63
1975	0.52	0.94	.55
1976	0.56	n.a.	.n.a.
1977	0.52	1.1	.47
1978	0.83	n.a.	n.a.
1979	1.06	1.43	.74

[1/] C.i.f. and duty paid

Source: Adapted from "Wholesale and Retail Market Prices of Commodities" Ministry of Finance and Economic Development, Statistics Division, Enugu, Various issues and Appendix Table 11 (e).

Milk Pricing Policy

5.30 Guaranteed minimum prices exist for grain crops and other commodities like cocoa, groundnut, rubber and oil palm produce. There is no guaranteed minimum price (GMP) for fresh milk in Nigeria. However, some agricultural economists have recommended that the GMP if it were to be implemented, must lie within the lower and upper ranges of average producer cost and average producer price (CARD, 1982, p.101).

Effects of Milk Imports on Local Milk Production

5.31 In our discussion thus far we have referred to the rather segregated nature of the markets for locally produced and imported milk. The former is sold in the rural north and middle belt states while the latter is sold in urban areas and in the rural areas of the southern states. Fresh milk is sold either as whole milk or after traditional processing, to rural villages and shops, rural working places, neighbourhood farm compounds, sometimes in exchange for grains and occasionally to government processing plants in milk collection centres (Waters-Bayer, 1982). Imported milk is sold in 170 gram tins, as powdered, butter or cheese, or in the form of locally recombined milk, yoghurt and ice-cream. This market segregation is caused by taste and the relative scarcity of locally produced milk. It means that local milk producers have no access to the purchasing power of the urban population. So the immediate effect of dairy imports is to prevent urban demand signals for milk from reaching milk producers in rural areas. The signals instead flow out of the country and stimulate increased dairy imports.

5.32 There are, however, two important economic links between the urban and rural milk markets: the allocation of foreign exchange to dairy imports rather than for example, inputs to local milk production programmes; and the consumers' allocation of their disposable income between purchases of imported dairy products or other competing commodities which are locally produced.

5.33 The question arises what would be the effect on local milk production if dairy imports were completely banned? The private milk recombining plants would either wind up or try and procure milk from local producers. In the long-run they might set up ranches of their own. Because of the problems of transport and preservation, it is possible that many rural milk consumers in the southern states would have to cut off milk consumption entirely. In the northern states, where there is an established rural tradition of drinking fresh milk and consuming other forms of milk products, locally produced milk might still find its way also into the urban markets.

5.34 A ban on milk import is so drastic a measure that the Government might be unwilling to adopt such a policy instrument. The alternatives are:

(1) reducing the foreign exchange allocation to dairy imports,
(2) increasing import duties on dairy products, and,
(3) imposing a sales tax on the consumption of imported milk.

The effects of import duty and sales' tax on the demand for imported milk will depend on the levels of duty and tax and on the price elasticity of milk demand.

However, the immediate effect of a cut in the foreign exchange allocated to dairy imports will be a direct physical reduction in the quantities imported and an immediate rise in the domestic prices for imported dairy products. There is bound to be a price limit beyond which the consumers would stop buying imported milk. The question is whether the demand for imported dairy produce would be substituted by a demand for locally produced milk. That is, would the consumer divert his expenditure on imported milk to locally produced milk? The answer to this question depends on the upbringing and the economic status of the individual consumer. Those who were brought up with milk would probably go for local milk. The very high income earners might continue to buy imported milk despite high prices. The response of those in the group who were not brought up with milk is difficult to predict.

DETERMINANTS OF DAIRY IMPORTS

General Analytical Model

6.01 The import demand for any commodity (M_i) is equal to the difference between domestic demand (D_i) and supply (S_i) for the commodity.

$$M_i = D_i - S_i \qquad \text{eq. 1}$$

According to equation 1, we do not need to know either domestic demand or supply in order to determine excess demand since by definition imports fill the gap and are equal to excess demand. Import demand models are thus excess demand models. Not all imports are necessarily retained, some may be re-exported. The analysis of imports has to take into account re-exports. In the case of dairy products in Nigeria, however, re-exports are prohibited. Our analysis accordingly deals with the quantity of imports only. The functional form for the demand for individual dairy products has been specified as:

$$M_{it} = f(P_{it}, P_{jt}, D_{it}, R_t, Y_t, Q_t, T, W) \qquad \text{eq. 2}$$

Where i = 1...5 denotes any one individual dairy product, e.g. butter, and j = 1...4 the remaining dairy products, i.e. cheese and curd, dry milk, cream and sour milk and condensed milk, in this example. The analysis covers the period 1960 to 1983, that is t = 1...24.

The variables are specified as:

M_{it} = the volume of imports of the i^{th} dairy product,
P_{it} = the price (in real terms) of the i^{th} dairy product,
P_{jt} = the prices (in real terms) of all other j dairy products,
D_{it} = import duty (in real terms), on the i^{th} dairy product,
R_t = foreign exchange reserve (in real terms),
Y_t = per caput income in real terms,
Q_t = domestic milk production,
T = time trend,
W = war dummy (1,0 variable)

Aggregate dairy imports (in LME) can then be expressed as:

$$M_t = f(P_t, R_t, Y_t, Q_t, T, W) \qquad \text{eq. 3}$$

Where the variable are specified as:

M_t = Volume of aggregate dairy imports (in LME)

P_t = weighted aggregate price of all dairy products (in real terms)

The corresponding empirical equations are:

$$M_{it} = a\, P_{it}^{b_i}\, P_{jt}^{b_j}\, D_{it}^{b_6}\, R_t^{b_7}\, Y_t^{b_8}\, Q_t^{b_9} + b_{11} W + e_t \qquad \text{eq. 4}$$

$$M_t = a\, P_t^{b_1}\, R_t^{b_2}\, Y_t^{b_3}\, Q_t^{b_4}\, T^{b_5} + b_6 W + e_t \qquad \text{eq. 5}$$

where e_t is normally distributed with zero mean and unit variance.

The subscripts i to j for different commodities are:

1 = Butter

2 = Cheese and curd

3 = Dry milk

4 = Cream and sour milk

5 = Condensed and evaporated milk

The log linear forms of the analytical equations have been used. Trial runs were made with unlagged and with a mixture of some lagged and some unlagged variables in order to determine the time sensitivity of the dependent to the independent variables.

Quantification of the Variables

6.02 The quantities of dairy imports were extracted from various issues of the Nigerian Trade Journal with some minor adjustments. For imports of cheese and curd in 1978, F.A.O. (Trade Year Book) figures were substituted for the Nigerian data because the latter were unrealistically low. Similarly, butter imports in 1962 were adjusted for what appears to have been a misprint, such that the data are compatible with the preceding and the succeeding years. Similar adjustments were made for the quantity of cream and sour milk imports in 1967.

6.03 The prices of the dairy import components were calculated as the border price (c.i.f.) deflated with the cost of living index. All dairy import prices are thus in real values. The inclusion of the prices of other imported dairy products in the import demand function for any particular dairy product is to determine the extent of substitutability or complementarity among the various dairy product components. The price of aggregate dairy imports was calculated as a weighted

average price where the weighting factors are the respective quantities imported of each individual dairy product. The weighted average price was also deflated with the cost of living index. Import duty was treated as a separate variable rather than included in the import price because the duty can be paid in local currency whereas imports have to be paid in foreign currency. The rates of import duty on butter and cheese are reported in Naira per kilogram while those for other dairy products are specified ad valorem, i.e. in percent of the import value. We converted the rates of duty on butter and cheese to Naira per ton and those on the other dairy products to Naira per unit price. All rates of duty are real values, i.e. deflated with the cost of living index. The values of external reserves have been extracted from various issues of the Financial and Annual Review of the Central Bank of Nigeria. They also were deflated with the cost of living index.

6.04 External reserves as a macro income variable is expected to measure the country's capacity to finance imports. There are, however, conflicting views about its effects on food imports. For general food imports, foreign exchange reserves are a significant determinant of the amount of imports (Ajayi, 1975). But in some economic studies (see for example Fajana, 1977 p. 118) foreign exchange reserves, though significant, have the wrong sign for milk, among other items. At the micro level, the individual's aggregate expenditure on any commodity is the product of the unit price and the quantity purchased. Our proxy for total expenditure is per caput income. This variable will give us an estimate of the income elasticity for imported dairy products. Per caput income was calculated from GDP and was originally availa · at 1973/74 factor prices. Since 1960 was the base year for all other real values, per caput income was reverted to current-values with the price index inflator and then calculated for 1960 as a base year. The GDP for 1981-83 was estimated on the assumption of 1.75% annual rate of growth.

6.05 The estimates of domestic milk production have been presented earlier in this report. Ideally, imports and domestic production and consumption should be treated in a simultaneous equation with the price mechanism providing for the equilibrium point. Any empirical tests of the relationship between prices and domestic milk production in Nigeria, however, prove not to yield any significant results. Domestic production, therefore, was included in the analysis of dairy imports as an exogenous variable. The theoretical justification is that

the markets for imported and locally produced milk are highly separated. Imports are mainly consumed in the tse-tse infested South and by urban dwellers, while local milk is mainly traded locally in rural areas in the North. The time trend is expected to measure the effects of changes in taste and consumer preferences over time. The war variable is an adjustment for import disturbances during the war time period.

6.06 Table 10 presents a summary of the expected direction of effects of the independent on the dependent variables. The negative sign on the own price is an indication that we are dealing with normal import demand curves. A positive or negative sign on the price of other dairy products indicates complementarity or substitutability of consumption respectively. An increase in the rate of duty is expected to reduce the quantity of dairy imports (negative sign). External reserves on the other hand are expected to influence imports positively i.e. an increase in external reserve is expected to increase the value and/or quantity of dairy imports. Per caput income also is expected to show a positive effect on dairy imports. Domestic milk production, however, since it serves as an import substitute, is expected to show a negative sign in relation to dairy imports. With regard to the trend variable, we can expect that imports will either increase over time due to an increase in population, or decrease due to import substitution through domestic production. The war variable can take a positive or a negative sign in relation to dairy imports. It can be negative because of increasing difficulties in transport and distribution, and the diversion of resources to war efforts. On the other hand, it can be positive because of a disruption of domestic production and an increase in food aid imports.

Table 10: A priori expectations for the direction of effects of the independent variables

	Effects on imports
P_{it}	(-)
P_{jt}	(-) or (+)
D_t	(-)
R_t	(+)
Y_t	(+)
Q_t	(-)
T	(-) or (+)
W	(-) or (+)

Results of the Analysis

6.07 Appendix 13 shows the results of the basic regression model of the import demand for individual dairy products in Nigeria. The most striking feature of this table is the rather limited number of significant variables for each of the commodities. Furthermore, some variables do not show their a priori expected signs. For instance, increases in prices for cheese, dry milk and condensed milk seem to have a positive effect on imports of these products. The rate of duty also has a positive relation with the quantity of imports for all commodities except dry milk. External reserves show negative coefficients for butter and cheese and curd. Per caput income has a negative coefficient for butter while domestic production has a positive coefficient for condensed and evaporated milk. Because of these unexpected features individual modifications were done for each single dairy product.

Product-Specific Calculations

6.08 Butter. Because of the significantly high inter-correlation between the (unlagged) rate of duty, per caput income and the time trend with the import price of butter, the rate of duty, per caput income and external reserves were lagged by one period while the trend variable was dropped. The resultant regression equation is:

$$\log M_{1t} = \log 18.120 - \underset{(1.035)***}{1.897 \log P_{1t}} - \underset{(.550)*}{1.720 \log P_{2t}} + \underset{(1.627)***}{3.607 \log P_{3t}} +$$

$$+ \underset{(1.049)}{.896 \log P_{4t}} - \underset{(1.327)***}{2.469 \log P_{5t}} - \underset{(2.605)****}{4.239 \log Q_t} - \underset{(.652)}{.220 \log D_{1t-1}}$$

$$- \underset{(.312)****}{.552 \log R_{t-1}} + \underset{(1.406)}{.567 \log Y_{t-1}} - \underset{(.554)}{1.6111 W} \qquad \text{eq. 6}$$

$R^2 = .91$ For the levels of significance see footnote to Appendix 13.

The only variable with an unexpected sign is now external reserves (R_{t-1}).

6.09 Cheese and Curd. In the calculations of the general model, the price of cheese (P_{2t}) had the wrong sign. Furthermore, the price of condensed and evaporated milk was highly correlated with the prices for butter, dry milk and

cream and sour milk. The removal of the price for condensed and evaporated milk and the time trend gave the following result:

$$\log M_{2t} = \log -8.1265 + \underset{(.904)}{.944 \log P_{1t}} - \underset{(.506)*}{1.692 \log P_{2t}} + \underset{(1.154)****}{1.972 \log P_{3t}} +$$

$$+ \underset{(.999)****}{1.365 \log P_{4t}} + \underset{(.800)}{.604 \log D_{2t}} - \underset{(.235)***}{.489 \log R_t} + \underset{(1.831)**}{5.668 \log Y_t}$$

$$- \underset{(1.705)****}{2.385 \log Q_t} + \underset{(.431)}{.266 W} \qquad \text{eq. 7}$$

$R^2 = .75$

In addition to the correct sign for the price of cheese there are now two more significant variables. External reserves, however, have dropped from their previous 5% to a 10% level of significance.

6.10 Dry Milk. In Appendix 13, although statistically significant, the price for dry milk has the wrong sign. By modifying the general model we find, however, that imports of dry milk respond, among other variables, to the lagged price and to the lagged external reserves. The regression equation is:

$$\log M_{3t} = \log 12.450 - \underset{(.981)***}{1.864 \log P_{1t}} + \underset{(.774)**}{2.014 \log P_{2t}} - \underset{(1.349)}{1.69? \log P_{3t}}$$

$$- \underset{(1.341)}{.603 \log P_{4t}} - \underset{(1.576)}{.365 \log P_{5t}} - \underset{(.168)}{.109 \log D_{3t}} + \underset{(.379)****}{.549 \log R_{t-1}} -$$

$$- \underset{(2.232)}{.314 \log Y_t} - \underset{(2.367)}{1.374 \log Q_t} + \underset{(.577)}{.158 W} \qquad \text{eq. 8}$$

$R^2 = .86$

6.11 Cream and Sour Milk. Trend alone accounts for 55% of the variability in imports of cream and sour milk. But when prices are lagged, the rate of duty distorts the signs of the price variables. So, although there are no significant variables for cream and sour milk in the general model, the general model appears as the best fit in terms of the signs of the price variables and of domestic

production. With a reduced number of variables, we arrive at some significant variables:

$$\log M_{4t} = \log 8.209 - .071 \log P_{4t-1} + .123 \log D_{4t-1} + .542 \log R_t$$
$$(.850) \qquad (1.33) \qquad (.278)^{**}$$
$$- .912 \log Qt - 2.695 \log P_{2t-1} \qquad \text{eq. 9}$$
$$(1.685) \qquad (.730)^{*}$$

$R^2 = .59$

6.12 Condensed and Evaporated Milk. This particular commodity is unique in the sense that 74% of the variability in the quantities imported are explained by the price lagged by one year with a high level of significance. If the one-year lagged price is maintained, the introduction of other variables slightly improves the fit and changes the sign of external reserves to match our a priori expectation without however increasing the number of significant variables.

$$\log M_{5t} = \log 8.232 + .864 \log P_{1t} - .958 \log P_{2t} + .545 \log P_{4t} -$$
$$(.807) \qquad (.822) \qquad (1.202)$$
$$- 2.825 \log P_{5t} + .135 \log D_{5t-1} + .116 \log R_t + .462 \log Y_t +$$
$$(1.455)^{***} \qquad (.149) \qquad (.312) \qquad (2.250)$$
$$+ .198 \log Q_t + .081 W \qquad \text{eq. 10}$$
$$(1.636) \qquad (.438)$$

$R^2 = .78$

6.13 Aggregate Dairy Imports (in LME). A slight departure from the general model is the introduction of lagged external reserves as shown in equation 11:

$$\log M_t = \log 6.796 - 1.084 \log P_t + .153 \log R_{t-1} + .403 \log Y_t -$$
$$(.293)^{*} \qquad (.091)^{***} \qquad (.993)$$
$$- .270 \log Q_t + .668 \log T + .014 W \qquad \text{eq. 11}$$
$$(.450) \qquad (.300)^{**} \qquad (.182)$$

$R^2 = .95$

The confidence interval for aggregate dairy imports is:

$P(4.844 \leq M_t \leq 5.669) = .95$

Elasticities

6.14 Appendix 14 shows the elasticities, derived from the product specific models, for all prices, per caput income, duty, external reserves, time trend and the war factor. The import demand for cream and sour milk is highly inelastic to the import price. Condensed and evaporated milk is the most price-elastic commodity. Butter, cheese and curd, and dry milk are price-elastic without showing extreme values.

6.15 With a cross-price elasticity of demand of 3.6 dry milk appears to be a strong substitute for butter. The degree of substitution between cream and sour milk and butter is only 0.9. Cheese and curd as well as condensed and evaporated milk, on the other hand are complementary to butter. When their prices go up, and the demand for them falls, the demand for butter also falls. This relationship however, is symmetrical. Cheese and curd appear to be complementary to butter, whereas butter is competitive rather than complementary to cheese and curd. Dry milk as well as cream and sour milk are substitutes for cheese. There is also a symmetrical relationship between butter and dry milk. Butter is a complement to dry milk and dry milk also shows a complementary relationship with butter. Cheese and curd maintain their competitive relationship to dry milk while these turn out as complementary products the other way around. The previously observed competitive relationship between cream and sour milk and cheese and curd is reversed to one of complementarity when the price of the corresponding commodities is lagged by one period. The complementary relationship between condensed and evaporated milk on the one hand and butter and dry milk on the other is reversed to substitution when the price of evaporated milk is lagged by one period.

6.16 All components of total dairy imports are highly inelastic with respect to the rate of duty. Cheese and curd, cream and sour milk, and condensed and evaporated milk react in a direction opposite to that expected with respect to the rate of duty. There is a slight negative effect of the rate of duty on butter and dry milk. We can, therefore, conclude that import duty in Nigeria has not served to restrict dairy imports but has, correspondingly, generated some revenues for the Government. Dairy imports also appear to be highly inelastic to the level of external reserves. This may be due to the fact that Nigeria was accustomed to financing imports on short-term credits.

6.17 Cheese and curd as well as cream and sour milk are all highly elastic to changes in income. But butter, dry milk, condensed and evaporated milk are highly inelastic to changes in the per caput income. The fact that a rise in income appears to depress the consumption of dry milk can probably be explained by the substitution effects between dry milk and other dairy products. Imports of butter, cheese and curd and dry milk are highly elastic with respect to domestic milk production. This can be expected since locally produced milk is traditionally converted to butter, cheese and ghee. Cream and sour milk as well as condensed and evaporated milk are highly inelastic to changes in domestic milk production.

Policy Instruments for Controlling Dairy Imports

6.18 Within our frame of analysis, there is no effective policy instrument for controlling dairy imports. Import duties seem to be ineffective. The level of external reserves seems not to have any noticeable effect on dairy imports. The only policy instrument (other than import licensing whose effect it has not been possible to quantify) which in the long run could be used to try and reduce dairy imports is increased efforts to stimulate domestic milk production. With the exception of condensed and evaporated milk which, however, is the largest single dairy produce imported, increasing domestic milk production decreases imports of dairy products. The magnitude of the decrease, though low in the case of cream and sour milk, is very high in the case of butter, cheese and curd, and dry milk.

SUMMARY AND CONCLUSIONS

7.01 In this paper we have outlined the magnitude of dairy imports, related policies and programmes and the situation regarding milk production and marketing in Nigeria. The chronic gap between demand and supply together with welfare considerations have created the necessity for continued imports of dairy products. The development programmes have recorded remarkable failures in harnessing local resources for increasing domestic milk production. Local milk processing has failed because of the existence of only very few milk collection centres and of the preference of processors for imported raw materials as inputs in milk recombination. The continued unsettled nature of most herdsmen also is detrimental to increased milk production and supply.

7.02 With regard to import control measures, import duties do not seem to have had any effect in reducing total imports of dairy products. Some dairy products even show a positive correlation with duty while the effects of duty on imports of butter and dry milk, though restrictive, are minimal. Import duties on dairy products, therefore, appear to be more of a budgetary tool for revenue collection than a restrictive measure on trade. If effective instruments for stimulating domestic milk production were devised and implemented a reduction in imports, particularly of butter, cheese and curd, and dry milk could be expected. The restrictive effect of increased domestic milk production on imports of cream and sour milk will be very small. Imports of condensed and evaporated milk, which at present account for two thirds of all dairy imports into Nigeria, might however be thoroughly insensitive to increased domestic milk production. This result is startling and further research is needed to find out more about the relationship between imports and domestic milk production.

7.03 This study thus also serves as a pointer to gaps in the knowledge about the dairy sector in Nigeria. First, further research on milk production systems is needed. Such research will analyse the production and cost functions of different milk production systems and the existence or absence of comparative advantage of domestic milk production. Second, dairy marketing in Nigeria needs to be analysed. Such research, among other things, should identify the various marketing systems, consumers' preferences for different systems, profit margins in different systems, milk pricing and the effects of the systems on domestic milk production. With the results of that research at hand, it should be possible to better assess the impacts of dairy imports on domestic milk production in Nigeria.

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Appendix 1: Value of dairy imports into Nigeria by commodity, 1962-1983

Year	Butter	Cheese & curd	Condensed & evaporated milk	Cream & sour milk	Powdered milk	Fresh milk	Other	Total dairy imports
			1000 Naira in current prices					
1962	3	0	59	0	8	-	-	71
1963	1	0	54	-	15	-	-	70
1964	0	0	93	-	14	-	-	108
1965	1	0	71	0	11	-	-	83
1966	0	10	99	0	18	-	-	126
1967	0	13	217	5	34	-	-	269
1968	0	13	308	8	37	-	-	365
1969	28	13	266	13	28	-	-	340
1970	13	29	452	13	46	0	-	553
1971	52	50	518	16	41	0	-	678
1972	52	39	501	14	36	0	-	642
1973	77	56	771	24	74	2	-	1004
1974	76	64	963	11	133	-	418	1665
1975	125	92	910	30	246	-	620	2032
1976	126	94	1306	32	268	-	823	2649
1977	147	112	1452	60	430	-	751	2953
1978	161	122	1571	52	533	-	765	3206
1979	4	229	5368	89	2795	-	-	8495
1980	279	194	2700	91	975	-	-	4338
1981	240	174	2860	44	855	-	-	4173
1982	304	101	3398	39	312	-	1130	5376
1983	234	180	2764	63	724	-	-	4015
1984	262	322	4511	87	1368	-	-	6540
1985	240	332	5052	224	2170	-	-	8018
1986	228	309	5514	383	29	-	-	6463
1987	243	261	5105	38	1859	-	-	7596
1988	21	223	3511	7403	3768	-	-	14926
1989	4	229	5368	88	2795	-	-	8485
1990	227	241	8003	95	5588	-	-	14155
1991	325	454	12105	336	9228	-	-	22448
1992	427	420	18125	171	6453	-	-	25596
1993	410	602	16528	643	5051	-	-	23234
1994	457	621	20962	482	6866	-	-	29388
1995	1002	968	30288	666	24958	-	-	57881
1996	1424	1240	41337	2848	19111	-	-	65959
1997	1676	1672	56174	4182	37466	-	-	101170
1998	2541	2243	58605	3287	50367	-	-	117143
1999	1276	757	71046	5669	57720	-	-	136076
2000	2048	94	113812	2653	47170	-	-	166677
2001	6251	150	106132	2340	43337	-	-	158828
2002	6485	206	106176	3126	44810	-	-	160803
2003	6486	236	113821	3242	64858	-	-	188642

Source: Nigerian Trade Summary.

Appendix 2: Government revenues from duties on dairy imports into Nigeria, 1942-83

Year	Butter	Cheese and curd	Condensed & evaporated milk	Fresh milk, cream and sour milk	Powdered milk	Total dairy imports
			(Naira)			
1942	542	130	-	-	-	672
1943	150	4	-	-	-	154
1944	28	62	-	-	-	90
1945	140	16	-	-	-	156
1946	4	1656	-	-	-	1660
1947	48	2470	-	-	-	2518
1948	40	1920	-	-	-	1960
1949	2978	1744	-	-	-	4722
1950	1350	3586	-	-	-	4936
1951	5224	5924	-	-	-	11148
1952	4416	3806	-	-	-	8222
1953	2404	5240	-	-	-	7653
1954	6400	6768	-	-	-	13168
1955	11068	10134	-	-	-	21202
1956	11722	9584	-	-	-	21306
1957	14016	11384	-	-	-	25400
1958	19050	13398	-	-	-	32448
1959	1350	22712	-	-	-	24062
1960	78804	54956	-	-	-	133760
1961	78672	58344	-	-	-	137016
1962	36110	62170	-	-	-	98280
1963	33462	58520	-	-	-	91982
1964	118720	158830	-	-	-	277550
1965	172970	105545	-	89500	866020	1324035
1966	145145	204560	-	153288	11764	604757
1967	197575	187950	2077956	15208	743724	3222413
1968	16440	436450	1404568	2960940	1507324	6310931
1969	2475	30985	1787501	29397	559030	2468388
1970	140776	87115	1600560	19000	558820	2415271
1971	127424	151130	1210460	67120	9427760	10983894
1972	192360	71280	3625000	68400	645300	4602340
1973	215292	125796	3307640	257200	505050	4410978
1974	190540	134800	1048090	192960	342280	1918675
1975	267900	211002	-	-	-	478902
1976	382110	352275	-	-	-	734385
1977	450180	278280	-	-	-	728460
1978	4518500	1186000	5860500	677400	10073400	22311800
1979	625200	60600	7104560	1132700	11545760	20470820
1980	1150000	25000	11281101	530660	9433062	22520813
1981	2250000	45000	10613207	589740	8667452	22165300
1982	2300000	45000	10613207	625118	8962028	22545353
1983	2350000	50000	10613207	648466	12971580	26633253

Sources: (1) Nigerian Trade Summary
(2) Objective Estimates

Appendix 3: Factors to convert dairy products into whole liquid milk equivalents (LME)

Commodity	Commodity code	Conversion factor[1/]
Dry milk (skim or whole)	DRM, DSM & DWM	7.6
Milk, condensed and evaported	MCE	2.0
Cheese and curd	CHC	4.4
Butter	BUT	6.6
Butteroil	BUO	8.0
Other (as part of food aid)	OTH	2.0

[1/] To be read, for example 1 kg. DRM = 7.6 kg ME
or 1 kg DWM + 0.5 kg BUO = 7.6 ME +4.0 ME=11.6 ME

Source: FAO, Milk and milk products: Supply, demand and trade projections 1985. ESC: PROJ78/3, Rome, 1978. Adapted from " Dairy Import into Sub-Saharan Africa Development and Policies" by V.H Von Massow.

Appendix 4: Quantity of dairy import commodities (Tons)

Year	Butter	Cheese & curd	Milk condensed & evaporated	Milk fresh cream & sour	Milk powder	Milk fresh	Others
1942	7.2	1.9	362.9	0.3	17.9	-	0.1
1943	1.7	0.1	293.6	-	21.3	-	6.7
1944	0.3	0.9	501.8	-	25.8	-	0.4
1945	1.6	0.2	386.4	0.7	19.2	-	-
1946	0.2	23.0	484.1	2.5	41.3	-	-
1947	0.7	27.9	932.5	21.6	53.1	-	84.7
1948	0.6	27.4	1200.2	20.7	52.0	-	12.3
1949	30.1	25.0	1084.6	28.3	48.3	-	3.7
1950	18.4	48.7	1778.4	28.3	75.8	0.2	8.3
1951	70.7	80.4	1887.1	32.2	59.6	0.8	51.2
1952	61.1	57.4	1745.3	23.6	52.4	1.7	55.1
1953	88.2	78.2	2603.2	41.4	94.2	7.3	53.1
1954	87.3	91.5	3847.9	34.6	173.5	-	584.8
1955	150.4	143.0	3295.8	111.3	317.7	-	824.2
1956	161.5	124.3	4766.9	108.8	430.4	-	1102.2
1957	195.4	160.5	5057.9	103.7	579.5	-	990.3
1958	265.5	188.1	5401.2	171.7	758.9	-	1002.5
1959	7.5	258.1	23187.2	200.4	13815.0	-	-
1960	358.2	240.8	9954.0	208.4	1808.8	-	-
1961	357.6	265.2	10189.1	133.1	1588.1	-	-
1962	164.1[1]	3718.2	11923.3	135.9	1615.6[1]	-	14262.8
1963	152.1	266.0	9739.3	186.8	1643.0	-	-
1964	339.2	453.8	20256.7	237.7	3220.7	-	-
1965	404.2	558.7	17206.0	573.6	5039.3	-	-
1966	414.7	841.6	18475.7	1005.6	85.0	-	-
1967	564.5	537.0	18350.9	449.6	4992.7	-	-
1968	35.3	1247.0	13155.7	22759.8	8226.5	-	-
1969	7.5	257.1	23187.2	299.5	13815.0	-	-
1970	340.4	248.0	20896.8	279.4	21337.3	-	-
1971	289.6	431.8	42223.8	914.5	21377.9	-	-
1972	437.2	324.9	61843.2	452.5	15279.7	-	-
1973	489.3	381.2	50442.0	1344.1	10921.6	-	-
1974	453.5	408.5	54954.2	1248.9	11096.3	-	-
1975	893.0	639.4	58914.1	993.3	26016.1	-	-
1976	1273.7	1067.5	74285.7	5046.3	20181.9	-	-
1977	1500.6	843.3	107514.0	4542.0	36407.1	-	-
1978	9020.0	2272.0	77611.0	3855.0	50544.0	-	-
1979	1252.4	121.2	73912.2	4819.0	39021.1	-	-
1980	2300.0	50.0	175000.0	3000.0	40000.0	-	-
1981	4500.0	90.0	180000.0	3500.0	25000.0	-	-
1982	4600.0	90.0	175000.0	3800.0	27000.0	-	-
1983	4700.0	100.0	190000.0	3900.0	50000.0	-	-

[1] Adjusted downward for consistency with other quantities relative to their value.

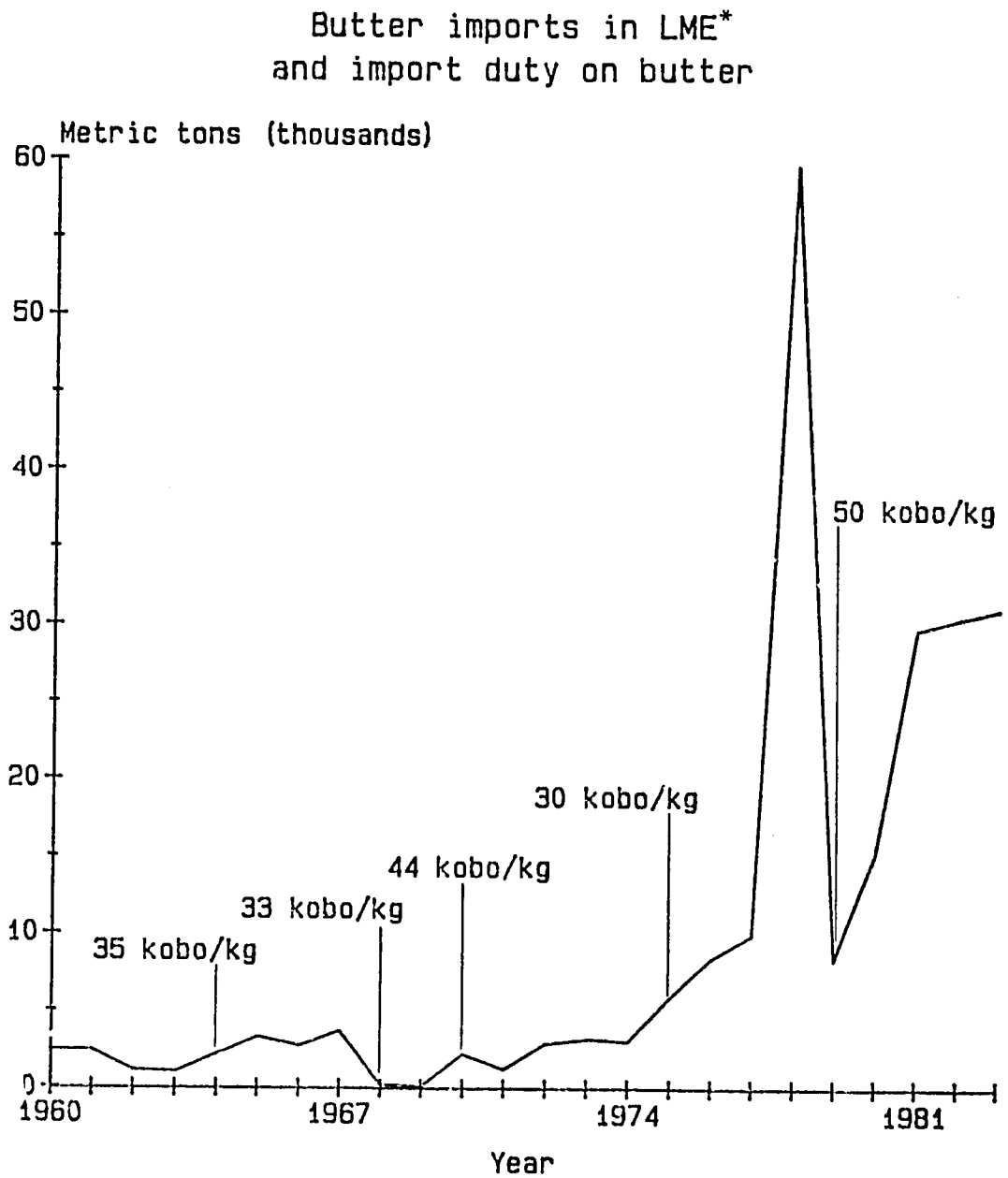
Source: Nigerian Trade Summary. See also para 6.02.

Appendix 5: Dairy imports (in whole liquid milk equivalents) into Nigeria, 1942-1983

Year	Butter	Cheese and curd	Condensed & evaporated milk	Cream and sour milk	Powder milk	Milk fresh	Others preserved & compounds	Total
1942	48	8	728	0	136	0	18	938
1943	11	0	587	0	162	0	13	774
1944	2	4	1004	0	196	0	1	1206
1945	11	1	773	0	146	0	0	931
1946	1	101	968	3	314	0	0	1387
1947	5	123	1865	22	404	0	169	2587
1948	4	121	2400	30	402	0	25	2981
1949	285	110	2160	28	367	0	7	2967
1950	121	214	3557	28	576	0	17	4514
1951	467	254	3774	32	453	1	102	5083
1952	403	253	3471	24	398	2	70	4620
1953	582	344	5206	41	716	7	106	7003
1954	576	403	7696	35	1310	0	1170	11197
1955	993	629	6502	111	2415	0	1648	12388
1956	1066	591	9534	109	3271	0	2204	16774
1957	1290	706	10116	194	4404	0	1981	18690
1958	1752	828	10982	172	5768	0	2005	21507
1959	50	1136	46374	299	104994	0	0	152853
1960	2364	1000	19910	298	14423	0	0	38095
1961	2350	1167	20378	133	12070	0	0	36108
1962	1083	16760	23846	136	12279	0	28526	82230
1963	1004	1170	19479	187	12487	0	0	34326
1964	2229	1997	40513	238	24477	0	0	69464
1965	2262	2458	34412	574	38299	0	0	79004
1966	2737	2703	36951	1006	646	0	0	45043
1967	2726	2263	36702	450	36746	0	0	79886
1968	233	5487	26211	22760	62521	0	0	117312
1969	50	1131	46374	300	104994	0	0	152849
1970	2247	1095	59604	279	162163	0	0	225478
1971	1911	1900	84628	915	162472	0	0	251825
1972	2886	1430	123686	453	116126	0	0	244580
1973	3229	1677	100884	1244	83004	0	0	190139
1974	2993	1797	109908	1240	84332	0	0	200280
1975	5804	2813	117823	993	197722	0	0	325250
1976	8406	4602	148571	5046	153382	0	0	320008
1977	9004	3714	215028	4542	276604	0	0	509878
1978	50591	10437	155222	3855	384134	0	0	613240
1979	8266	933	147824	4819	303400	0	0	465243
1980	15180	220	350000	3000	304000	0	0	672400
1981	29700	396	360000	3500	266000	0	0	659596
1982	30360	396	350000	3800	266000	0	0	650556
1983	31020	440	380000	3900	330000	0	0	795360

Source: Appendix Tables 3 and 4

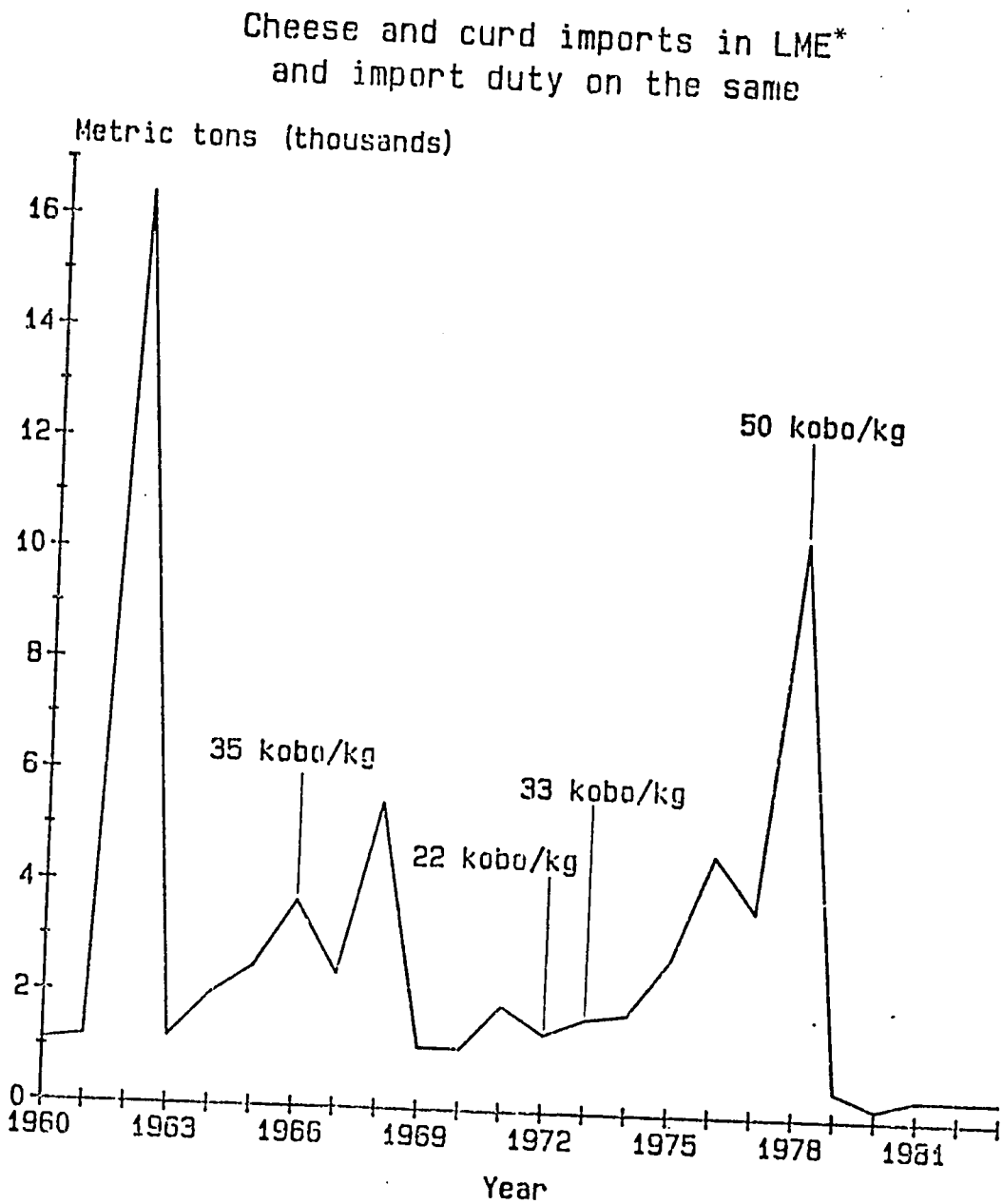
Appendix 6a



*Whole liquid milk equivalent – see Appendix 3

Source: Appendix 5

Appendix 6b

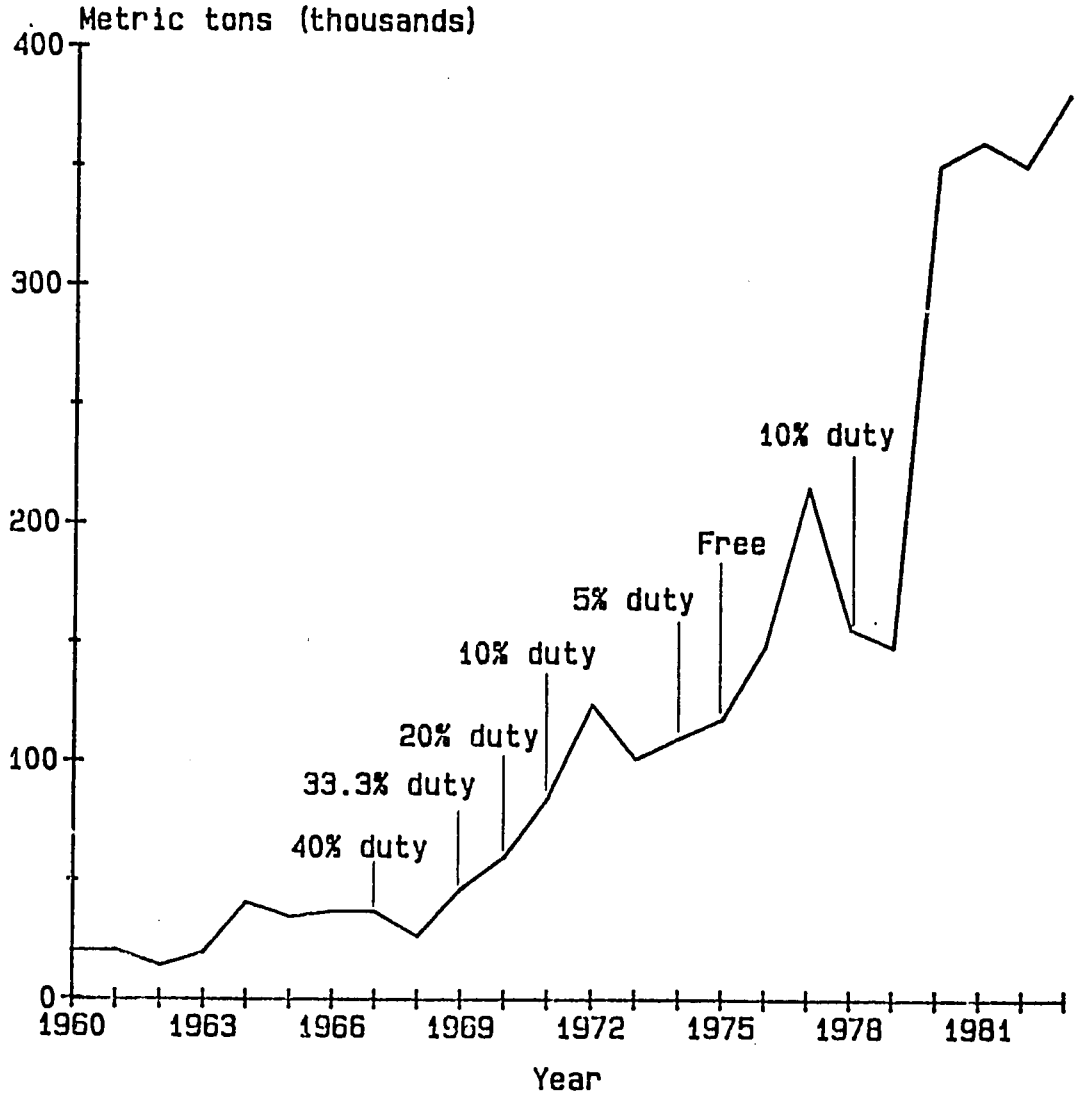


*Whole liquid milk equivalent – see Appendix 3

Source: Appendix 5

Appendix 6c

Import of condensed and evaporated milk in LME* and import duty on the same

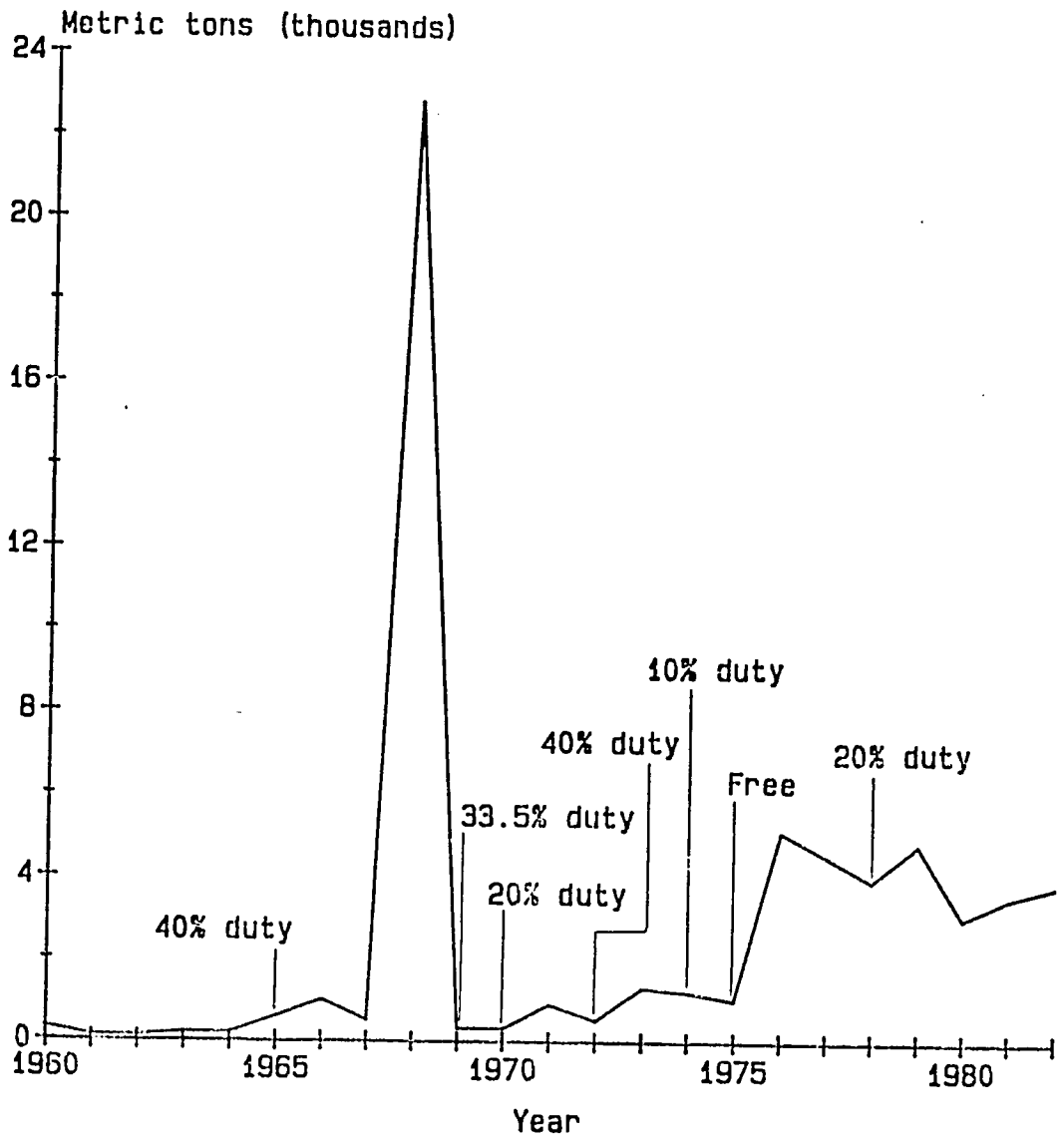


*Whole liquid milk equivalent – see Appendix 3

Source: Appendix 5

Appendix 6d

Import of fresh cream and sour milk in LME* and import duty on the same

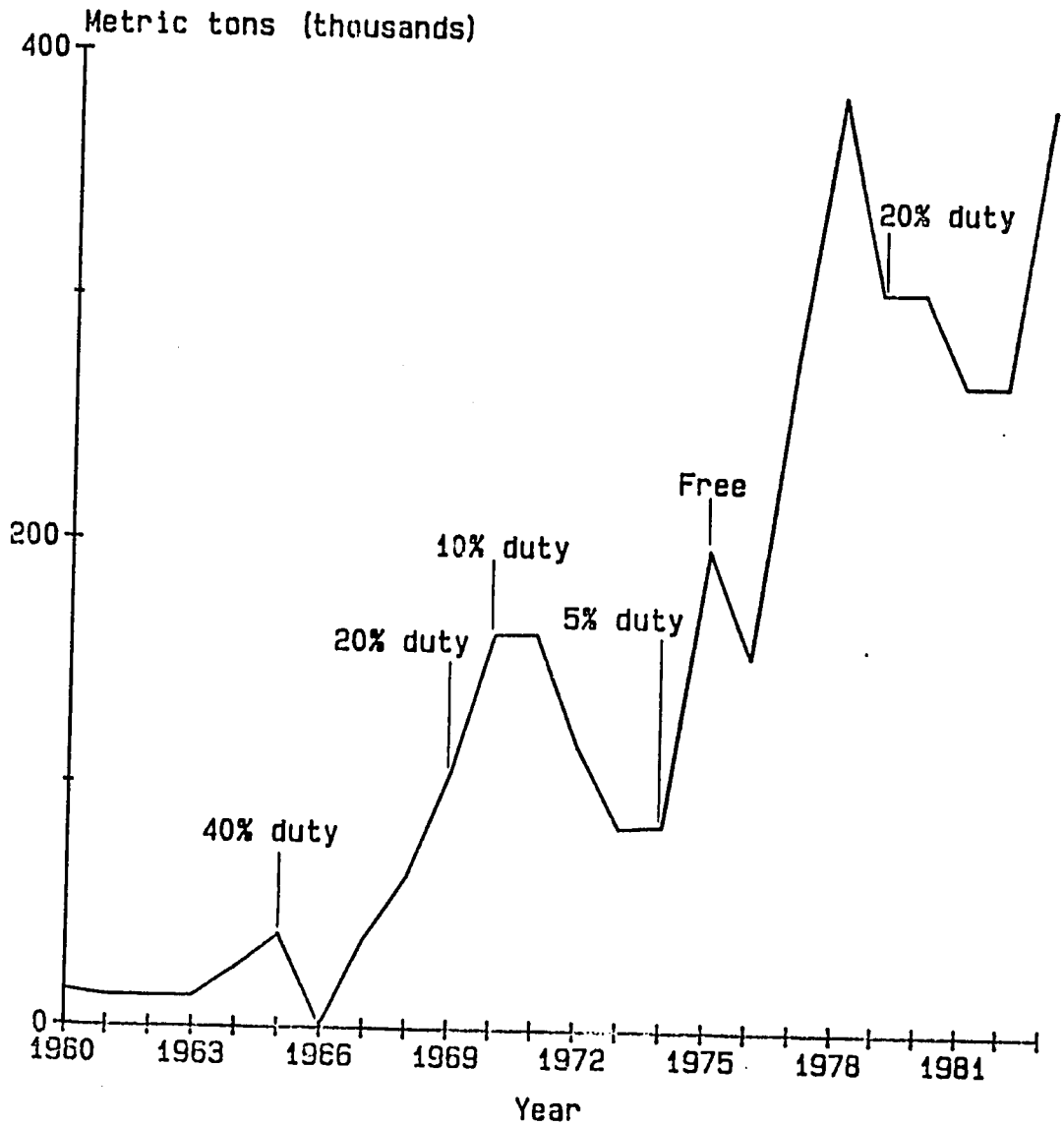


*Whole liquid milk equivalent – see Appendix 3

Source: Appendix 5

Appendix 6e

Import of powdered milk in LME*
and import duty on the same

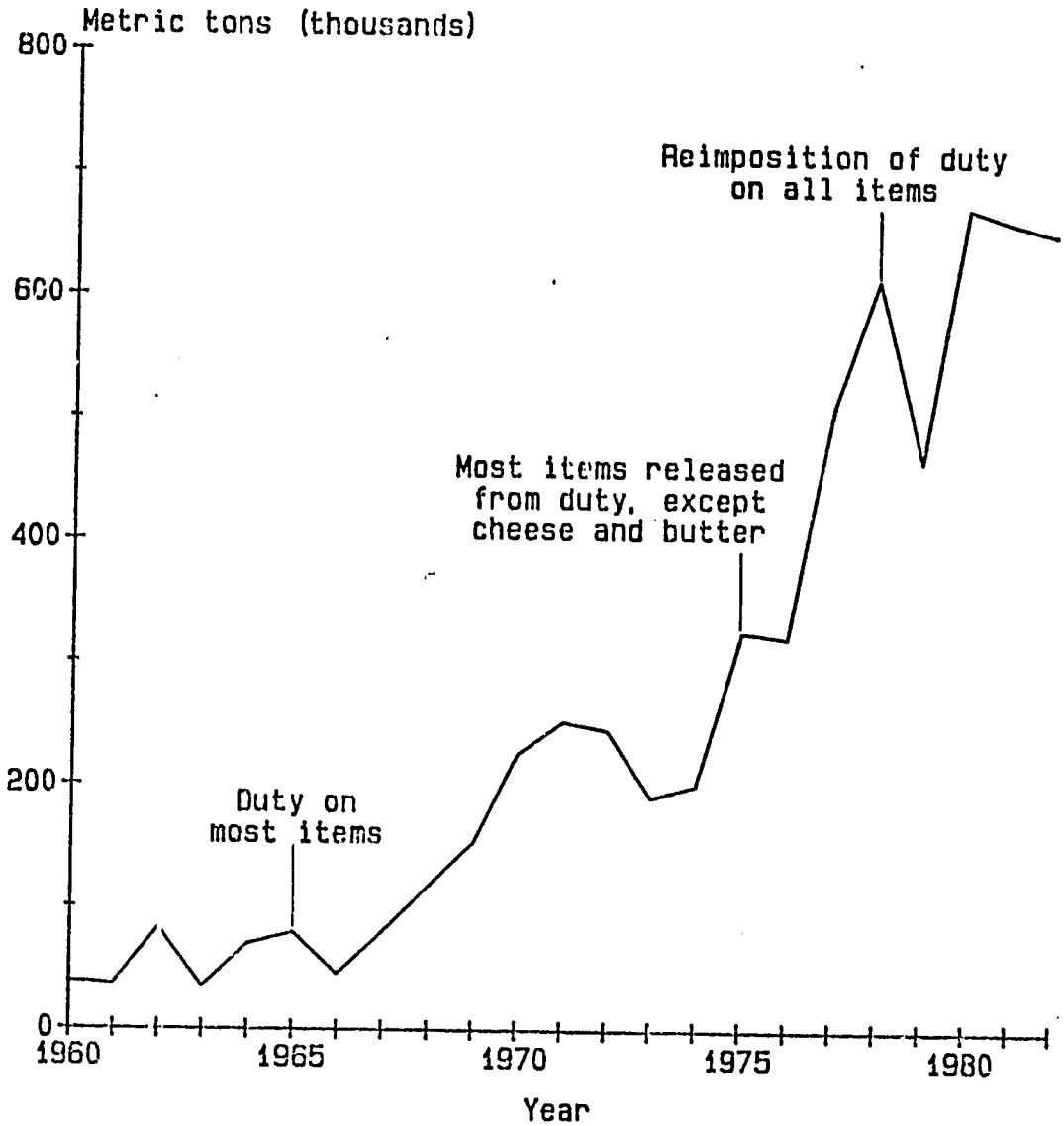


*Whole liquid milk equivalent — see Appendix 3

Source: Appendix 5

Appendix 6f

Dairy imports in LME* and major import duty decisions



*Whole liquid milk equivalent – see Appendix 5

Source: Appendix 5

Appendix 7: Dairy plants in Nigeria

Name and location	Products	Capacity (litre/day)	Utilisation (%)	Source of milk		
				own ranch	local provision	imports
Agege dairy plant, Lagos	Fresh milk	500	NA	X		
Maiduguri Urban Dairy, Borno	Fresh milk Yoghurt	500 1000	25	X		X
Nigerian Dairies Ltd., Kaduna	Milk Yoghurt	10000 15000	NA		X	X
Kano Urban Dairy, Kano	Milk Yoghurt Cream and butter	3000 200 300	35		X	X
Ilorin Urban Dairy, Ilorin	Milk Yoghurt	200 NA	10		X	X
Nigerian Dairies Ltd., Minna	Milk Yoghurt	15000 NA	27	X	X	
LIBC, Minna	Yoghurt	15000	>100			X
Madara Ltd., Vom via Jos	Milk Yoghurt	20000 15000	20	X	X	X
Buttira Dairy, Nuri, Vom	NA	NA	NA	X		
Runka Dairy, Kaduna	Milk Yogurt	3000	25		X	
Iwo Road Dairy, Oyo	Fresh milk	500	15	X		
Bulossa Dairy Birmin Kebbi, Sokoto	Fresh milk	500	20	X	X	
Sokoto Dairy, Sokoto	Fresh milk	500	NA	NA	NA	NA

Sources: Obi, A C. 1982. Prospects for dairy development in Nigeria. Paper presented at the 8th Annual Conference of the Nigerian Society for Animal Production. Port Harcourt, and CARD, 1982

Appendix 6: Cows and Cows in Milk[1/]

Year	Total herd[2/]	Traditional herd (97% of total herd)	Adult cows (50% of traditional herd)	Cows in milk (25% of adult cows)	FAO Cows in milk (56.6% of adult cows)
	(Million heads)				
1970	6.68	6.48	3.240	0.810	N.A.
1971	6.88	6.67	3.340	0.834	1.129
1972	7.10	6.89	3.450	0.861	1.110
1973	7.32	7.10	3.550	0.888	1.092
1974	7.55	7.30	3.650	0.913	1.092
1975	7.77	7.54	3.770	0.943	1.100
1976	8.01	7.77	3.885	0.971	1.130
1977	8.24	7.99	3.995	0.999	1.150
1978	8.50	8.25	4.125	1.031	1.180
1979	8.70	8.44	4.220	1.055	1.200
1980	9.01	8.74	4.370	1.093	1.230
1981	9.28	9.00	4.500	1.125	1.250
1982	9.85	9.55	4.770	1.194	1.250
1983	10.13	9.83	4.915	1.229	1.230

[1/]The cow proportion of 50% and the cow in milk proportion were taken from P.N. de Leeuw "Feed requirements of pastoral milk production herds in the savanna region". Proceedings 1978.

[2/]This column was derived by first apportioning the 1978 cattle population figure between Northern and Southern states with the assumed distribution ratios. Next, the regional data were increased or decreased with the assumed regional growth rates. The estimated regional data were thereafter aggregated to form the national estimates.

Source: See Section 5 - Milk Production from Traditional Fulani Herds, p. 13-15 of text

Appendix 9: Dairy projects in Nigeria - planned and actual expenditure, 1970-1975

Projects	Plan	Actual
	(Naira)	
Benue-Plateau		
1. Supplementary feeding	20,230	54,220
2. Plateau Dairy Scheme	195,300	2,120
3. Dairy plant	260,000	30,050
Kwara		
1. Grazing reserves	40,000	22,000
2. Supplementary feeding	20,000	12,000
3. Demarcation of state routes	26,000	16,000
4. Breeding investigation	30,000	30,000
5. Borgu Dairy	98,000	-
6. Borgu Ranch	329,000	88,000
7. Ilorin Dairy	98,000	58,000
Lagos		
1. Dairy farm	200,000	52,346
Mid-Western State		
1. Igarra Cattle Ranch	400,000	255,955
North-Central State		
1. Cattle improvement centre	30,000	29,588
2. Cattle treatment	43,500	37,996
3. Ranch management	154,000	122,946
4. Development of grazing reserves	93,000	77,712
5. Fencing grazing reserves	44,000	32,052
6. Veterinary centres	120,000	105,800
7. Suplementary feeding	24,000	-
North-Eastern State		
1. Rinderpest control	5,958	6,744
2. Cattle breeding ranches	279,996	196,539
3. Dairy development Borno	154,006	79,617
4. Range management Borno	273,366	203,834
5. Supplementary feeding	78,596	54,568
6. Dairy development Wambilla	199,000	-
Sub-total	3,215,952	1,568,067

(contd..)

Appendix 9 (contd.):

Projects	Plan	Actual
	(Naira)	
Sub-total	3,215,952	1,568,067
		(contd..)
North-Western State		
1. Veterinary clinical centres	80,000	40,990
2. Rinderpest control	58 000	70,148
3. Sokoto cattle breeding ranch	396,000	160,000
4. Grazing reserves	760,000	324,969
5. Range management	1,426,000	570,077
6. Supplementary feeding	66,000	33,000
7. Stock route and pest control	80,000	61,165
8. Pilot dairy schemes	258,000	88,462
Rivers State		
1. Dairy plant and pasture development	96,000	69,100
2. Dairy equipment and appliance	48,000	6,000
3. Dairy laboratory equipment	16,000	-
South Eastern State		
1. Obudu cattle ranch	771,500	421,912
2. Veterinary clinic and laboratories	198,000	17,513
Kano State		
1. Grazing and water for cattle	612,400	328,604
2. Stock routes	64,000	54,138
3. Pest control (rinderpest)	19,400	6,940
4. Kano Urban Dairy	52,000	87,100
Federal Government		
1. Vom project	323,660	40,692
2. State veterinary laboratories	176,000	5,363
Total	8,716,912	3,754,180

Source: Second National Development Plan, 1970-1974; Ministry of Economic Development and Reconstruction. 1973. Second Progress Report. Lagos. pp. 176-197

Appendix 10: Dairy programs and expenditure. 1975-80

Programs	Expenditure 1975-77	Allocation 1975-80	% Expenditure
	(million of Naira)		
Federal			
1. Tse-Tse Fly Programs	2.402	12.307	20.25
2. F.D.A. Veterinary Offices	0.454	21.800	2.08
3. Kaduna Dairy	-	0.188	-
4. Milk Collection and Cooling Centres	-	0.126	-
5. Hedara Ltd. (Vom Dairy Ltd).	-	0.760	-
6. Minna Dairy	-	0.320	-
7. Mambilla Livestock Project	-	1.900	-
Bauchi State			
1. Range Management	0.054	1.059	5.10
2. Dairy Farms	0.062	600.000	0.01
Bendel State			
1. Obiaja Cattle Dairy Ranch	0.412	1.000	41.20
Benue State			
1. Pilot Dairy Development	-	0.500	-
2. Supplementary Feed Program	0.032	0.300	10.67
Borno State			
1. Range Management	0.208	1.351	15.40
2. Pregnant Female Cow	0.200	0.167	119.76
3. Supplementary Feed Program	0.199	0.960	20.73
4. Dairy Farms (Nguru)	0.600	0.030	2000.00
Cross River State			
1. Urban Dairy Scheme	0.028	0.500	5.60
2. Obudu Cattle Ranch	0.238	0.700	34.00
3. Grazing Reserve	0.300	0.500	60.00
Gongola State			
1. Range Management	0.193	1.474	13.09
2. Supplementary Feed Program	0.170	1.017	16.72
3. Pregnant Cows Recovery Programs	0.022	0.167	13.17
4. Dairy Farms	0.146	1.000	14.60
5. Mambilla Dairy Project	0.256	3.000	8.53
Kaduna State			
1. Dairy Investigation	0.079	0.200	39.50
2. Range Management	0.349	1.800	19.39
3. Supplementary Feeds	0.125	0.500	25.00

(contd...)

Appendix 10 (cont.): Dairy programs and expenditure 1975-80

Programs	Expenditure 1975-77	Allocation 1975-80	% Expenditure
	(million of Naira)		
Kano State			
1. Supplementary Feed Scheme	0.660	3.036	21.74
2. Range Management	0.019	0.230	8.26
Kwara State			
1. Ilorin Dairy	0.050	0.209	23.92
2. Bergu Dairy	-	500.000	-
Lagos State			
1. Dairy Development and Expansion Scheme			
2. Ikoroda Dairy Farm	0.413	3.900	10.59
Niger State			
1. Range Management	0.075	1.000	7.50
2. Minna Dairy Expansion	0.022	0.200	11.00
Ogun State			
1. Urban Dairy	-	0.500	-
Ondo State			
1. Urban Dairy (Akure)	-	0.500	0.00
Oyo State			
1. Urban Dairy	0.227	1.130	20.09
2. Rural Dairy	0.030	0.310	9.68
3. Dairy Goats	0.006	0.210	2.86
Plateau State			
1. Milk Collection Centres	0.400	1.000	40.00
2. Range Management	0.550	2.000	27.50
3. Supplementary Feed Program	0.043	0.170	25.29
Sokoto State			
1. Sokoto Urban Dairy	0.090	0.750	12.00
2. Range Management	0.647	3.728	17.36
3. Birnin-Kebbi Dairy Expansion	0.156	0.330	47.27
Total	10.097	1172.829	0.86

Source: Second Progress Report on the Third National Development Plan, 1975-80. Central Planning Office, Federal Ministry of Economic Development and Reconstruction. Lagos pp. 122-198

Appendix 11 a: Total import value (c.i.f. and duty paid), and unit price (c.i.f. and duty paid) of cheese and curd, and cost of living index

Year	Total Import Value c.i.f. (N000)	Total Import Duty (N000)	Total Reconstruction Charges (N000)	Total Landed Value* (N000)	c.i.f. unit price (N/T)	Landed Unit Price (N/T)	Cost of Living Index (Base = 1960)
1960	193.80	54.96	-	248.85	776.18	996.2	100
1961	172.00	58.34	-	232.33	656.01	876.06	105.8
1962	191.38	62.17	-	255.55	61.47	68.72	116.3
1963	170.70	58.52	-	238.37	675.9	896.9	112
1964	321.70	158.83	-	527.54	709.1	1059.1	111.6
1965	321.00	106.55	-	527.54	594.22	894.22	115
1966	308.67	204.56	-	603.19	366.72	716.72	128.2
1967	216.04	187.95	-	448.80	402.31	836.11	121.8
1968	222.52	436.45	16.69	675.66	178.44	514.83	117.8
1969	230.32	80.90	17.05	347.26	930.84	1350.68	121
1970	241.2	87.12	12.06	340.38	960.06	1367.54	160
1971	454	151.13	22.7	627.83	651.41	1053.98	134.5
1972	420	71.28	21	512.28	202.71	1576.73	187.6
1973	602	125.8	30.1	757.9	579.22	1088.2	195.4
1974	621	134.81	31.05	786.86	526.16	1026.22	208.1
1975	967.7	211	-	1178.7	513.45	1313.45	205.1
1976	1239.5	352.28	-	1191.78	161.12	1116.42	365.9
1977	1672.2	278.29	-	1950.49	982.92	2312.93	422.6
1978	2243	1186	-	3429	985.62	1385.62	491.9
1979	297.1	60.6	-	417.7	986.37	3386.37	540.8
1980	87.34	25	-	110.34	986.8	2286.37	604.5
1981	159.2	45	-	204.2	768.89	2268.89	703.4
1982	206.37	45	-	251.37	293	2793	786.4
1983	235.85	50	-	285.85	358.5	2858.5	900.9

*c.i.f. plus taxes

Appendix 11 b: Total import value (c.i.f. and duty paid) and unit price (c.i.f. and duty paid) of butter

Year	Total Import value C.i.f. (N000)	Total Import Duty (N000)	Total Reconstruction Charges (N000)	Total Landed Value* (N000)	C.i.f. Unit Price (N\T)	Landed Unit Price (N/T)
1960	278.97	78.80	-	357.77	778.81	1000.00
1961	259.79	78.67	-	318.46	670.55	890.55
1962	304.49	56.11	-	340.60	1855.06	2075.06
1963	284.01	33.46	-	317.47	1867.26	2087.25
1964	261.74	118.72	-	380.46	771.64	1121.64
1965	240.33	173.00	-	413.33	486.30	836.36
1966	227.54	145.15	-	372.69	548.69	898.70
1967	242.53	197.58	-	440.11	429.64	779.65
1968	20.72	11.65	1.55	33.92	588.64	960.91
1969	4.26	2.48	0.32	7.06	568.00	942.55
1970	227.40	149.78	11.37	388.55	668.04	1141.45
1971	324.80	127.42	16.24	468.46	1121.55	1617.61
1972	427.00	192.37	21.35	640.72	976.60	1465.51
1973	401.10	215.19	20.06	636.45	819.74	1300.74
1974	457.30	199.54	21.37	678.21	1206.84	1495.50
1975	1002.00	269.90	-	1271.90	1122.06	1424.30
1976	1424.30	382.11	-	1806.41	1118.24	1418.95
1977	1676.10	450.11	-	2126.28	1116.95	1416.95
1978	2541.00	4514.50	-	7055.50	281.43	781.43
1979	1275.00	626.20	-	1902.00	1018.68	1518.68
1980	2948.11	1150.00	-	4098.33	1281.79	1781.79
1981	6251.18	2250.00	-	8501.18	1389.15	1889.15
1982	6434.67	2300.00	-	8784.67	1409.71	1909.71
1985	6484.67	2350.00	-	8834.67	1379.72	1879.72

*c.i.f. plus taxes

Appendix 11 c: Total import value (c.i.f and duty paid) and unit price (c.i.f. and duty paid) of powdered milk

Year	Total Import value c.i.f. (N000)	Total Import Duty (N000)	Total Reconstruction Charges (N000)	Total Landed Value* (N000)	C.i.f. Unit price (N/T)	Landed unit price (N/T)
1960	975.37	-	-	975.37	513.68	513.68
1961	854.61	-	-	854.61	538.13	538.13
1962	784.80	-	-	784.80	485.76	485.76
1963	723.09	-	-	723.09	440.65	440.65
1964	1367.64	-	-	1367.64	424.64	424.64
1965	2170.05	866.02	-	3036.07	430.63	602.48
1966	29.41	11.76	-	41.17	382.82	488.25
1967	1859.31	743.70	-	2603.03	372.41	521.27
1968	3768.31	1507.32	282.62	55558.25	458.07	675.65
1969	2705.15	559.03	209.64	3562.82	202.33	257.97
1970	5538.20	558.82	270.41	6426.43	261.00	301.18
1971	9277.60	927.76	463.88	10669.24	433.08	499.08
1972	6453.00	645.30	322.65	7420.95	422.33	485.67
1973	5050.50	505.05	252.53	5808.08	462.43	531.80
1974	6865.60	343.28	343.28	7552.16	618.73	680.60
1975	24957.90	-	-	24957.90	950.33	950.32
1976	19110.60	-	-	19110.60	946.02	946.92
1977	37465.80	-	-	37465.80	1029.08	1029.08
1978	50767.00	10073.40	-	60840.40	906.50	1105.80
1979	57728.80	11545.76	-	69274.56	1142.15	1735.29
1980	47160.81	9432.06	-	56603.77	1131.58	1415.85
1981	43337.26	8667.45	-	52004.71	1238.21	1485.85
1982	44810.14	8962.03	-	53772.17	1211.08	1452.30
1983	64857.90	12971.58	-	77829.48	1297.16	1556.69

*c.i.f. plus taxes

Appendix 11 d: Total import value (c.i.f. and duty paid) and unit price (c.i.f. and duty paid) of milk, fresh, cream and sour

Year	Total Import value c.i.f. (N000)	Import duty (N000)	Total Reconstruction Charges (N000)	Total Landed Value* (N000)	C.i.f. Unit Price (N/T)	Landed Unit Price (N/T)
1960	90.98	-	-	90.98	304.89	304.89
1961	44.18	-	-	44.18	331.93	331.93
1962	29.27	-	-	29.27	289.70	289.70
1963	60.06	-	-	60.06	321.52	321.52
1964	86.75	-	-	86.75	264.96	264.96
1965	223.75	89.50	-	313.25	390.08	546.11
1966	383.22	153.29	-	536.91	381.00	533.52
1967	38.02	15.21	-	53.23	85.56	118.29
1968	7360.72	2960.08	596.81	10918.87	323.41	470.73
1969	87.78	29.40	7.12	124.30	209.09	415.03
1970	84.76	19.00	4.99	118.75	330.16	425.02
1971	234.75	67.12	17.62	419.50	266.06	458.72
1972	176.57	68.40	8.08	287.05	276.05	507.96
1973	641.20	257.20	33.76	932.35	477.10	693.66
1974	431.10	102.96	25.33	699.48	385.20	560.08
1975	665.70	-	-	665.70	670.10	670.10
1976	2807.70	-	-	2807.70	564.31	564.31
1977	4181.70	-	-	4181.70	920.67	920.67
1978	3387.60	677.40	-	4064.40	878.60	1054.32
1979	5662.50	1133.70	-	6802.20	1176.28	1411.54
1980	2653.20	530.66	-	3183.96	884.83	1061.32
1981	2048.70	580.74	-	2538.44	842.40	1010.98
1982	3125.50	625.12	-	3750.71	822.52	987.02
1983	3242.33	648.47	-	3890.80	831.37	997.64

*c.i.f. plus taxes

Appendix 11 e: Total import value (c.i.f. and duty paid) and unit price (c.i.f. and duty paid) of milk condensed and evaporated : sweetened and unsweetened.

Year	Total Import Value c.i.f. (N000)	Total Import Duty (N000)	Total Reconstruction Charges (N000)	Total Landed Value* (N000)	c.i.f. unit price (N/T)	Landed Unit Price (N/T)
1960	2798.72	-	-	2798.72	281.14	281.14
1961	2860.16	-	-	2860.16	280.71	280.71
1962	3398.26	-	-	3398.26	285.01	285.01
1963	2762.78	-	-	2762.78	282.78	282.78
1964	4511.26	-	-	4511.26	222.70	222.70
1965	5052.21	-	-	5052.21	292.62	292.62
1966	5513.00	-	-	5513.00	298.85	298.85
1967	5194.80	2077.96	-	7272.85	282.00	396.32
1968	3511.42	1404.57	263.36	5179.35	266.01	392.70
1969	5267.87	1787.50	402.59	7557.96	231.50	325.95
1970	8002.80	1600.56	400.14	10003.50	268.12	335.16
1971	12104.60	1210.46	605.23	13920.29	286.07	328.98
1972	18125.00	3625.00	906.25	22656.25	292.03	366.35
1973	19593.20	22.07	826.91	20672.75	327.37	400.83
1974	20961.80	1048.09	1048.09	23057.98	381.44	419.59
1975	30287.80	-	-	30287.80	514.10	514.10
1976	41336.90	-	-	41336.90	556.46	556.46
1977	56174.10	-	-	56174.10	522.48	522.48
1978	58605.00	5860.50	-	64465.50	755.11	830.62
1979	71045.60	7104.56	-	78150.16	961.22	1057.34
1980	113811.91	11381.19	-	125425.12	650.35	711.00
1981	106132.07	10613.21	-	116745.28	589.62	648.58
1982	106132.07	10613.21	-	116780.50	606.47	667.37
1983	113820.75	11382.08	-	125202.83	599.06	658.96

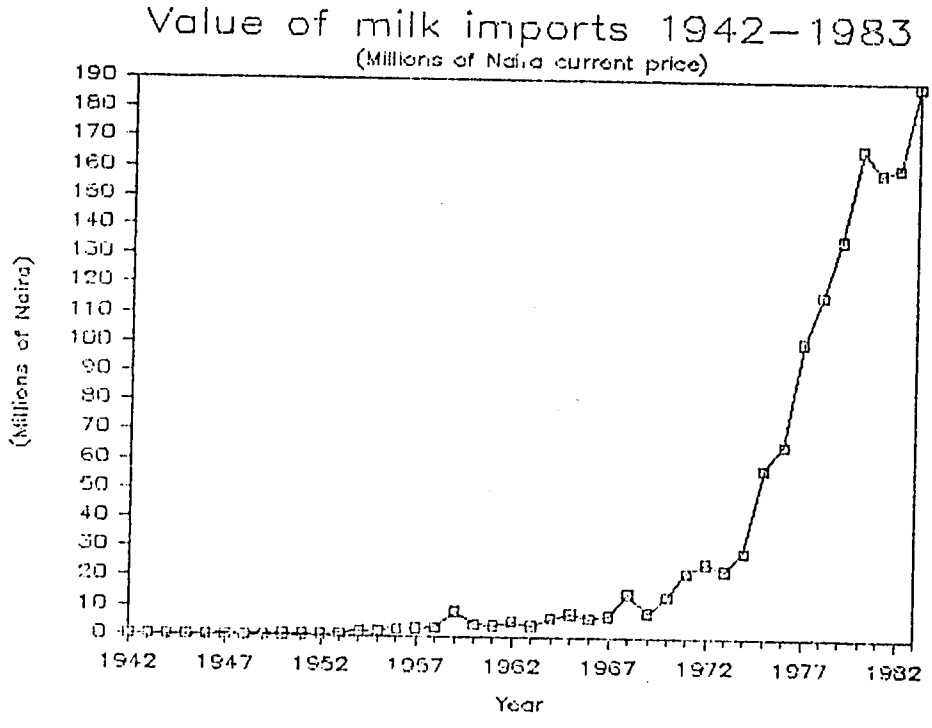
c.i.f. plus taxes

Appendix 11 f: Total import value (c.i.f. and duty paid) and unit price (c.i.f. and duty paid) for milk equivalent imports 1960-1983

Year	Total Imports (Tons)	Total Import Value (N000)	Import Duty (N000)	Total Landed Value* (N000)	C.i.f. Unit Price (N/T)	Landed Unit Price (N/T)
1960	38095	4337930	133760	4471690	113.87	117.38
1961	36108	4172730	137016	4309746	115.56	119.36
1962	82230	5775720	854115	6629835	70.24	80.64
1963	24326	4023630	91982	4115612	117.22	119.90
1964	69464	6540180	277550	6826730	94.28	98.28
1965	79004	8018330	1314035	9332365	101.44	118.13
1966	45043	6462790	604757	7067547	143.48	156.91
1967	70486	7585790	3220431	10816203	94.06	135.23
1968	117212	14884365	6220841	22365650	126.45	190.65
1969	152840	8847006	2868382	11600284	55.26	75.89
1970	225478	14119213	3316272	17777602	62.62	77.07
1971	251825	22440358	1093230	24605224	89.11	127.42
1972	248580	25522010	4662240	31478140	104.20	128.70
1973	190130	23135600	4410078	23816968	121.08	151.56
1974	200280	29214630	1918675	32776180	146.27	163.65
1975	278204	57881100	4780000	58360002	153.01	154.27
1976	320104	65050000	7383385	66033385	206.05	208.35
1977	509878	101100000	7288650	101808350	198.42	199.85
1978	612240	117143000	22311800	139454800	191.02	227.41
1979	468843	190075800	26870020	196546620	202.73	336.77
1980	672400	166677470	22520613	189198283	247.88	281.38
1981	650606	158528410	22165799	180902809	240.80	278.40
1982	650556	160303060	22545253	182348413	247.18	281.83
1983	795366	1886+1500	25633253	215274753	237.13	270.66

*c.i.f. plus taxes

Appendix 12


Value of milk imports 1942–1983
(Millions of Naira current price)
(Millions of Naira)
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
1942
1947
1952
1957
1962
1967
1972
1977
1982
Year

Appendix 1?: Dairy imports, general log linear model - unlagged variables

Independent variables	Butter	Cheese & curd	Dry milk	Cream and sour milk	Condensed & evaporated milk
Log of intercept	220.047	-1?.426	21.289	6.599	-1.76#
	(9.782)	(7.6#5)	(11.76)	(91#.978)	(11.#65)
P1 for butter	-2.951	1.119	-2.907	-2.#8#	0.3??
	(1.29#)	(0.9c6)	(1.06#)	(1.3#3)	(0.9#2)
P2 for cheese	-1.251	1.782	1.589	0.299	-0.3#6
	(0.536)	(0.#8)	(0.7#2)	(0.951)	(0.72)
P3 for dry milk	?.?0	1.#67	2.625	#.83#	0.65?
	(1.602)	(1.181)	(1.551)	(2.65?)	(1.?3)
P# for cream and sour milk	0.?81	1.21#	-2.21	-0.235	1.338
	(1.27?)	(1.08)	(1.686)	(2.16#)	(1.?18)
P5 for evaporated milk	-2.788	1.?1#'	-2.21	-0.235	1.338
	(1.#45)	(1.08)	(1.686)	(2.16#)	(1.?18)
Dt	0.838	0.586	-0.02c	0.1#1	0.15c
	(1.c?7)	(0.85?)	(0.1#8)	(0.186)	(0.215)
Rt	0.02?	0.672	-0.135	-0.377	-0.#8c
	(0.?17)	(0.25?)	(-0.28c)	(0.501)	(0.?15)
Yt	-0.91#	8.#12	0.823	0.392	3.765
	(3.?71)	(2.82?)	(#.067)	(5.1?2)	(3.#87)
Qt	-3.7?8	-6.177	-2.803	-2.803	3.765
	(2.c6?)	(2.#91)	(3.152)	(3.152)	(3.#87)
T	-0.186	-0.52#	-0.002	1.000	0.068
	(0.661)	(0.53)	(0.8)	(0.998)	(0.626)
W	0.9	0.7c	0.87	0.7#	0.78
Adj. R^2	0.80	0.60	0.75	0.50	0.57

* Significant at 1% level
** Significant at 5% level
*** Significant at 10% level
****Significant at 20% level

Standard errors are in parentheses.

Dt = import duty (in real terms)
Rt = foreign exchange reserves (in real terms)
Yt = per caput income (in real terms)
Qt = domestic milk production
T = time trend
W = war dummy (1,0 variable)

P1 = price (in real terms) of butter
P2 = price (" ") of cheese and curd
P3 = price (" ") of dry milk
P# = price (" ") of cream & sour milk
P5 = price (" ") of condensed and evaporated milk

Source: Own calculations based on the general analytical model described in Chapter 6

Appendix 14: Elasticities

Commodity	Butter	Cheese & curd	Dry milk	Cream & sour milk	Milk	Condensed & evaporated milk	Aggregate (in LME)
P1 for butter	-1.697	0.994	-1.864	-	-	0.864	-
P2 for cheese	-1.72	-1.692	2.014	-2.695	-	0.958	-
P3 for dry milk	3.607	1.972	-1.693	-	-	-	-
P4 for cream & sour milk	0.696	1.366	-0.603	-0.071	-	0.545	-
P5 for evaporated milk	-2.469	-	-0.365	-	-	-2.825	-
P weighted price	-	-	-	-	-	-	-1.004
Duty	-0.22	0.604	-109	0.123	-	0.135	-
External reserve	-0.552	-0.489	0.549	0.542	-	0.116	0.163
Time	0.567	5.668	-0.314	-	-	0.462	0.403
War	-1.611	0.266	0.158	-	-	0.081	0.014

Source: Own calculations based on product specific models described in Chapter 6.