Dairy imports into sub-Saharan Africa and their policy implications*

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Summary

COMMERCIAL IMPORTS *of dairy products into sub-Saharan Africa increased sixfold over the last decade, reaching US$ 707 million net in 1981 in addition to US$ 140 million worth of dairy products received as food aid. The subcontinent now imports roughly 30% of its total milk consumption. These imports are not evenly distributed: West and central Africa import 46% and 57% of their needs respectively while East Africa imports 13%.*

This paper describes the development of African dairy imports and highlights the factors that have caused their recent tremendous increase. The role of national policies with their objectives and instruments, and possible effects, are discussed and the paper gives a brief assessment of how further research may help solve some of the problems that have arisen.

It is obvious that some countries have an alarming dependence on dairy imports, particularly in the form of food aid. No single reason is readily apparent but, in some countries, national policies have been to blame. In many countries, dairy imports are likely to discourage domestic milk production, particularly where there is direct competition between the production of re-constituted milk from imported milk powder and butter oil, and the local production of *fresh milk.*

However, in the absence of data on milk prices and reliable production statistics, no firm conclusions can be reached for the subcontinent. In-depth studies of individual countries and the effects of their governments' policies for the dairy sector are recommended.

Introduction

The fact that imports exist in sub-Saharan Africa should not in itself be a source of unease. Economic theory provides some clear arguments to show that external trade policies based on the principle of comparative advantage can enhance human welfare in a country, even if substantial imports of certain products occur. However, there tends to be more concern over imports of basic foodstuffs. Governments hesitate to expose their countries to the uncertainties of highly volatile international markets in basic products, particularly foodstuffs, whose supply can affect political stability. Moreover, imports have to be offset by equivalent exports to maintain a balance of foreign exchange. If a country faces an increasing dependence on imported food at a time of acute or latent shortage of foreign exchange, then imports may pose severe problems.

Over the last decade there has been a tremendous increase in dairy imports into sub-Saharan Africa and, in most of the countries concerned, there has also been a chronic shortage of foreign exchange. Given the importance of dairy products, both for human consumption and as

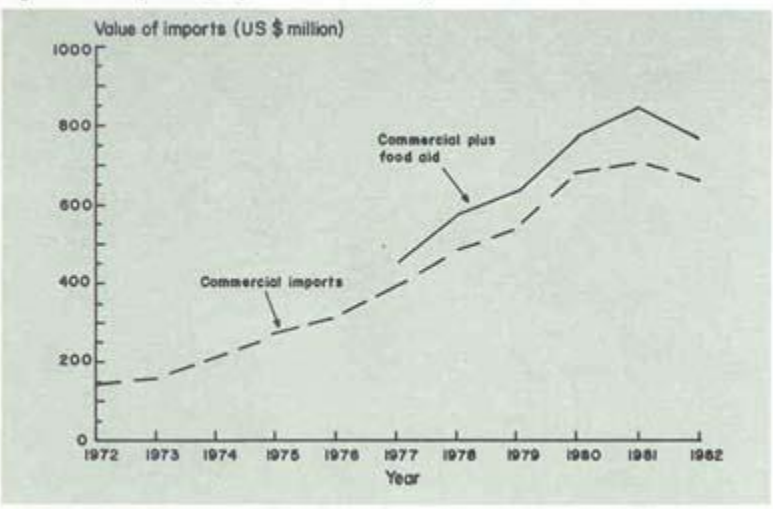
a source of farm income, it is vital to study the causes and effects of this development. There is a considerable amount of published literature on the theory of international trade and food policy (see for example Heidhues, 1979; Oyejide, 1983) and there have been several studies of the related problem of cereal imports and policy reactions (McIntire, 1981; Morrison, 1984; Huddleston, 1984). However, there has been no published study of dairy imports into sub-Saharan Africa (see also Eicher and Baker, 1982). This article attempts to correct this deficiency.

Increases in dairy imports into sub-Saharan Africa

Background

Commercial imports of dairy products into sub-Saharan Africa have increased steadily since 1960. According to FAO *Trade Yearbooks* they rose in *value* from US$ 43 million in 1960 to US$ 113 million in 1970 and then to US$ 680 million in 1980. The increase continued in 1981(US$ 707 million) but appears to have come to a halt in 1982 and 1983 (Figure 1). In 1980, sub-Saharan African countries spent approximately 5% of their total revenues from agricultural, forestry and fishery exports on imports of dairy products. Dried and condensed milk made up two thirds of the total dairy imports in 1960 but accounted for almost 90% from 1970 to 1983. This indicates that there has been a shift from imports of items such as cream, yoghurt and cheese, to imports of the more basic dairy products.

Figure 1. *Value of net dairy imports into sub-Saharan Africa, 1972–82.*



Non-commercial imports

Before the commercial import figures are broken down into regional groupings and countries, the role of non-commercial imports of dairy products, in the form of food aid, must be mentioned. The major items of food aid are skimmed milk powder and butter oil which can be recombined to form liquid milk. In 1981, sub-Saharan African countries received as food aid a total of about 88 000 t of dried skimmed milk, and 9000 t each of butter oil and other dairy products (FAO, 1984). This is equal to almost 770 000 t of liquid milk equivalent (LME)[1]. These imports are provided free of charge by the donor, although the recipient country sometimes has to contribute to shipping and/or distribution costs. Valued at current prices of commercial

imports (c.i.f.)[2], dairy food aid to sub-Saharan Africa in 1981 was equivalent to almost US$ 140 million, or 16% of the total value of all dairy imports (Figure 1)[3].

1. For the conversion of dairy products into milk equivalents, see FAO (1978a).

2. The c.i.f. import price is inclusive of the cost of insurance and freight.

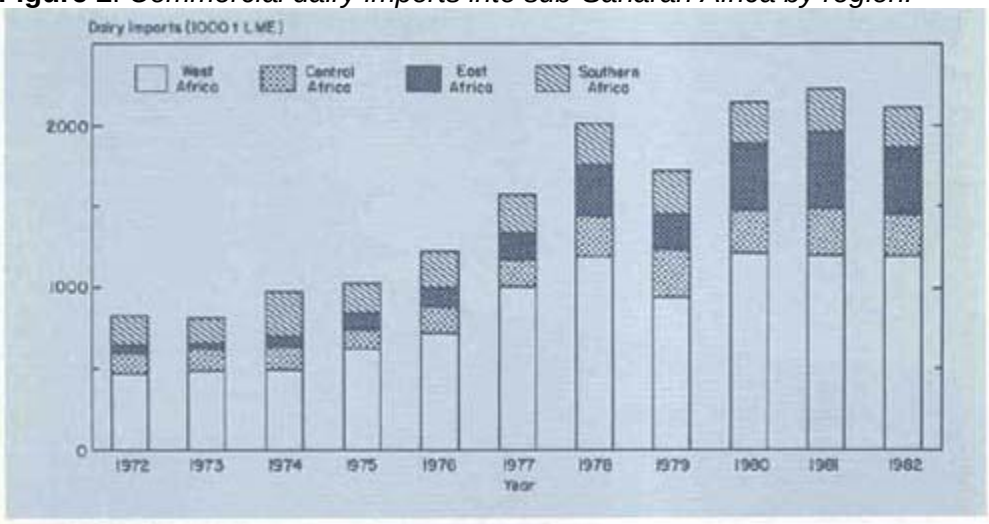
3. Butter oil has been valued at 1.2 times the import (c.i.f.) price for butter according to the price ratio set for the GATT minimum prices (GATT, 1983). 'Other dairy products' have been valued as equivalent to the price of condensed milk. A weighted regional average has been used for those countries and commodities where no price for commercial imports for the year in question is available.

Detailed statistics on food aid are available for the period 1977 to 1981, when food aid increased in volume by almost 140% in LME against an increase of 43% for commercial imports. On average the share of food aid in total dairy imports (in LME) rose from 17% in 1977 to 25% in 1981 and 23% in 1982. Both the quantities of dairy products imported commercially and as food aid have to be considered when the effects of imports on domestic prices, production and consumption are analysed. However, since food aid can be given in various ways, e.g. with special conditions attached to its use or as a direct contribution to domestic supplies, the precise effects of each type of donation have to be carefully analysed for each country.

Dairy import statistics by region

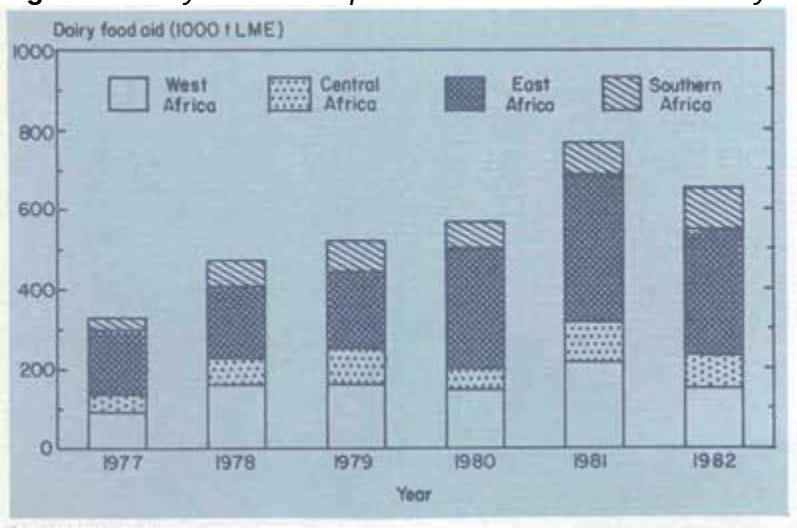
It would be of interest to study dairy imports by ecological zones, but this is not possible given the form of the available data. Instead, all sub-Saharan African countries have been grouped into four regions i.e. West, central, East and southern Africa. As can be seen in Figure 2, West African countries are responsible for most (about 55 to 60%) commercial imports. The other three regions share the remaining 40% more or less equally, although East Africa increased its share from about 5% to 20% in the last decade. There is a different regional pattern for food aid. East Africa receives almost 50% of all food aid deliveries to sub-Saharan Africa (Figure 3), while the share of West Africa fluctuates between 25 and 33% of the total.

Figure 2. *Commercial dairy imports into sub-Saharan Africa by region.*



Source: *FAO Trade Yearbooks* (various years).

Figure 3. *Dairy food aid imports into sub-Saharan Africa by region.*



Source: FAO, 1984.

Further information can be obtained by comparing regional dairy imports per caput. As can be seen from Table 1, only in southern Africa was the volume of commercial dairy imports per caput more or less stable from 1972 to 1982. East Africa showed the biggest increase in commercial imports per caput, from 0.62 kg/head for 1972 to 3.87 kg/head for 1982. Combined food aid and commercial dairy imports per caput increased by 104% from 1977 to 1982 in East Africa. With 8.77 kg/head in 1982, West Africa imports most dairy products per caput.

Table 1. *Net dairy imports per caput by the regions of sub-Saharan Africa, 1972, 1977 and 1982*.

Year	Type of Imports	Net dairy imports (kg LME/caput)				
		West Africa	Central Africa	East Africa	Southern Africa	Sub-Saharan Africa
1972	Commercial	4.12	2.71	0.62	5.25	3.00
	Food aid	n.a.[1]	n.a.	n.a.	n.a.	n.a.
	Total	n.a.	n.a.	n.a.	n.a.	n.a.
1977	Commercial	7.59	3.18	1.70	5.91	4.91
	Food aid	0.71	0.81	1.60	0.82	1.00
	Total	8.30	3.99	3.30	6.73	5.91
1982	Commercial	7.78	4.29	3.87	5.52	5.78
	Food aid	0.99	1.36	2.86	2.36	1.77
	Total	8.77	5.65	6.73	7.88	7.55

[1]n.a. = not available.
Sources: Calculations based on FAO *Trade Yearbooks* (various years), FAO (1978a); FAO (1984) and World Bank (1983).

The dependence on commercial dairy imports and food aid is best illustrated by comparison with total milk consumption i.e. total domestic milk production plus total dairy imports. Although in general milk production data for African countries are not very reliable, changes in import consumption ratios may be used, if interpreted cautiously. These are presented in Table 2 for 1971–73 and 1981–83.

Table 2. *Contribution of commercial, food aid and total imports of dairy products to total milk consumption for the regions of sub-Saharan Africa, 1971–73 and 1981–83*.

Period	Type of Imports	Dairy imports/milk consumption				
		West Africa	Central Africa	East Africa	Southern Africa	Sub-Saharan Africa
1971–73	Commercial	0.26	0.33	0.01	0.23	0.11
	Food aid	n.a.	n.a.	n.a.	n.a.	n.a.
	Total	n.a.	n.a.	n.a.	n.a.	n.a.
1981–83	Commercial	0.41	0.39	0.07	0.25	0.21
	Food aid	0.05	0.13	0.06	0.10	0.06
	Total	0.46	0.52	0.13	0.35	0.27

Note: Consumption is calculated as all liquid milk production plus total imports. All figures are the respective 3-year averages.
Sources: Calculations based on *FAO Production Yearbooks, FAO Trade Yearbooks,* FAO (1978a) and FAO (1984).

The overall dependence on dairy imports was highest in West and central Africa, where imports comprised about 50% of total consumption. In East Africa local milk producers provide most of the dairy products consumed, but the increase in the ratio between commercial imports and consumption between 1972 and 1982 was as large for East Africa as for West Africa. Furthermore, East African countries are more dependent on food aid. In two thirds of East African countries food aid accounted for 40% or more of total dairy imports in 1982, whereas in other regions less than two fifths of countries fall into this category. Five out of the 45 sub-Saharan African countries depend on food aid for more than 50% of their total dairy imports.

Share of total dairy imports in total consumption

When the food needs, incomes and dairy imports of African countries are examined more closely, three broad groupings can be discerned.

There are nine countries (Benin, Congo, Ghana, Ivory Coast, Liberia, Nigeria, Sierra Leone, Togo and Zaire) with less than 20 kg milk consumption per caput that import more than 60% of their requirements. These countries are highly dependent on dairy imports. However, with the exception of Ghana and Sierra Leone, all meet at least 90% of the total calorie requirement of their populations (World Bank, 1983). Dairy imports do not, therefore, appear to play a crucial role in overall human nutrition in these countries. Ghana and Sierra Leone, with lower nutritional levels, are not only dependent on dairy imports but more than 30% of these imports are in the form of food aid. Benin (in common with Central African Republic, Lesotho and Somalia) shows the atypical feature of a high share of dairy food aid in total milk consumption. For the majority of all countries the proportion of dairy food aid decreases with a rising share of total dairy imports in total consumption.

Congo, Ivory Coast, Liberia and Nigeria are highly import-dependent yet have a relatively low per caput consumption. However, all these countries have comparatively high average incomes, i.e. their GNP per caput exceeds US$ 400. Most dairy imports are purchased rather than received as food aid.

The third group comprises nine countries—Burkina Faso, Burundi, Chad, Ethiopia, Malawi, Mali, Somalia, Tanzania and Uganda. Each of these countries has a GNP per caput of less than US$ 300 and receives more than 30% of all dairy imports as food aid. In all of these countries, with the exception of Somalia, more than 80% of the population lives in rural areas.

It is clear that sub-Saharan Africa cannot easily, or quickly, meet its demand for milk from domestic supplies.

Some potential influences

Population growth

The human population of sub-Saharan Africa increased annually by an average of 2.9% from 1970 to 1980 (World Bank, 1981). With all other factors remaining constant, and assuming no changes in demand caused by changes in age distribution, demand for milk would have increased at the same rate. However, commercial dairy imports (in LME) into sub-Saharan Africa increased by an annual average of 9.9% over the same period, indicating that factors other than population must have been influential.

Urbanisation

Rapid urbanisation is widely assumed to boost the demand for imports of all food products. The mechanism behind this is the change of status from one of rural subsistence to that of the urban dweller whose milk demand, given the present stage of agricultural development and infrastructure in many sub-Saharan African countries, cannot be met by domestic supply. In other words, people move to the cities but their milk source does not, The World Bank (1981) reports that urban populations in sub-Saharan Africa have increased overall by 6% a year, and by 8.5% a year for 35 major capitals. However, there is no formula available to translate this growth into a growth of demand for dairy imports.

Income

Incomes in the countries of sub-Saharan Africa increased by an average of 0.8% over the last 10 years (World Bank, 1981). It can be assumed that part or all of this additional income was spent on food, and on milk products in particular. The increase in demand for milk due to rising incomes can be estimated from the income elasticity of quantitative demand for milk which was calculated to be 0.68 for sub-Saharan Africa in the mid-1970s (FAO, 1978b). This means that the demand for milk increases at about two-thirds the rate of the increase in total income. Solely in terms of the income elasticity of demand, an annual growth rate in demand for milk of about 0.54% could thus be expected. However, there are several complicating factors because a population is composed of individuals, not averages. High-income consumers differ from those on a low income, just as urban consumers differ from rural, and consumer preferences can change over time. However, the figure does give an indication of the relationship between income and demand for dairy products.

Consumer prices

The effect of price changes on the demand for milk is well defined by economic theory. Rising prices for milk will, under normal circumstances, lead to a decrease in demand and *vice versa.* The extent of the change is determined by the price elasticity of quantitative demand. Cross price elasticities, which indicate the effects of changes in the prices of commodities that are complementary to or substitutes for milk, can also be defined. However, in practice there are several problems.

Milk can hardly be considered a homogeneous product. Qualitative differences with regard to fat content, purity and, above all, freshness and taste, may well lead to substantial price differences. In many countries reconstituted milk (from milk powder and butter oil) cannot compete at the same price as fresh milk. In many countries the marketing channels are very diverse. Often petty traders compete with cooperatives and/or parastatals, and each tends to provide different services to the consumers. Thus, differences in both the level of service and the quality of milk can have an important influence on price structures.

A special problem is the role of rural producer-consumers. In a system where a significant, if not dominant, share of the milk produced is used for the farmer's own subsistence, it is sometimes hard to determine what his reaction to changing prices will be. The ratio between milk and cereal prices plays an important role in this respect. Again, very little is known about the size, or even the sign (positive or negative), of the cross price elasticity.

Producer prices

Many of the points raised above also apply to producer prices. Again, the economic parameters describing the reaction of subsistence producers are either unknown or incomplete. Even overall estimates of aggregate price elasticities of milk supply are rarely available. There have been efforts to identify the effects of several non-price factors influencing milk supply, and to establish some causal links (McClintock, 1984). However, the results are not encouraging, and only guesses can be made about what caused the decline in African milk production per caput of 0.4% per year over the last decade (see Anteneh, 1984). There is a widespread opinion that milk producers respond significantly to rising prices. With regard to the 'direction' of the effects, economic theory predicts that milk supply will probably increase when the price-cost ratio for dairy production compares favourably with other production alternatives. More detailed case studies may allow us to draw further conclusions. Unsatisfying as this may be, it is maintained here that the price mechanism plays a crucial role in determining both the demand for, and the supply of, milk.

Foreign exchange

The availability of foreign currency to pay for imports is one of the factors that influences imports most directly. In the last decade, balance-of-payment deficits have increased in most sub-Saharan African countries (World Bank, 1981), and this should have curbed rather than stimulated dairy imports. However, many African countries have resorted to market interference, and to controls on exchange rate and currency. Government policy has a decisive influence in this area, but for many countries the limit for expenditures on dairy imports does not yet seem to have been reached.

Food aid

There are two ways in which dairy food aid influences total dairy imports. First, the decision to supply food aid to a particular country is not influenced by the market price for milk in that country; in this respect the availability of food aid must be considered an independent variable. Second, an offer of food aid may well change a country's demand for commercial imports by either complementing them or partly substituting for them.

Only general remarks can be made about the factors which influence the availability of dairy food aid. The EC, the most important donor to African countries, has since 1979 operated within an annual target of 150 000 t of skimmed milk powder and 45 000 t of butter oil. This is allocated to various developing countries and aid organisations or to the FAO World Food Programme (CEC, 1983). There are various forms of dairy food aid. The most frequent are 'food-for-work' programmes, dairy development projects and unconditional or 'emergency' shipments. In all cases the recipient country has to 'apply' for food aid in that a political agreement or contract is required.

No statistics are available to show the relative importance of these different forms of dairy food aid to sub-Saharan African countries. The World Food Programme is committed to dairy projects in nine African countries (FAO/WFP, 1983) but other organisations also cover dairy development, e.g. the EC donations to Mali. Figure 1 shows that the share of food aid in sub-Saharan Africa's total dairy imports increased from 7% in 1977 to 25% in 1981. The present dependence of individual countries has already been described. It is hard to foresee whether

the EC's expressed intention to cut back on dairy food aid *(The Economist*, 1984) will stimulate commercial imports or reduce consumption. There may even be a rise in African milk production with the removal of the disincentive effect sometimes ascribed to food aid.

International prices

Relative price differences between individual countries, when translated into absolute price differences (by the exchange rate), are the driving force behind international trade. Relative price differences are due to differing patterns of demand and supply and are relatively constant. When many countries trade in a commodity, countries trading in small quantities have little influence on the world market price that emerges. This lack of influence of 'small' countries certainly applies to sub-Saharan African countries and their role in the world markets for milk products. Assuming no government interference and ample foreign exchange, the ratio between domestic and international prices determines the amount of net imports, ensuring the balance between supply and demand and adjusting domestic prices towards world market levels.

Two amendments to this basic mechanism must be made. First, milk and dairy products are traded mainly in processed forms. With milk the processing charges must be taken into account, unlike wheat for which one can directly compare the import (c.i.f.) prices and the price on the domestic market adjusted for transport costs, storage etc. Although fresh milk is the major domestic dairy product it is rarely traded internationally, and so any comparison of international and domestic prices has to use recombined milk as a substitute. The following example may illustrate the case: skimmed milk powder at a price (c.i.f.) of US$ 1000/t and butter oil at US$ 2500/t can be recombined with water in the proportions of 10% skimmed milk powder, 3.5% butter oil and 86.5% water. Allowing for a processing cost of 10%, the equivalent 'border' price for recombined milk is US$ 0.21/litre. Translated into domestic currency at the current exchange rate and adjusted for transport costs etc., this border price, when compared with domestic prices, determines whether imports will flow in or not. A further complication is that consumers usually recognize a quality difference in favour of fresh milk, and this means that the domestic price for fresh milk can be somewhat higher than the border price of recombined milk, and still remain competitive.

The second amendment to the general theory concerns the effect of government policy. Often heavily distorted exchange rates, import duties, import monopolies and other regulations interfere with the free market assumed in the above example. Because of this interference, any interpretation of the international to domestic price ratio must be adjusted to allow for these policy distortions.

Increases in dairy imports into sub-Saharan Africa are thus caused by a variety of factors. Population growth, urbanisation, income and consumer prices are potential influences on the demand side. The effects of changes in producer prices are probably the main influence on the supply side. Foreign exchange, food aid and international prices also have major direct effects on dairy imports.

The effect of these various influences can be summarised as follows. On the demand side, all factors contribute to rising imports to differing degrees. With regard to prices, both on the demand and supply sides, more analysis is needed in order to judge better their causes and effects. In many African countries prices have been depressed by government policies, and this would further increase the demand for imports. Foreign exchange limitations do not seem to have slowed the increase in total dairy imports, whereas availability of food aid and depressed

international prices for dairy products appear to have contributed to the increase. Although varying widely, government policies will have influenced all of these factors and could even have changed the direction of their impact. Some evidence about the potential role of governments in the development of dairy imports in the last decade is given below.

On a sub-continental scale there are few data to quantify the factors influencing international markets. However, an auxiliary calculation, which includes some trend values to allow for different reasons for growth in commercial dairy imports, is given below. Population growth and rising incomes are taken as exogenous factors. No empirical data are available for price changes, government policies and other factors such as shifts in consumer preferences. Thus, the total change in dairy imports (ΔM) is explained below by a term for changes in population (ΔN) plus a term for changes in disposable income per caput (ΔY) minus a term for changes in domestic milk production (ΔQ) plus a residual term (e) comprising all other factors.

The resulting equation is

$$\Delta M = \frac{(\Delta N + \eta . \Delta Y - RSS . \Delta Q + e)}{1 - RSS} \quad (1)$$

The influence of the single factors is weighted by the rate of self-sufficiency (RSS) which is the share of domestic supply in total dairy consumption. Changes in per caput incomes are multiplied by the coefficient of their assumed influence on dairy demand, i.e. the income elasticity of milk demand (η). Table 3 gives results of the calculations for countries listed in order of the magnitude of the residual term. The higher a country ranks in Table 3, the greater are the influences of 'other factors' (i.e. other than population, income and changes in domestic production) on dairy imports.

Table 3. *Indicators of potential policy influence on dairy imports in 29 countries of sub-Saharan Africa*.

Country	Region[a]	Ecological zone[b]	Average annual growth in imports[c] (%)	Share of food aid in total imports[d] (%)	Average annual growth in per caput consumption[e] (%)	Residual term[f]
Zambia	S	SH/SA	–15.0*	0.32	–10.3*	+19.2*
Sierra Leone	W	H/SH	+10.2	0.35	+ 9.3*	+10.0*
Ivory Coast	W	H/SH	+14.4	0.01	+ 8.7	+ 7.6
Somalia	E	A/–	+80.5*	0.49	–14.0*	+ 6.4*
Congo	C	H/SH	+ 8.9	0.08	+ 9.8*	+ 5.4*
Togo	W	SH/H	+12.9	0.18	+ 5.9	+ 4.6
Nigeria	W	SH/SA	+15.4	0.01	+ 6.3	+ 4.5
Liberia	W	H/–	+ 6.5	0.10	+ 3.3	+ 3.2
Niger	W	A/–	–0.7	0.25	+ 3.2*	+ 3.0*
Mauritania	W	A/–	+ 5.5	0.35	+ 1.5	+ 2.3

Uganda	E	SH/H	–1.6	0.43	–0.9	+ 2.2
Malawi	S	SH/SA	+ 1.5	0.41	+ 2.8	+ 1.6
Cent. Afr. Rep.	C	H/SH	+ 3.0	0.30	+ 2.0	+ 1.6
Burundi	C	HL/SH	+35.0	0.40	+ 2.8	+ 0.4
Upper Volta	W	SA/SH	+36.2	0.36	+ 8.0	+ 0.3
Benin	W	SH/SA	+12.2	0.39	+ 1.7	+ 0.2
Ethiopia	E	A/HL	+21.3	0.40	–0.2	–0.2
Senegal	W	SA/A	+ 5.7	0.19	–0.4	–0.3
Mali	W	A/SA	–0.1	0.32	+ 1.2	–0.3
Lesotho	S	n.a.	+10.1	0.51	+ 3.3	–1.2
Guinea	W	SH/H	+ 3.2	0.24	–2.5	–2.7
Ghana	W	H/SH	–2.9	0.30	–5.4	–3.4
Rwanda	C	HL/SH	–3.2	0.95	–2.8	–4.3
Madagascar	S	SH/H	–5.6	0.31	–5.4	–4.3
Cameroon	C	H/SH	+ 8.5	0.17	–1.0	–4.6
Zimbabwe	S	SA/SH	+47.2	0.32	–5.6	–5.1
Sudan	E	A/SA	+ 18.8	0.40	–6.9*	–8.1
Zaire	C	H/SH	–4.2	0.16	–9.2*	–8.5
Tanzania	E	SH/SA	+ 0.4	0.51	–8.6*	–10.1*

* Figures marked thus are considered particularly unreliable.
[a] C = central, S = southern, E = East and W = West Africa.
[b] SH = subhumid, H = humid, SA = semi-arid, A = arid, HL = highlands (see Jahnke,1982, p. 233).
[c] Commercial dairy imports only, from 1972–74 (av.) to 1980–82 (av).
[d] Average of 1980–82 figures.
[e] Consumption = domestic production + commercial imports, for the same period as under note c.
[f] The residual term is the term 'e' in Equation 1; period as for note c.
Sources: *FAO Production Yearbooks, FAO Trade Yearbooks,* FAO (1978a; 1984) and World Bank (1981; 1983).

For example, Nigeria ranks in the upper quarter of Table 3. Commercial dairy imports into Nigeria grew by an average of 15.4% annually even without food aid. Per caput milk consumption increased by 6.3% per year, mainly due to the increase in imports. The residual term of +4.5 indicates that population, income and milk production growth in Nigeria account for only a 10.9% increase in dairy imports. The remaining increase of 4.5% must be due to pricing policy, exchange rate controls, or long-term shifts in demand e.g. substitution of sheep and goat milk for cow's milk. In Cameroon the figures suggest that commercial imports of dairy products would have increased by another 4.6% annually if policy and other factors had not curbed their growth. Per caput consumption declined by 1.0% on average.

Table 3 shows that in 25 out of the 29 countries listed the change in per caput milk consumption, whether positive or negative, was in accordance with the sign of the residual term (e). In two thirds of the countries, growth in imports matched a growth in per caput consumption.

The importance of dairy imports for consumption, and of national policies for the development of dairy imports, is underlined by these results.

Some possible effects of increased dairy imports

The complex interactions between prices, demand and supply in domestic and world markets make it difficult to distinguish causes and effects. On the demand side, population, income growth and urbanisation can be taken as independent variables (although the availability of cheap imported foodstuffs may itself have stimulated migration to the cities). In general, increases in dairy imports have increased the total supply of milk and dairy products in importing countries, thereby halting, or even reversing, upward trends in prices. Consumers in general have benefited from this effect.

Declining producer prices

In the face of declining or stagnant prices, producers can be expected to cut back on dairy production and shift their resources to the production of more profitable items. However, many producers may stay in milk production simply because they have no production alternatives. Similarly, it could be argued that technical innovations, e .g. improvements in management and breeding stocks, would lower production costs and offset the effect of decreasing dairy prices. In Europe, for example, the EC reports an annual average increase in milk yield per cow of 2.2% since 1974, and 3.8% for 1981/82, which is claimed to reflect improved herd structure and quality of milk cows (CEC, 1984). For sub-Saharan Africa, however, virtually no increase in average yield was observed over the last decade, either per productive animal or per total herd. The only regional exception was West Africa which showed a modest improvement in dairy production (Anteneh, 1984).

Unfortunately, the availability and quality of price statistics are very poor for most African countries. It is therefore impossible to quantify, on a sub-Saharan or regional scale, the impact of dairy imports on domestic price levels and production. There have been cases where local milk processing plants have stopped collecting fresh milk because they found it more economic to sell reconstituted milk from cheap milk powder and butter oil imports[4]. There may be a circular effect, with imports depressing local production and this generating even greater demand for imports. Such an effect will approach an equilibrium if prices are not fixed.

4. The dangers of dairy imports are discussed, for example, by the Ministry of Agriculture, Tanzania (1977).

Balance of payments

The level of dairy imports is directly affected by the availability of foreign exchange and variations in the exchange rate. At the same time, growing expenditure on dairy imports poses an additional burden on a country's balance of payments and tends to weaken its currency. The total impact on the economy is not easily quantified, but one can compare the value of net imports of dairy products with total export revenues to get an indication of the burden placed on the balance of payments. It becomes obvious that there are great variations among the countries for which data are available. In those five countries (Burkina Faso, Benin, Mauritania, Senegal and Somalia) that spend a relatively large percentage of total export earnings on dairy

imports (5% or more) it is possible that imports have displaced expenditures on long-term development projects.

The role of national policies

It is generally accepted that national policies play a critical role in livestock development (World Bank, 1981). Not only do they modify the overall economic environment for agricultural production, but they often interfere directly with the production processes, marketing channels, and consumption, as well as with external trade.

The use of the word 'policy' requires some explanation. In many cases it is necessary to distinguish between deliberate policies for which governments design effective instruments, and policies which governments publicly espouse but which they know will not be effective. Another distinction needs to be made between policies which are clearly defined and targeted to dairy imports, consumption or production, and other policies, such us the setting of the exchange rate, which are not specially directed towards dairy imports but which may have indirect effects on them. Finally, there is the distinction between policies which are consistent in their effects and those which are not, regardless of the government's original intention. A government may make decisions in two areas which then have a perfectly consistent though unintended influence on a related third area. Consider, for example, a government that devalues its currency in order to comply with IMF or IDA credit requirements, and decides to impose a duty on beef exports to increase its tax revenues. By curbing imports and reducing the profitability of beef production the government produces a consistent policy that also stimulates dairy production.

Objectives of government interference

As Bates (1983) puts it: "Bluntly, food policy appears to represent a form of political settlement—one designed to bring peaceful relations between African governments and their urban constituents". If true, this attitude is in marked contrast to that in most developed countries, especially in the EC, where the overall objective has usually been to support agricultural incomes (Heidhues, 1979).

For African countries it seems appropriate to assume that agricultural policies favour the consumer rather than the producers[5]. What are the possible objectives behind such policies? Three types of objectives can be mentioned: governments aim to survive; they also have general objectives in the area of food policy; and they may have certain, specific objectives relating to dairy imports.

5. Nevertheless, careful examination of existing policies is required, as can be seen, for example, from von Braun and de Haen (1983) who showed that agricultural policy in Egypt was much less at the cost of agriculture than was generally expected.

Food policy is often crucial to government aims because it has direct effects on the population and their goodwill. Therefore, the objectives of food policy, whether to secure food supply, to increase self-sufficiency or to support special groups like city dwellers, are often closely related to government self-interest.

Not all policy objectives are necessarily consistent with each other: they may also be in conflict. Often one objective can only be reached at the expense of others. To try and provide both attractive farm incomes and low food prices—without imposing huge costs on the national budget— is a common example of one objective being sacrificed for the sake of others.

In the field of dairy import policy six common objectives may be distinguished: to meet certain milk consumption targets; to generate tariff revenues; to protect producers against world market competition; to save foreign exchange; to stimulate domestic dairy development; and to realize the benefits of free trade. The starting point for the following descriptions relate to a country that is a net importer of dairy products and whose government has no policy on such imports.

The milk consumption objective

Any increase in milk consumption in a poor country could substantially improve overall nutrition, whether it be that of vulnerable groups like children or pregnant women or that of the whole population. A government wanting to increase milk consumption will have to do so by way of increased imports if domestic production is insufficient or if market links between producers and consumers are weak. The major instruments used to stimulate imports are a reduction in tariffs, import subsidies and (subsidised) state trading and distribution. Alternatively, the government can request food aid. Depending on the instruments used there will be some burden on the national budget.

The tariff revenue objective

If dairy imports already exist, the government can try to make them contribute to the national budget. By imposing an import tariff this will create the desired revenue at the expense of the consumers and/or the external suppliers. Since budgetary considerations are the major force behind such a policy, the economic effects on consumers and producers are given lower priority. There may be a contradiction, and consequent trade-offs, between this objective and a policy that sets consumption targets.

The protection objective

Tariffs to raise tax revenues increase domestic prices over world market prices, and thereby favour domestic production over imports. The same protective wall around local producers can also be erected by introducing quantitative restrictions, i.e. import quotas, or other non-tariff barriers such as quality requirements, port procedures and fees. In any case, the successful protection of domestic milk producers imposes a burden on consumers, either through higher consumer prices or through increased taxes that are needed to finance additional government compensation. The protection objective is not compatible with any objective that seeks increased consumer welfare.

The foreign exchange objective

A government's effort to save foreign exchange has similar effects. Dairy imports, unless they are in the form of food aid or can be paid for in local currency, can be reduced by the same instruments as those used to pursue the protection objective. The primary effects are the same. However, the secondary effects need to be analysed to see whether or not the stimulus to milk production increases the demand for foreign inputs and thus affects the foreign exchange

balance. In some situations trade-offs occur between the protection and the foreign exchange and/or the tariff revenue objectives, although some of the instruments used may at first glance appear to serve all three objectives.

The dairy development objective

It may not be immediately clear how a government can develop the domestic dairy sector other than by reducing imports and increasing domestic prices. However, the dairy development objective can be pursued positively by a channelled *increase* in imports. There are two major strategies: the first is based on the assumption that dairy production needs a minimum level of marketing channels and processing facilities to get off the ground. Where production is scattered and insignificant, dairy imports can help create an infrastructure and stimulate demand at the same time. However, many reservations apply and such a policy will usually be only a short-term device. The second strategy is based on the same fundamental assumption but includes the concept of using revenues from food aid sales for investment. As in the Indian 'Operation Flood', dairy food aid can be sold locally to generate funds for dairy development. The same procedure is possible with controlled commercial imports if the balance between domestic supply and demand results in prices above world market levels. It is clear that any such dairy development policy incorporates an array of policy instruments, with those affecting dairy imports being prominent.

The free-trade-benefits objective

In the 'free trade' theory, overall national welfare is considered to be maximised by the undistorted allocation of resources according to their economic value as expressed in international prices. According to the pure theory, governments should not interfere with dairy imports.

However, there is a role for government policy which does not necessarily conflict with the principle of comparative advantage. For example, there may be reasons to offset price movements on the international markets that are not true indicators of the supply and demand situation, but merely reflections of other countries' protectionist policies.

The instruments used to balance out these market defects, e.g. anti-dumping tariffs, will be of a transient nature. They may be supplemented by quality controls, price monitoring and other means to ensure fair competition. The difficulty in such an 'adjusted free trade' policy lies in the inherent temptation for governments to lapse into the protectionist stance they originally set out to combat.

The major instruments and their effects

Import subsidies

Governments can improve milk consumption through import subsidies which can be targeted or non-targeted. A common example of an effort to meet milk consumption requirements of specific target groups is that of a school milk programme in which the government subsidises a particular group. If the government wants to subsidise milk consumption in general rather than that by school children in particular, it can simply subsidise all dairy imports with a fixed amount

per tonne. However, even if the same amount of total imports is assumed in each case, the effects are quite different.

The general subsidy will decrease domestic prices and thus have a disincentive effect on producers, whereas the special subsidy to a target group allows them to buy and consume milk that would not otherwise be consumed. The difference between a targeted and untargeted import subsidy is that the latter has disincentive effects on domestic production, whereas a targeting of import subsidy can avoid disincentives, or at least diminish them.

A non-targeted subsidy effect can also be brought about by other countries subsidising their producers whereby world market prices decline. The implications are the same and, as with food aid, the government does not have to pay. This interpretation may well describe what has actually happened: depressed world market price levels, basically due to USA and EC dairy policies, have fuelled Africa's milk demand and dairy imports, thereby hampering the continent's dairy development efforts.

Import tariff

In economic terms a tariff has the opposite effects of an import subsidy. The consumers are the losers since milk consumption and real disposable income are reduced as a consequence of higher prices. However, producers benefit.

Other aspects of government policy

Many African governments have attempted to control trade in foodstuffs directly. They participate in, or even monopolise, import activities by setting up statal or parastatal organisations that often have far-reaching powers. It is hard to generalise about their effects since they can intervene in the market in many ways. Statal or parastatal organisations can be subsidised as well as taxed, can reap monopoly rents or supply isolated areas with high distribution costs at no extra expense. All these activities can substitute, complement or offset dairy import policies, and the eventual effects on production, consumption, trade and welfare are difficult to assess.

In general, state trading tends to act against the market forces rather than to reinforce or complement them. Frequently, through state trading, governments pursue precisely those objectives which the market will not provide for. Keeping consumer prices at an artificially low level despite insufficient supply, or limiting imports in a similar situation, are common examples. This often means an overall decline in welfare. The answer to the question 'Who gains, who loses?' depends on the market situation and on the activity undertaken. The most obvious sign of the effects of state trading against the market forces is the existence of 'black', i.e. free, markets—a common feature of many African countries.

Price policy is another important issue but it is too complex to be thoroughly covered here. In theory, almost all the listed objectives concerning dairy imports can be reached by setting producer or consumer prices. For example, by pushing the domestic milk price below world market levels, a government takes away any commercial incentive to import dairy products, and thereby saves foreign exchange. Any pricing policy, however, faces the major problem of actually controlling administered prices. Sub-Saharan African milk markets in particular, with their abundance of informal marketing channels and direct producer-consumer links, are almost impossible to control effectively. Both Kenya and Mali, to name but two of many possible

examples, have at least one milk price with its respective marketing channel in addition to the official, controlled market price (FAO, 1981; 1983).

Some examples of current policies

Dairy import policies do not often feature in African governments' official statements. This is not surprising since they involve details which do not lend themselves to public speeches or election promises, and other products may be considered more important. The result is that information on specific objectives for dairy imports is rare.

Thus, statistics on tariffs, trade regulations and marketing patterns are often hard to find; however, two approximations that are readily available are the relative importance of imports in the domestic dairy sector, and what proportion of these imports is commercial. Both variables are relatively high if the country has followed a policy of relatively open borders. The two criteria selected to identify a relatively open-border policy are whether the share of imports in total milk consumption is over 50%, and whether at least 65% of dairy imports are commercial (Table 4). An interesting pattern emerges. Other than the islands in the Indian Ocean, all 18 countries that meet these criteria are located along the West and central African coastline. Apart from Senegal, none of these countries' dairy imports seem to put a particularly large burden on their foreign exchange account. For Ghana, Nigeria and Senegal the World Bank (1983) states that they have a high or, in the case of Senegal, a medium distortion of the exchange rate, and this may have fuelled dairy imports.

Table 4. *Tentative indicators of an open-border policy with regard to dairy imports for 18 countries of sub-Saharan Africa, 1980–82*.

	Dairy imports as % of consumption	Commercial dairy imports as % of total dairy imports	Value of dairy imports as % of total export revenues
Angola	51	84	2
Cameroon	51	83	1
C.A.R.	56	70	1
Congo	82	92	1
Gambia	68	75	n. a.
Ghana	88	70	1
Guinea Bissau	57	66	n.a.
Ivory Coast	94	99	3
Liberia	94	90	1
Mauritius	77	91	n.a.
Nigeria	66	99	2
Reunion	82	99	n.a.
S. Tome	83	68	n.a.
Senegal	60	81	5
Seychelles	83	88	n.a.
Sierra Leone	69	65	2

Togo	64	72	1
Zaire	91	84	3

Note: All figures are 1980–82 averages.
Sources: Calculations based on *FAO Production Yearbooks, FAO Trade Yearbooks,* FAO (1984) and World Bank (1983).

Again, the speculative character of such calculations must be stressed and before any conclusions can be reached, national price statistics for dairy products must be available.

Kenya and Mali are two countries for which some information is available. Each country contains two markedly different ecological zones and thus features different milk production patterns and supply potentials, i.e. pastoral semi-subsistence and intensive mixed crop–livestock farming. The following descriptions include the findings of country studies within the International Scheme for the Coordination of Dairy Development (ISCDD) (FAO, 1978c; 1981; 1983).

Kenya

Kenya is generally believed to have the potential for meeting domestic milk demand, and throughout the 1970s the trade balance in dairy products showed a modest export surplus. The government encourages development of regional cooperative dairies to improve market outlets; maintains growth of smallholder milk production; aims to improve nutritional levels and to provide 'a stimulus to dairy development' with a school milk programme; and promotes a change to zero grazing systems in the high-potential areas where more than three quarters of all dairy cattle are located (FAO, 1981).

The trade-off between producer and consumer welfare is alleviated by the government's commitment to a school milk programme. The major policy instruments used consist of: setting basic prices at the producer and retail levels; providing artificial insemination, animal health and other extension services; and running the school milk programme. The Kenyan Ministry of Livestock Development (1980) also records the existence of a 50% import duty and a 15% sales tax on dairy products which it wants to be removed at times of strong import demand. Beyond that, no articulate dairy import policy emerges.

However, a rapidly increasing demand and the school milk programme led to a milk deficit in 1979/80; this is likely to persist throughout the 1980s. The policy effect of creating extra demand for milk is obvious in this case and has been realized by the government (Kenyan Ministry of Livestock Development, 1980). Since 1983, the FAO/ World Food Programme (WFP) has provided milk powder and butter oil shipments to support the school milk programme (FAO/WFP, 1983).

One could conclude that the more general measures on the production side, e.g. input provision, could not match the effects of government policy on the demand side. The role of price setting and the adequacy of the marketing system would need further analysis in this respect. The government's reactions, in terms of calling in the WFP and of considering a tax reduction for dairy imports, are well-targeted steps in an import policy, but their effects cannot yet be observed. The Kenyan example shows how easily a fairly balanced market can be disturbed by government interference. It also shows that different periods are needed for policy

instruments to become effective: stimulating milk production is unlikely to show quick results, whereas dairy imports and the consumer tend to react immediately to incentives.

Mali

Mali is a country with a low overall potential for intensive milk production. However, the economic importance of livestock is substantial (Wilson et al, 1983; FAO, 1978c). To date, milk policy has had effects only in the Bamako region, where the country's single milk processing plant, Union laitière de Bamako (ULB), is located. This reflects both the government's objective to provide the capital with a reasonable supply of milk and the fact that the majority of milk production in rural areas is consumed at source (FAO, 1978c). Consequently, on the fresh milk market only ULB buying and selling prices are subject to price fixing and government control. However, effects on the domestic supply side are negligible since the plant's output is almost exclusively recombined milk. On the demand side, it is interesting to note that the prices for direct sales of fresh milk in Bamako are about 50% above the official ULB retail price for combined milk. This apparently reflects consumer preferences since no 'black market' for ULB milk exists.

Commercial imports are subject to licensing and foreign exchange allocation, and the parastatal SOMIEX has a monopoly on imports of milk powder and condensed milk in cans. An average of 26 000 t of dairy products (in LME) was imported annually from 1980 to 1982, including about one third as food aid. According to FAO (1983), more than half these total imports are consumed in Bamako. The capital's estimated milk consumption in 1984 was 20 to 25 kg LME per caput. In some parts of the country, especially in the northern pastoral areas, per caput milk consumption is substantially higher.

The main problem is the effect of imports on consumption and production resulting from ULB and SOMIEX policy and price setting. The interactions between ULB and the free market, as well as ULB's role as a market outlet for local milk producers, are crucial for dairy development in the Bamako region (see also von Massow, 1984).

Government policies can be influenced by both the agroclimatic potential and the production system. Government interference seems to be stronger in the 'high-potential' countries, whereas in the case of Mali, policies and their application are uncertain. At least in Kenya and Mali, dairy imports are such that special import policies are considered necessary or are already being pursued.

The contribution of policy research

The above discussion on dairy imports into sub-Saharan Africa and their policy implications has raised a number of issues: the impact of urbanisation on dairy and food imports; differences in demand for fresh vs recombined milk including their respective demand elasticities; the extent to which food aid substitutes or complements commercial dairy imports; and the question of how feasible dairy development along the lines of the 'Operation Flood' in India could be for sub-Saharan African countries.

All these issues should be of considerable interest to policy-makers. However, to foresee the impacts of any dairy import policy, there are two basic requirements: sound information must be available and a synchronisation of the researcher's contribution and the policy-maker's expectations is needed. These two conditions are obviously linked to each other.

The information problem

The set of statistical data that is most needed is that of domestic dairy prices. The close monitoring of a selected sample of markets gives an indication of the success or failure of any policy and enables researchers to advise on any necessary changes. The central role of prices in directing milk production, consumption and imports makes the improvement of price statistics a top priority. Dairy production data are also of great importance but are very unreliable at present. To improve production data is technically and organisationally more difficult than monitoring prices. It would help to monitor the national herds more closely and complement this by systematic analyses of the changes in animal productivity in some of the major production areas. As with prices, the survey emphasis is on continuity rather than absolute completeness of data. A concerted effort in these two areas would yield a high dividend and provide a significant step forward in policy research and formulation.

The congruence problem

Most economists are committed to the ideas and assumptions of the neo-classical theory. However, their perception of a 'welfare-enhancing' policy may be regarded as useless by policy-makers: the economist uses an overall 'social welfare' criterion while the politician may pursue very different targets. The question is how to merge these sometimes conflicting attitudes. Does the economist have to bend to the policymaker's wishes? Or should the policy-maker defer to the economist?

A first step would be to define more clearly the objectives the politician pursues and to see that policy research provides the decision-maker with the relative welfare costs of present or planned policies. To give an example, a government should be informed that while raising revenues of, say, US$ 50 million, an import tariff on dairy products poses a burden of US$ 200 million on consumers' welfare while benefiting producers by only US$ 75 million, i.e. it leads to an overall welfare loss. The policy researchers would then have to consider the alternatives and describe their costs and benefits.

The above assumes that the relationship between policy and research may well remain unequal. Research has to serve policy by providing information about specific policies and their alternatives rather than by presenting one 'optimal' solution. Thus, the inherent claim of the researcher to know better than the politician what might be good for the country or not, is excluded.

This paper, in conclusion, argues that some dairy import policies in sub-Saharan African countries may have to be changed. Policy researchers will have to provide the basic information for policy-makers to make decisions according to their objectives. Both sides should take this as a challenge for cooperation.

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List of abbreviations

AP	animal protein
a.s.l.	above sea level
EC	European Communities
cal	calorie
CEC	Commission of the European Communities (Brussels)
c.i.f.	Import price that includes the cost of insurance and freight
DM	dry matter
GATT	General Agreement on Tariffs and Trade (Geneva
GE	gross energy
GNP	gross national product
IDA	International Development Association
IMF	International Monetary Fund (Washington D.C.)
LME	liquid milk equivalent
LW	Liveweight
mb	millibar
MJ	megajoule
sec	second
SOMIEX	Société malienne d'importations et d'exportations
t	metric tonne
ULB	Union laitière de Bamako
WFP	World Food Programme (Rome)
yr	year