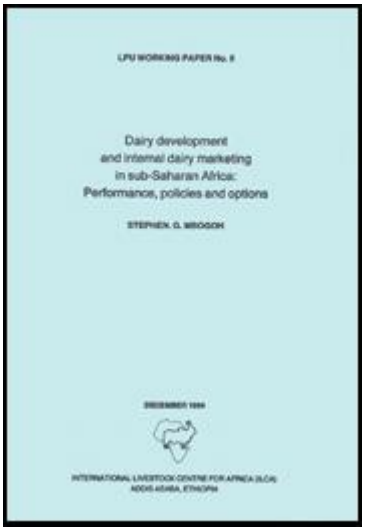
Dairy development and internal dairy marketing in sub-Saharan Africa: Performance, policies and options

LPU Working Paper No. 5



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December 1984

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LPU

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Acknowledgements

This paper presents the findings of phase I of the Livestock Policy Unit's study of Dairy Marketing Systems in sub-Saharan Africa. Full details of the Protocol for this study can be found in ILCA's Livestock Policy Unit (LPU) Programme Review and Protocols for 1984.

The author acknowledges the support, encouragement and constructive criticisms which Stephen Sandford provided throughout the preparation of several drafts of this paper. Useful comments and suggestions on ways of improving some earlier drafts of the paper were also received from Addis Anteneh, Gil Rodriguez Jr., and Valentin von Massow, and the author is grateful for their contributions. However, the author remains solely responsible for any shortcomings that may still occur in the paper.

Stephen G. Mbogoh

Addis Ababa,
December 1984.

Summary

0.01. Dairying in sub-Saharan Africa plays an important role, both as a means of generating income for livestock producers and in providing much needed food for Africa's consumers. As an illustration, the share of the value of milk in the value of all livestock food products in sub-Saharan Africa in 1977 was about 56%, while the share of the livestock subsector in the agricultural GDP of sub-Saharan Africa as a whole in 1980 was estimated to be 17%.

0.02. The dairying subsector in sub-Saharan Africa has not performed satisfactorily in terms of achieving national self-sufficiency in dairy products over the last two decades. While the human population in the region was growing at the rate of about 2.9% p.a. during the 1970s, the total regional output of dairy products only grew at the rate of about 1.4% p.a. The fast growth in population led to proportionate increases in the demand for dairy products, and sub-Saharan Africa was able to more or less maintain its level of per caput consumption of dairy products only through increased imports of dairy products.

0.03. Trends in *production* and *consumption* generally influence the environment within which marketing policies have to be designed, formulated and implemented. As production and consumption expand, marketing must change to involve not only the traditional redistribution from surplus producers to deficit consumers within the same rural areas and adjacent towns, but also the long-distance movement of products from far-removed rural producing areas to the rapidly expanding metropolises whose supplying hinterlands can no longer hope to match the rapidly expanding demand. It is now becoming increasingly obvious that for some time to come the imbalance between domestic demand and production of dairy products in many sub-Saharan African countries will be such that marketing must also involve the distribution of imported dairy products to consumers in the major cities and sometimes in rural areas as well. Hence there is need to plan and develop the dairy marketing systems in sub-Saharan Africa to cope with these extra demands on their capacities.

0.04. This paper seeks to identify and examine the dairy marketing policies that have been pursued in different countries in sub-Saharan Africa with a view to assessing how such policies may influence the structure and performance of the markets of dairy products in the region. Such a review is expected to create an awareness of the appropriateness of different marketing policies for different sets of circumstances. Generally, it is recognized that improvements in the marketing infrastructure and the pursuit of appropriate policies can play a complementary role to development efforts. For instance, the provision of an assured dairy marketing outlet that is sufficiently remunerative to producers is a necessary condition for any significant increase in the production of dairy products for the market.

0.05. The review of available literature indicates that hardly any detailed studies on internal dairy marketing systems have been undertaken in sub-Saharan Africa. Therefore, relatively little is known about the relative efficiency of alternative dairy marketing systems in terms of such criteria as costs and marketing margins, including matters of product hygiene and quality, range and stability of services offered, convenience and responsiveness to consumer demand, stability of producer and consumer prices, and ability to achieve specified goals for a marketing system. In spite of this gap in knowledge, many dairy development projects in sub-Saharan Africa in the

past have been launched prior to detailed evaluation of the types of marketing systems which would best handle surpluses of dairy products which accrue to such projects. The same trend continues even today. Such projects have often been accompanied by the establishment of government marketing organisations which are given power to control both domestic and external trade in dairy products. Ironically, the establishment of such large-scale enterprises has often been justified on the grounds of their perceived efficacy in achieving the objectives of dairy marketing policies.

0.06. This paper identifies the major objectives of dairy marketing policies in sub-Saharan Africa as:

i. provision of higher and more stable prices to producers;
ii. assurance of reliable milk supplies to urban consumers at reasonable prices;
iii. improvement of hygiene and quality of dairy products that flow through various marketing channels;
iv. provision of convenient services to dairy consumers at reasonable prices; and
v. assurance of the supply of dairy products to certain sectors of the population in order to ensure certain minimum nutritional standards for those sectors.

0.07. The main policy instruments that have been deployed to try and achieve the objectives of dairy marketing policies in sub-Saharan Africa include:

i. establishment of monopolistic large-scale dairy marketing enterprises in order to try and achieve economies of scale and improvements in product hygiene and quality;
ii. licensing and inspection of competing traders to ensure adherence to certain minimum standards of product hygiene and quality; and
iii. encouragement of market competition as a means of enhancing marketing efficiency.

0.08. The overall review indicates that some objectives have been achieved to some degree, but usually at the expense of others. The review further indicates that governments tend to favour the establishment of large-scale dairy marketing enterprises, which are often state-owned, despite the fact that little is known about the relative efficiency of alternative dairy marketing systems. The paper, therefore, concludes that there is a need to undertake comprehensive and detailed dairy marketing case studies in some selected sub-Saharan African countries in order to generate information that could facilitate the choice of the most appropriate dairy marketing systems to accompany dairy development projects under different circumstances.

Background to the study

Introduction

1.01. Livestock production constitutes an important economic activity in most countries of sub-Saharan Africa.[1] The estimated average share of the livestock subsector in the agricultural income (i.e. agricultural GDP) of sub-Saharan Africa as a whole in 1980 was about 17%, but there is a great variability of this share between countries and subregions. For instance, the range in the share for individual countries was from about 2.2% for Gabon in Central Africa to about 86.3% for Mauritania in Western Africa for 1980 while the average share by subregions was from 6.4% for Central Africa to 31.4% for Eastern Africa (Jahnke 1982).

1. The countries included in this region of the world and their groupings are given in Table 3.

1.02. A consideration of how much the livestock subsector contributes to the national income (GDP) attributable to agriculture is just one of the methods of assessing the importance of the livestock subsector to the national economy. However, it would be more enlightening to assess the importance of the livestock subsector in terms of its contribution to food production, especially when dealing with a situation such as exists in sub-Saharan Africa whereby production of food toward higher levels of self-sufficiency is of great concern.

1.03. Milk constitutes a significant proportion of the value of all livestock food products in sub-Saharan Africa (about 56%), while livestock food products also constitute an important proportion of the value of total food products in the region. Actual estimates of the share of different types of major food products in the value of total food products in sub-Saharan Africa for the year 1977 are given in Table 1. The data in Table 1 suggest that dairy development may be expected to play a major role in bridging the gap between the local food production and consumption in sub-Saharan Africa.

Table 1. *Production of major types of food products in sub-Saharan Africa, 1977 by quantity and value.*[e]

	Production			
	Quantity	Value[e]	Share in total value	Share in value of all LP*
Type of food product	(million metric tons)	(1000 US$)	%	%
1. Major staple food crops:				
– cereals	36	5,016,600	42.5	n/a*
– non-cereals[a]	32	4,459,200	37.8	n/a*

2. Livestock and poultry				
Products:				
– meat[b]	3	463,770	3.9	19.9
– milk[c]	6	1,313,580	11.1	56.3
– eggs[d]	0.5	557,450	4.7	23.9

LP* = livestock food products; n/a = not applicable.
a = aggregate of rootcrops, pulses, groundnuts, bananas, and plantains, all in cereal equivalents.
b = aggregate of meat of indigenous cattle, sheep, goats, pigs, and poultry, all in carcass weight equivalents.
c = aggregate of cow, sheep and goat milk, but excludes camel milk, in whole milk equivalents.
[d] = estimated to be less than a half million tons, but rounded to the nearest half million ton.
[e] = values based on average unit values (prices) of world imports and exports of respective products in 1977.
Sources: Paulino and Yeung (1981); *FAO Trade Yearbook* (1979), and *FAO Production Yearbook* (1979), with unit value assessments and calculations by the author.

1.04. Sub-Saharan Africa is the home of about 8% of the world human population (1980 estimate),[2] yet the region produces only about 4% and slightly more than 1% of the world's meat and milk products respectively (Addis Anteneh 1984). Sub-Saharan Africa's per caput food production is generally below the world average, except in the case of per caput production of non-cereal staple food crops (Table 2).

2. Calculation based on figures from the FAO *Production Yearbook* (1981).

Table 2. *Average per caput food production in the world and sub-Saharan Africa by majo food types in 1977.*

Type of food	Production in kg per caput	
	World	Sub-Saharan Africa
1. Major staple food crops:		
– cereals	320	115
– non-cereals[a]	50	100
2. Livestock and poultry products:		
– meat[b]	30	10

– milk[c]	150	20
– eggs	6	2

a = aggregate of rootcrops, pulses, groundnuts, bananas, and plantains, all in cereal equivalents.
b = aggregate of meat of indigenous cattle, sheep, goats, pigs, and poultry, all in carcass weight equivalents.
c = aggregate of cow, sheep and goat milk, but excludes camel milk, in whole milk equivalents.
Source: Calculations based on data compiled from Paulino on a Yeung (1981).

The changing food balance situation

1.05. Rapid increases in both human population and per caput disposable income in the face of slow or stagnating growth in food production in most of the member countries of sub-Saharan Africa have resulted in sub-Saharan Africa shifting its trade position in food products from a minor net exporter in the early 1960s to a major net importer in the late 1970s and early 1980s. The food situation in sub-Saharan Africa presents an even more gloomy picture when one examines the growing trade deficit situation on dairy products. Even though sub-Saharan Africa has managed to maintain a close balance between production and consumption of meat during the last two decades, the imports of milk and milk products have more than doubled during the same period (e.g. see Addis Anteneh 1984).

Projections of food balance situation

1.06. Estimates of food production and the effective demand in sub-Saharan Africa by the year 2000 indicate a staggering food deficit, particularly in the major livestock products (meat, eggs and milk). The deficit in the case of milk is estimated to be over 10 million tons by the year 2000, and such a gap can be closed only if the growth in milk production during the 1980s and beyond far surpasses the growth rate of the last two decades in sub-Saharan Africa's livestock production (between 2% and 3% per annum) and reaches record levels of at least 5.3% per annum (Paulino and Yeung 1981).

Delineation of the region being considered

1.07. Various authors have used the terms "sub-Saharan Africa" and "Tropical Africa" to refer more or less to the same geographical land mass, sometimes with minor differences in terms of the names and actual number of countries included, and sometimes without specifying individual countries (for instance, see Jahnke (1982); Paulino and Yeung (1981); and Montgolfier - Kouevi and Vlanovou (1981)). This makes the reconciliation of results or data presented in different reports by different authors difficult. For this reason, the names of the countries included in the region referred to as sub-Saharan Africa in this study have been given in Table 3.

1.08. In this paper, sub-Saharan Africa as a region is divided into 4 subregions, namely Eastern Africa, Central Africa, Southern Africa, and Western Africa, the countries included in each subregion being given in Table 3.

Table 3. *Member countries of sub-Saharan Africa and their regional groupings.*

1. Eastern Africa subregion:	
	- Comoros - Djibouti - Ethiopia - Kenya - Seychelles - Somalia - Sudan - Tanzania - Uganda
2. Western Africa subregion:	
	- Benin - Chad* - Gambia* - Ghana - Guinea - Guinea-Bissau - Ivory Coast - Liberia - Mali* - Mauritania* - Niger* - Nigeria - Senegal* - Sierra Leone - Togo - Upper Volta*
3. Central Africa subregion:	
	- Angola - Burundi - Cameroun - Central African Republic - Congo - Gabon - Rwanda - Zaire
4. Southern Africa subregion:	

	- Botswana - Lesotho - Madagascar - Malawi - Mauritius - Mozambique - Namibia - Reunion - Swaziland - Zambia - Zimbabwe
Note: Total membership = 44 countries and 4 broad subregions. * Members of the Sahel group of countries in Western Africa (IFPRI classification).	

1.09. Some authors further subdivide the Western Africa subregion into (i) West Africa (consisting of Benin, Ghana, Guinea, Guinea-Bissau, Ivory Coast, Liberia, Nigeria, Sierra Leone and Togo), and (ii) the Sahel group (consisting of Chad, Gambia, Mali, Mauritania, Nigeria, Senegal, and Upper Volta) - see Paulino and Yeung (1981). Other authors have used the term "Sahelian countries" to include Sudan (see ILCA Bulletin No. 10 of December 1980), but Sudan is classified as belonging to the Eastern Africa subregion in this paper. Understanding of these groupings is important when one compares production and consumption performance using data from different sources.

The scope and objectives of the study

1.10. The existing and the projected food balance situation in sub-Saharan Africa calls for an intensified effort to accelerate the rate of the development of the agricultural sectors[3] of the economies of the countries of the region if sub-Saharan Africa is to avert a major food crisis in the future.

3. Both crop production and livestock production subsectors

1.11. This paper is based on a study of the trends of production, consumption, and prices of dairy products in sub-Saharan Africa. The major focus of the study is on the nature and the scale of operation of the dairy marketing structures, with a view to identifying areas in which improvements or reforms in marketing could contribute more effectively to the overall objectives of the dairy development policies in the region.

1.12. The analysis is biased toward an examination of the marketing of domestically produced milk and milk products, including the marketing of imported but locally reconstituted whole milk powder and recombined skimmed milk powder and butteroil. However, the paper also briefly examines what has been happening to the imports of other dairy products during the last two

decades. A major objective of the appraisal is to assess what impacts various government dairy development and marketing policies may have had on the production and consumption of dairy products in sub-Saharan Africa. Hopefully, an understanding of these policy impacts can help in the formulation of more appropriate policies for further dairy development in the region.

Methodological aspects: Data sources and reliability

1.13. This study is principally based on the review and analysis of internationally published aggregate statistics on production trade, consumption and prices with regard to dairy products in individual countries and regions within sub-Saharan Africa. The major data sources are the *FAO Production Yearbooks* and *FAO Trade Yearbooks* (various annual issues), but other relevant published and unpublished official reports, documents and conference papers are also used. Such papers and documents are given in the list of references. The study starts from a working assumption that such data are of acceptable reliability, even though a number of economists have pointed out weaknesses in the aggregate production, trade, and consumption statistics that are recorded and reported by the FAO, particularly for developing countries - for instance, see Paulino and Yeung (1981).

1.14. The major weakness with internationally published aggregate agricultural statistics for developing countries is attributed to methods of data collection. Efforts to improve the quality of agricultural statistics in developing countries must necessarily take a long time and improvements can only occur with economic development. Therefore, the only alternative when evaluating the performance of the agricultural sectors of developing countries over time is to make prudent use of existing data sources.

1.15. Even though the study starts from a working assumption that existing data are of reasonable quality, there are some analytical problems which arise from the fact that data are not available for some countries within the sub-Saharan Africa region. In some cases, data coverage is incomplete, a factor which may lead to an underestimation of the true situation in the region—especially in the case of on-farm dairy production estimates. However, it can be reasonably assumed that such data paucity and discrepancies do not interfere with the main thrust and essence of the analysis and the implications of the results vis-a-vis the main policy issues in livestock development in the region.

1.16. This study is organised in five major parts. The first part gives the background to the study. The second part examines and analyses trends in dairy production, trade and consumption, including a brief evaluation of developments in prices for dairy products. The third part examines and evaluates the marketing systems of dairy products, the main emphasis being on the nature of marketing structure, while the fourth part of the study examines and evaluates the impacts of government policies toward the marketing of dairy products. The final part of the study aims to identify critical issues in dairy development and marketing policies in sub-Saharan Africa that need further research.

Trends in production, trade and consumption

Production: Resource base, levels and trends

Regional overview

2.01. Production of dairy products in sub-Saharan Africa over the last two decades has been characterized by a rapid growth in total output during the 1960s, followed by a deceleration in the rate of growth during the 1970s. As such, most dairy products registered only minor increases in their absolute quantity levels between 1970 and 1980 (see Table 9). However, per caput production of dairy products declined throughout the two decades, mainly as a result of the fast growth in human population throughout the region.

2.02. Trends in livestock output generally reflect changes in livestock populations and their productivity. During the 1960–1980 period the ruminant livestock populations in sub-Saharan Africa generally increased in numbers, and increases in both milk and meat production in the region during the two decades generally reflect the trends in livestock populations (Table 4). However, the growth in output of livestock products could not keep up with growth in human population, hence the declining per caput production of livestock products.

Table 4. *Changes in livestock numbers, output and a productivity in sub-Saharan Africa, 1960–1980*[a]

	Output		
Parameters	1960	1970	1980
Cattle population (million)	96.9	131.6	148.8
Small ruminant population (million)	160.8	209.3	238.8
Meat production (all types) (million tons)	1.6	2.7	3.2
Milk production (cow's only) (million tons)[b]	–	5.0	5.6
Beef yield (kg/head)	12.8	13.3	13.9
Milk yield (kg/head)[b]	–	37.7	37.8
Meat production (all types) per caput (kg)	8.0	10.2	9.1
Milk production (cow's only) per caput (kg)[b]	–	19.0	16.0

a. All estimates derived from FAO *Production Yearbooks.*
b. Data on milk production are considered to be particularly inaccurate for the 1960s period, hence they were omitted in the original calculation.
Source: *ILCA Annual Report 1982* (Published 1983).

2.03. The distribution of ruminant livestock populations, the major resource in the production of dairy products, differs between subregions and within countries in sub-Saharan Africa. Even though the cow continues to be the major source of milk and milk products in sub-Saharan

Africa, camels, sheep and goats are also significant sources of the total output of dairy products in the region.

2.04. Indigenous zebu and taurine breeds of cattle virtually constitute the entire herd of cattle in sub-Saharan Africa. The indigenous cattle breeds are characterized by low productivity. Lactating cows rarely achieve a milk yield in excess of 200 litres per lactation for human consumption. This yield performance is relatively poor when compared with typical yields of about 3000 litres of milk per lactation which are expected from imported exotic dairy cows, such as Friesian or Jersey breeds (ILCA Bulletin No. 4; June 1979). Sub-Saharan Africa, therefore, appears to have the potential to improve dairy production through a strategy of adopting high-yielding exotic dairy breeds of cattle, or through a programme of cross-breeding to improve the yields of indigenous cattle breeds. However, dairy production in the region is also constrained by a number of some environmental factors which will be highlighted later in the paper.

2.05. The sub-Saharan Africa region can be classified into five major ecological zones, namely (i) arid, (ii) semi-arid, (iii) subhumid (iv) humid, and (v) highland zones. The distribution of the ruminant livestock population in sub-Saharan Africa by livestock species and ecological zones, including the share of each type of ecological zone in the total land area in the region, is given in Table 5.

Table 5. *Distribution of ruminant livestock populations by species and ecological zones in sub-Saharan Africa for the year 1979*

Ecological zone[b]	Cattle 1000 head (%)	Sheep 1000 head (%)	Goats 1000 head (%)	All ruminants[a] 1000 TLU (%)
Arid (37.3)	31,462 (21.3)	37,063 (35.7)	48,287 (38.6)	41,697 (30.4)
Semi-arid (18.1)	45,454 (30.8)	23,071 (22.2)	33,215 (26.5)	37,446 (27.3)
Subhumid (21.7)	32,758 (22.2)	14,153 (13.6)	20,266 (16.2)	26,370 (19.2)
Humid (18.5)	8,814 (6.0)	8,177 (7.9)	11,586 (9.2)	8,148 (5.9)
Highlands (4.4)	29,022 (19.7)	21,401 (20.6)	11,933 (9.5)	23,646 (17.2)
TOTALS (sub-Saharan Africa)	147,510 (100.0)	103,865 (100.0)	125,287 (100.0)	137,308 (100.0)

a. Includes camels

b. The figures in parentheses under ecological zones give percentage of total land area of sub-Saharan Africa that is covered by the given zone.
Source: Jahnke (1982), pp. 19–21.

2.06. The data presented in Table 5 indicate that most of the ruminant livestock populations in sub-Saharan Africa are concentrated in the arid and semi-arid zones, with about 37% of the TLU[4] being found equally distributed between the subhumid and highland zones and only about 6% of the TLU being found in the humid zones.

4. TLU = Total Livestock Units, as standardized measure of livestock numbers, whereby a camel is taken as equivalent to one Livestock Unit (LU), while one head of cattle is equivalent to 0.7 of LU, and a head of sheep or goat is equivalent to 0.1 of LU (see Jahnke 1982, p. 10).

2.07. Dairy production in sub-Saharan Africa is constrained by a number of factors, which may be classified as being biological, climatic, and socio-economic in nature. The extremely low dairy production in the humid zones of sub-Saharan Africa—primarily in the Central and Western Africa subregions—is attributed to a virtual non-existence of livestock populations in these zones which are infested by the tsetse fly, the vector of trypanosomiasis. Only indigenous (local) cattle breeds thrive in the arid and semi-arid zones which occupy more than 50% of the land area in sub-Saharan Africa (a bio-climatic constraint to increasing dairy production). The arid and semi-arid areas are also the home of pastoral/nomadic cattle herdsmen, whose main purpose for milk production is for their own and family consumption. There are also some technical constraints to improving dairy production. Exotic cattle breeds and the crossbred cattle, which easily outyield the indigenous cattle breeds in milk production, tend to thrive best under the high potential, temperate highland areas, where high standards of dairy management are required. Such high potential areas are often characterized by mixed farming so that dairying may only be one of the many economic activities of producers. Under such circumstances, the choice of the type of economic activities to pursue will depend on the profitability of alternative enterprises. However, nutritional considerations may also affect the choice of the activities, since nutritional aspects will influence the family's production decisions as far as food production is concerned.

2.08. The data presented in Table 4 indicate that both livestock numbers and the output of livestock products in sub-Saharan Africa recorded an increase in absolute amounts over the 1960–1980 period. However, the growth in numbers of the ruminant livestock species occurred at much lower rates during the 1970s than during the 1960s. A major cause of the deceleration in growth during the 1970s was the severe drought which decimated herds, especially in the Sahel and Ethiopia. However the drought crisis in the Sahel and some parts of Eastern and Southern Africa does not explain why there was an overall deceleration in growth of livestock populations in the rest of sub-Saharan Africa, where cattle populations grew at a rate of 3.7% per annum during the 1960s, but where the rate fell to 2.1% per annum during the 1970s *(ILCA Annual Report 1982).* The causes of such a deceleration are believed to lie in either a decrease in fertility and/or an increase in mortality. Increasing regional conflicts and wars, frequent outbreaks of disease, and poor livestock husbandry (which contributes to the poor nutrition) have undoubtedly contributed to the poor performance of livestock in sub-Saharan Africa in terms of growth both in livestock numbers and their productivity during the 1970s *(ILCA Annual Report 1982).*

Regional and subregional production trends and performance

2.09. The overall increase in the output of dairy products in sub-Saharan Africa during the last two decades is believed to have been more due to an expansion of livestock population rather than due to improvements in livestock productivity. This proposition has been supported by some recent work carried out at ILCA (McClintock 1983).

2.10. Even though the cow is the main source of dairy products in sub-Saharan Africa, the camel becomes more important as one moves into the more arid parts of the region, particularly in the Sahel and in some parts of Eastern Africa. Table 6 gives an idea of the importance of the various ruminant livestock species as sources of dairy products in sub-Saharan Africa during 1978. However, one must realize that data on milk production from camels ere rarely properly recorded, so that the figures for milk production from camels as given in Table 6 are even more of a guess than for milk from other livestock populations and are based on estimates from the census of camel populations and the expected yield of milk per head of camel.

Table 6. *Milk production in sub-Saharan Africa by ruminant livestock species in 1978.*

Ruminant livestock species	Amount of milk (1000 metric tons)	% Share in total output
Camels[a]	2,200	23.6
Cattle	5,627	60.3
Sheep & goats (Shoats)	1,507	16.1
Total production	9,334	100.0

a. Estimates based on yield of 200 kg of milk per head of camel, which is considered fairly conservative when compared with the figures quoted in the survey by Dahl and Hjort (1976).
Source: Adapted from Jahnke (1982), p. 30.

The data presented in Table 6 suggest that camels are second to cattle In terms of their share in total milk output in sub-Saharan Africa, despite their limited distribution in the region (Jahnke 1982, p. 31). Buffaloes are an important source of dairy products in a number of developing countries, particularly in the Asian subcontinent and also in Egypt in North Africa, but this ruminant animal has not yet been domesticated in any country within sub-Saharan Africa.

2.11. When compared with the dairy output performance in the developing countries as a group, the performance in dairy production in sub-Saharan Africa can be judged to be poor. Table 7 gives a comparison of growth rates in the production of the various types of dairy products by the major world regions (or country groupings) and for sub-Saharan Africa for the 1963–1980 period.

Table 7. *Comparison of growth rates in production of various dairy products by major world regional groupings, 1963–1980.*

Region/type of product	Period & annual growth rates		
	1963–1970	1970–1980	1963–1980
1. World:			
(i) Liquid whole cow milk	1.8	1.6	1.7
(ii) All* liquid whole milk	1.7	1.7	1.7
(iii) Dry whole cow milk	7.8	5.4	6.4
(iv) Dry skim milk and buttermilk	6.4	3.4	4.6
(v) Evaporated and condensed milk	1.4	0.3	0.7
(vi) Cheese	1.1	4.0	2.8
(vii) Butter and ghee	0.9	1.6	1.3
2. Developing countries:			
(i) Liquid whole cow milk	0.6	1.3	1.0
(ii) All* liquid whole milk	0.7	1.3	1.0
(iii) Dry whole cow milk	5.9	5.5	5.7
(iv) Dry skim milk and buttermilk	6.0	2.3	3.8
(v) Evaporated and condensed milk	–0.9	–1.3	–1.1
(vi) Cheese	4.0	4.3	4.2
(vii) Butter and ghee	–0.2	–0.5	0.2
3. Developing countries:			
(i) Liquid whole cow milk	3.2	3.1	3.1
(ii) All* liquid whole milk	2.7	3.1	2.9
(iii) Dry whole cow milk	19.4	5.8	11.2
(iv) Dry skim milk and buttermilk	–18.9	12.6	–1.6
(v) Evaporated and condensed milk	6.9	3.7	5.0
(vi) Cheese	–9.8	2.3	–2.9
(vii) Butter and ghee	2.3	2.5	2.4
4. Sub-Saharan Africa			
(i) Liquid whole cow milk	1.6	1.3	1.4
(ii) All* liquid whole milk	2.1	1.3	1.6
(iii) Dry whole cow milk	29.8	–3.4	9.1
(iv) Dry skim milk and buttermilk	17.5	–4.8	3.9
(v) Evaporated and condensed milk	N/A	–30.7	N/A
(vi) Cheese	18.5	9.2	7.4
(vii) Butter and ghee	1.6	0.9	1.7

All liquid milk refers to liquid milk from all animal sources, except camels.

N/A implies "not applicable" (since value at basis was zero).

Source: Calculations by author based on data in the Appendix Table A.1.

2.12. Liquid milk (from all ruminant livestock sources) can be taken as the main dairy product because all the other dairy products, as recorded in the published statistics, are basically derived from the recorded or estimated total liquid milk production in each country. Therefore, developments in total liquid milk production generally indicate the output performance of the dairy industry. The parameters which have been presented in Table 7 indicate that the rate of growth in milk production in the developed countries almost doubled from about 0.7% per annum during the 1960s to about 1.3% per annum during the 1970s. Over the same period, the growth rate in world total milk production actually stagnated at around 1.7% per annum, while the corresponding annual rates of total dairy production growth for the developing countries as a group and sub-Saharan Africa as a region changed from 2.7% to 3.1% and from 2.1% to 1.3% respectively. Evidently, the rate of progress in dairy production in sub-Saharan Africa declined between the 1960s and 1970s.

2.13. Although the highest growth rates in dairy production have occurred in developing countries during the last two decades these countries still constitute milk-deficit areas in general, while developed countries are generally milk-surplus regions. Since the developing countries also experience much higher population growth rates, these countries have experienced declining per caput milk production over the last two decades. In terms of aggregate output, the developed countries (excluding Eastern Europe and the USSR) contribute 45%, Eastern Europe and USSR contribute 31% while the developing countries contribute 24% of the total world dairy production. Despite the fast growth rates in dairy production that have been recorded for Eastern Europe, USSR and developing countries during the last decade, the above dairy production shares by different world regions are not expected to change significantly during the 1980s (FAO, 1978).

2.14. Dairy production in the various subregions (country groups) within sub-Saharan Africa varies between and within subregions. Table 8 gives a comparison of dairy production growth rates in the various subregions of sub-Saharan Africa during the 1963–1980 period. The parameters given in Table 8 indicate that the Eastern Africa and Western Africa subregions experienced significant growth rates in output during the last two decades. However, the dairy output performance in the rest of the region was not so impressive.

Table 8. *Comparison of growth rates in total dairy output in the subregions of sub-Saharan Africa during the 1963–1980 period.*

Subregion/Country grouping (No. of countries) Type of product	Period & annual % growth rate		
	1963–1970	1970–1980	1963–1980
1. Eastern Africa (9):			
(i) Liquid whole cow milk	1.9	1.3	1.6
(ii) All* liquid whole milk	2.8	1.4	2.0
(iii) Dry whole cow milk	23.6	–5.0	5.9
(iv) Dry skim milk and buttermilk	12.1	–6.8	0.6
(v) Evaporated and condensed milk	N/A	–21.6	N/A
(vi) Cheese	10.6	3.2	6.2
(vii) Butter and ghee	–0.9	0.2	–0.2
2. Central Africa (8):			
(i) Liquid whole cow milk	–1.1	1.6	0.5,
(ii) All* liquid whole milk	–1.2	1.8	0.6
(iii) Dry whole cow milk	0	0	0
(iv) Dry skim milk and buttermilk	0	0	0
(v) Evaporated and condensed milk	37.2	3.0	15.9
(vi) Cheese	0.3	2.4	1.5
3. Western Africa (16):			
(i) Liquid whole cow milk	2.8	1.6	2.1
(ii) All* liquid whole milk	1.8	1.4	1.5
(iii) Dry whole cow milk	N/A	–1.6	N/A
(iv) Dry skim milk and buttermilk	N/A	–1.6	N/A
(v) Evaporated and condensed milk	0	0	0
(vi) Cheese	30.1	0.7	11.9
(vii) Butter and ghee	6.6	2.1	4.0
4. Southern Africa (11):			
(i) Liquid whole cow milk	–0.5	0.7	0.2
(ii) All* liquid whole milk	–0.3	0.7	0.3
(iii) Dry whole cow milk	0	0	0
(iv) Dry skim milk and buttermilk	0	0	0
(v) Evaporated and condensed milk	N/A	N/A	N/A
(vi) Cheese	27.4	–0.3	10.3
(vii) Butter and ghee	0.4	–1.3	–0.6

* All liquid milk refers to milk from all animal sources, except camels. N/A implies "not applicable" (since basic value was zero).
Source: Calculations by the author, based on the data in the Appendix Table A.2.

2.15. Production of such dairy products as dried milk and evaporated and condensed milk generally reflect production of at least sufficient amounts of liquid whole milk in the sense of more than satisfying the immediate market demand for liquid milk. Table 8 suggests that there has been a general decline in the rate of growth of the production of such milk products as dry milk and evaporated and condensed milk in sub-Saharan Africa over the last two decades. This trend reflects the increasing scarcity of liquid milk to satisfy the ever-increasing demand for liquid milk in most parts of the region, particularly during the 1970s. For instance, Eastern Africa and Kenya in particular managed to produce some dry whole cow milk and evaporated and condensed milk during the late 1960s and early 1970s, but the situation changed drastically by the end of the 1970s when even Kenya had to import some dry skim milk and butteroil for recombination into liquid milk in order to satisfy the local market demand.

2.16. Dairy production statistics for the four subregions of sub-Saharan Africa suggest that production of whole liquid milk from small ruminants has been expanding more rapidly than cow milk production over the last two decades. The situation regarding the expansion of camel milk production is still not well understood, mainly because statistics on camel milk production are hard to come by, and only rough estimates based on expected yield and estimated camel populations are usually available. Traditionally, the camel has been an important source of milk in sub-Saharan Africa, primarily in the arid and semi-arid parts of the region, especially in Ethiopia, Somalia and the Sahel group of countries. However, it appears that camel milk production has been on the decline even in the traditionally important camel milk producing areas (Paulino and Yeung 1981, p. 10). Table 9 gives a breakdown of whole liquid milk (fresh milk) production from the different ruminant livestock species (other than camels), by subregions for the 1963–1980 period. The table also gives the trends in the rates of growth of milk production during the same period.

2.17. Table 9 indicates that whole liquid milk production from cows has made some significant but not adequate gains since the 1960s, the changes in absolute amounts over the 17-year period being 30% for Eastern Africa, 9% for Central Africa, 42% for Western Africa, and 13% for Southern Africa. The overall change in the absolute amount of cow milk production for the entire region (SSA) was 27% during that period. Sheep milk production appears to have made the highest gains in terms of production expansion during the 1963–1980 period, the highest gains having been made in Eastern Africa, followed by Central, Southern and Western Africa subregions in decreasing order. However, the data on small ruminant production are notoriously unreliable.

Table 9. *Trends in growth rates and volumes of production of fresh whole milk in sub-Saharan Africa by animal source* and subregions, 1963–1980 (Production in 1000 Metric Tons).*

Region/country group (No. of countries) Annual sources	Production			% Annual growth rate			% Change
	1963	1970	1980	1963/70	1970/80	1963/80	1963/80
1. Eastern Africa (9):							
Fresh: cow milk	2787	3186	3624	1.93	1.30	1.56	+30
sheep milk	102	256	299	14.05	1.56	6.53	+193
goat milk	551	731	860	4.12	6.27	5.38	+144
Total:	3440	4173	4783	2.80	1.37	1.96	+39
2. Central Africa (8):							
Fresh: cow milk	261	242	284	–1.07	1.61	1.50	+ 9
sheep milk	1	2	2	–10.41	0	4.16	+100
goat milk	13	9	16	– 5.92	5.92	1.23	+23
Total:	275	253	302	–1.18	1.79	0.55	+10
3. Western Africa (16):							
Fresh: cow milk	784	949	1117	2.77	1.64	2.10	+ 42
sheep milk	89	110	115	3.07	0.44	1.52	+29
goat milk	302	272	291	–1.48	0.31	–0.44	–7
Total:	1175	1331	1523	1.80	1.36	1.54	+ 30
4. Southern Africa, (11):							
Fresh: cow milk	606	584	626	– 0.53	0.70	0.19	+ 13
sheep milk	2	1	1	N/A	0	N/A	N/A
goat milk	13	19	20	5.57	0.51	2.57	+ 54
Total:	619	604	647	– 0.35	0.69	0.26	+ 5
** Sub-Saharan Africa (44):							

Fresh: cow milk	4438	4961	5651	1.60	1.31	1.43	+ 27
sheep milk	192	369	417	9.78	1.23	4.67.	+117
goat milk	879	1031	1187	2.30	1.42	1.78	+ 35
Total:	5509	6361	7255	2.08	1.32	1.63	+ 32

* Excepting camel milk production, for which statistics are available.
N/A implies "not applicable" (since basis value was zero)
Source: FAO *Production Yearbooks* (1973, 1981), with calculations by the author.

2.18. Central Africa and Southern Africa experienced negative growth rates in the production of whole liquid milk during the 1960s primarily due to a drop in whole liquid cow-milk production. The two subregions of the Sub-Saharan Africa made only a relatively moderate recovery in liquid milk production during the 1970s (see Tables 8 and 9). In terms of total whole liquid milk production (referred to as "All Liquid Whole Milk" in Table 8, and as "Total" in Table 9), the Eastern Africa subregion had the best production performance over the last two decades. In absolute amounts, Eastern Africa produces nearly three times as much milk as that produced by Western Africa, the next largest milk-producing subregion in sub-Saharan Africa.

2.19. Available dairy production statistics, as presented in Table 9, generally relate to total dairy production. No breakdown of production in terms of how much of the total production was consumed by the producing households (i.e. unmarked production) and how much of total production was marketed is usually available. However, an idea of how much of total production is marketed may be grasped from the discussion of marketing systems and marketing structures, which is presented in part three of this paper.

Dairy trade and prices

World perspective

2.20. Despite the relatively moderate growth in world milk production during the 1970s (estimated at about 1.7% per annum—see Table 7), the world supply of dairy products still exceeds commercial demand[5]. This situation, which has persisted through most of the 1970s, has led to the stockpiling of dairy products (notably skim milk and butter) in the developed countries, the world's main producers of dairy products.

5. This relates to effective demand in the sense of the amount of dairy products that can be sold at commercial (international market) rates or prices.

2.21. The growing discrepancy between dairy output and commercial outlets in most of the developed countries has been a result of deliberate government policies in these countries. For instance, most governments in Western Europe and North America have continued to support milk producer prices (even in the face of declining world market prices for dairy products) for social[6] rather than economic reasons. This situation has enhanced milk production even in the high-cost producer countries of Western Europe, where supply has grown relatively fast while the rate of growth in demand for dairy products has been declining. The European Economic

Community (EEC) has therefore become one of the major world milk-surplus regions during the 1970s. North America (particularly the United States) has also continued to be a major dairy-surplus region (FAO 1978).

6. Farm support programmes are undertaken for social welfare reasons (e.g. to ensure that farmers' incomes are stabilized and maintained at some desired levels), regardless of the costs of producing the products for which farm prices are supported.

2.22. Developing countries, which account for about 24% of the total output of world dairy products, constitute the main dairy-deficit region of the world. FAO estimates that the availability of cheap imports of dairy products from the developed countries (mainly in the form of dry skim milk and butter or butteroil) may have led to a situation whereby dairy development in developing countries has not received the priority that it deserves in recent times (FAO 1978). Some of the dairy imports into developing countries have been by way of food aid, but the impact of such cheap sources of dairy products in the developing countries is still uncertain.

Dairy trade in sub-Saharan Africa; trends and the share in the value of the world dairy trade

2.23. Imports of dairy products into sub-Saharan Africa since the beginning of the 1970s have accounted for an average of 5.1% of the overall value of the world trade in dairy products, with the imports of milk alone accounting for about 11.8% of the average value of the world milk trade during the 10-year period. In 1980, the relative shares of the value of sub-Saharan Africa's imports of dairy products and milk alone in the value of the world trade in dairy products and milk alone were 5.5% and 12.2% respectively (Table 10).

Table 10. *Value of the world and sub-Saharan Africa[a] trade in dairy products, 1970 and 1980, in US$ 1000.*

Region/dairy product	Period and value	
	1970	1980
World:[b]		
(i) All dairy products	2,214,854 (4.7)	12,851,262 (5.5)
(ii) Milk only	798,980 (11.3)	5,076,864 (12.2)
Sub-Saharan Africa:		
(i) All dairy products	103,846	705,055
(ii) Milk only	90,582	619,785.

a. Only the value of dairy imports is given in the case of sub-Saharan Africa.

b. The figures given for the value of world dairy trade are based on the average value of the world imports and exports of dairy products. The figures in parentheses give the share of the value of imports of dairy products into sub-Saharan Africa in the value of the world trade in dairy products.

Source: *FAO Trade Yearbooks* (1973 and 1982), with calculations by the author—see Appendix Table A.6 too.

2.24. Sub-Saharan Africa has rapidly changed its net dairy trade position from a small net importer in the early 1960s to a major net importer in the 1970s and early 1980s. Two major factors have contributed to this change:

i. rapid population growth and rising per caput disposable income in the region, leading to a fast growth in effective demand for dairy products; and
ii. slow growth in the production of dairy products in the region.

Generally, human population in sub-Saharan Africa has been growing at nearly twice the rate of growth in dairy production in the region during the last two decades. This factor has resulted in declining per caput production of dairy products in the region, and it is not surprising that the volume and value of dairy imports into the region have grown relatively fast over the last two decades.

2.25. The worsening net dairy trade position for sub-Saharan Africa is demonstrated by the fact that the regional dairy trade deficit was about US$43 million in 1960, US$113 million in 1970 and US$680 million in 1980. Even though part of this fast growth in the dairy trade deficit for sub-Saharan Africa could be attributed to inflation, the proportion of the total increase not attributable to inflation alone is estimated to about 80% of the total increase (von Massow 1984 (a)).

2.26. The major dairy products which have been traded in sub-Saharan Africa have consisted of fresh milk, milk powder (dry skim milk, dry buttermilk, or dry whole milk), evaporated and condensed milk, cheese and curd, and ghee. To avoid a double-counting of imports and exports of dairy products at subregional level, one should consider only the developments of net trade situation. With dairy imports exceeding dairy exports in most cases, the net trade position for sub-Saharan Africa (both at regional and subregional levels) is analysed primarily in terms of the developments in net dairy imports in this paper. Table 11 gives the developments in the net dairy import position for the subregions and the entire region of sub-Saharan Africa during the 1970.

2.27. Table 11 indicates that the imports of dry milk have constituted the bulk of dairy imports into all but one subregion of sub-Saharan Africa, namely Western Africa, where the major component of dairy imports has been evaporated and condensed milk. In terms of quantity, dry milk and evaporated and condensed milk have accounted for nearly 90% of all dairy imports into sub-Saharan Africa over the last decade.

Table 11. *Trends in net dairy trade in sub-Saharan Africa (net dairy imports) by subregions and products, 1970 and 1980 (quantities in metric tonnes).*

Region/subregion and product	Amount of net dairy imports	
	1970	1980
1. Eastern Africa (9)[a]:		
(i) Fresh milk	(–257)[c]	2,654
(ii) Dry milk	8,134	50,894
(iii) Evaporated and condensed milk	6,365	10,197
(iv) Cheese and curd	423	316
(v) Butter and ghee	2,065	5,225
2. Central Africa (8)[b]:		
(i) Fresh milk	742	3,307
(ii) Dry milk	7,326	25,975
(iii) Evaporated and condensed milk	8,242	17,784
(iv) Cheese and curd	1,891	1,870
(v) Butter and ghee	1,651	2,695
3. Western Africa (16)[b]:		
(i) Fresh milk	3,169	14,466
(ii) Dry milk	25,762	103,439
(iii) Evaporated and condensed milk	82,187	238,872
(iv) Cheese and curd	2,537	1,870
(v) Butter and ghee	3,980	16,128
4. Southern Africa (11)[b]:		
(i) Fresh milk	30	18,057
(ii) Dry milk	12,116	25,785
(iii) Evaporated and condensed milk	18,706	4,251
(iv) Cheese and curd	3,687	2,910
(v) Butter and ghee	3,261	6,202
Totals for sub-saharan Africa (44)[b]:		
(i) Fresh milk	3,684	38,484
(ii) Dry milk	53,338	206,093.
(iii) Evaporated and condensed milk	115,500	270,104
(iv) Cheese and curd	8,538	7,049
(v) Butter and ghee	10,957	30,250

a. With imports exceeding exports in all but one case (for fresh milk in Eastern Africa, 1970), the data presented give the net trade position as deficits in dairy products in all but one case.

b. Number of countries forming the region/subregion.

c. Eastern Africa was a net exporter in this case (hence negative sign).

Source: Compiled from *FAO Trade Yearbooks* (1973, 1981); all calculations by the author.

2.28. At the regional level, aggregation of the subregional dairy imports and exports data presents no problem in reflecting the net trade position. Generally the exports of dairy products from sub-Saharan Africa have declined very sharply during the 1970s, while the dairy imports into the region have increased relatively fast during the same period. The consequence of this has been a rapid increase in both the value of dairy imports and the net trade deficit position of sub-Saharan Africa over the last decade. Table 12 indicates the developments of dairy exports and imports for the sub-Saharan Africa region in terms of the rates of growth in the quantities of dairy products which have been traded during the 1970s.

Table 12. *Rate of growth in quantities of exports and imports of dairy products in sub-Saharan Africa, 1970–80.*

Type of dairy product (for all subregions)	% Annual growth rates, 1970–1980		
	Exports	Imports	Net* imports
Fresh (liquid) milk	–15.2	11.1	26.4
Dry milk (skim/whole)	–19.5	13.9	14.5
Evaporated and condensed milk	–8.5	8.6	8.9
Cheese and curd	–37.0	–2.5	–1.9
Butter and ghee	–19.4	8.2	10.7

* Net Imports = Imports less Exports.

Source: Calculations based on data in Table 11 and others as compiled by the author from *FAO Trade Yearbooks* (1973, 1981).

2.29. The value of dairy imports into sub-Saharan Africa has increased relatively fast over the last two decades. For instance, the value of all dairy imports into the region was estimated at about US$41 million in 1960, about US$104 million in 1970 and about US$705 million in 1980. The corresponding figures for the value of the imports of milk alone into the region were about US$28 million in 1960, US$91 million in 1970 and US$620 million in 1980 (see Appendix Table A.6). These increases in the value of dairy imports into the sub-Saharan Africa region imply that the value of *all dairy imports* into the region grew at an annual average rate of 15.2% during the 1960-1980 period, the rate being lower (at 9.6 p.a.) during the 1960s but much higher (at 21.1% p.a.) during the 1970s. The corresponding rates of growth in the value of the imports of *milk only* were 12.3% p.a. for the 1960s, 21.2% p.a. for the 1970s, and 16.7% p.a. for the 1960–1980 period. This suggests that the value of the imports of milk alone has grown somewhat faster than the value of all dairy imports into sub-Saharan Africa over the last two decades.

2.30. The fast growth in the imports of dry milk and tinned evaporated and condensed milk into Western Africa is largely responsible for the large increase in the volume of dairy imports into sub-Saharan Africa over the last decade. Nigeria alone contributed nearly 30% to the increase in the value of dairy imports into sub-Saharan Africa during the 1970s, with the value of all dairy imports into Nigeria in 1980 accounting for about 40% of the total value of sub-Saharan Africa imports of dairy products[7].

7. Calculations based on the data presented in Appendix Table A.6.

2.31. At a regional level, the imports of fresh milk, milk powder, evaporated and condensed milk and butter and ghee all registered positive growth rates in volume (quantity) during the 1970s. The imports of cheese and curd actually declined at the rate of 2.5% per annum during the same period (see Table 12).

Trends in prices of dairy products

2.32. International prices for dairy products can be viewed as the composite of f.o.b[8] prices of the dairy products in the major exporting countries, such as the countries of the European Economic Community (EEC), New Zealand and the United States of America. As far as individual dairy importing countries are concerned, the prices at which they obtain their imports of dairy products must include the cost of insurance and freight (c.i.f.) over and above the f.o.b. prices. Hence the c.i.f. prices will differ between importing countries.

8. f.o.b. = free on board; f.o.b. prices refer to prices payable at the port from which shipments of exports are made.

2.33. Farm price-support programmes for dairy production in Western Europe (mainly in the EEC) and North America (mainly United States of America) are blamed for the problems that characterize the world market for dairy products. Price support programmes have led to over-production of dairy products in these developed market economies so that not all of such products can be disposed of through the normal commercial outlets. These developed countries, being the major dairy producers, have contributed to the depression of international dairy prices through two main mechanisms:

i. the lack of sufficient commercial outlets in developed countries has led to a stockpiling of dairy products, primarily in the form of dried skimmed milk and butteroil; and
ii. these countries have often offered for sale on the world market their stockpiles of dairy products at concessional rates or, in more crude terms, they have dumped their dairy products into the world market.

The stockpiles of dairy products in developed countries reached record levels in the mid-1970s, and the 1970s were generally years of depressed international prices in dairy trade, except for two relatively short periods during the first half of the 1970s (FAO 1978). At current prices only about 20% of the increased value of dairy imports into sub-Saharan Africa over the last two decades can be attributed to dairy price increases (von Massow 1984 (a)), and there is no doubt that the rate of global inflation over the last two decades has been such that it must have caused the real prices of dairy products in world markets to decline during that period.

2.34. The stockpiling of dairy products in the developed countries of Western Europe (mainly EEC) and North America (United States) and its contribution to the depression of international dairy trade and prices has not changed much in the early 1980s. According to the FAO *Food Outlook (Vol. 1) 1984,* the world production of dairy products in 1983 was estimated to be 3% higher than the 1982 production level. The FAO blames increases in the world's stocks of dairy

products on weak internal and external demand in the face of higher production levels in the EEC and the US during the 1983 and notes that such stockpiles of dairy products were responsible for the relatively low export prices for some dairy products during 1983.

2.35. As a net dairy-import region, sub-Saharan Africa would be expected to benefit from the depressed international prices for dairy products. However, a survey of internal dairy product prices in various countries within sub-Saharan Africa reveals that the range of prices in the region is much wider than that which occurs on the world market (ILCA Bulletin No. 4; 1979). Most countries in sub-Saharan Africa have both the formal dairy marketing subsystem (the official channel), which caters primarily "for urban milk supplies, and the informal (traditional and primarily rural) marketing subsystem operating at the same time. The government-controlled (official) prices rule in the formal marketing subsystem while prices obtaining in the traditional marketing subsystem generally characterize a "free marketing system" and usually tend to be much higher than the official producer prices.

2.36. With most countries in sub-Saharan Africa being net importers of dairy products, and with both the formal and informal marketing subsystems operating at the same time in each country, one can conceptualize the existence of three different prices for dairy products in each country: (i) the official producer and consumer prices; (ii) the rural or traditional prices, which often are both producer and consumer prices (because producers will often sell directly to consumers); and (iii) the equivalent of the c.i.f. prices (prices at which imports are secured). Usually, the three different types of prices differ substantially both within and between countries, and the greatest variations are likely to occur in the prices in the traditional rural marketing subsystem.

2.37. Available records suggest that prices in the official (formal) dairy marketing subsystem within a country are relatively more stable. This situation arises out of the concern by governments to keep dairy product prices low in order to ensure that the urban populace can get their requirements cheaply. Even though data that would facilitate a systematic analysis and comparison of the marketing margins and prices in the official (formal) and traditional marketing subsystems is lacking, it appears that the traditional market prices are relatively more unstable and that they usually are above the official market prices. There is also some evidence that the differences between the official and traditional market prices can be very large at times (especially owing to seasonality of agricultural production).

2.38. A survey of dairy prices by ILCA suggests that the differences between the official and traditional market prices can fluctuate between parity and triple the official price in certain areas of West Africa, especially in Ghana and Nigeria, while they could be from 50% to 100% higher than the official prices in Sudan, Mali and Tanzania. A comparison of local and world market prices for dairy products also suggests that there is greater variability in local market prices and that the local prices can be as high as two to three times the world market prices. FAO (1978) reckons that market prices for milk (and other dairy products) have increased much faster in sub-Saharan Africa than in the world market during the late 1960s and the 1970s. Hence the difference between domestic (sub-Saharan Africa) and world milk prices should be expected to have increased during the 1970s (see also ILCA Bulletin No. 4; 1979).

2.39. Even though there is a lack of sufficient market data which would facilitate a systematic appraisal of differences in prices and trading margins between the official and traditional marketing subsystems in sub-Saharan Africa, it appears that many African governments have been slow in responding to the changes in internal dairy production cost structures. Such changes would have required regular revision of the official prices in order to reflect the levels of the prices in the informal or traditional markets. The hypothesis in this line of argument is that the traditional market prices are more competitive and that they reflect the actual market conditions. These prices should thus contribute to the decision-making process if the development of the dairy industries in sub-Saharan Africa is to be accelerated.

2.40. Given the scarcity and limitations of the available data on the operation and performance of both the official and traditional dairy marketing subsystems, efforts should be made to carry out country-specific case studies in order to generate data that can be used to appraise the performance of the official and parallel (traditional) markets. This brief review has identified the possibility of the existence of three different types of dairy prices at any one time: (i) the traditional market prices, which often are the highest; (ii) the relatively stable official channel prices; and (iii) the c.i.f. (world market or import) prices, which often are the lowest. There is no doubt that the governments of sub-Saharan Africa countries are now faced by relatively low c.i.f. prices for dairy products, and the temptation to import cheap dairy products (especially milk powder and butteroil) rather than to intensify local production of dairy products in order to satisfy local demand for these products is quite large. The existence of big differences between the prices prevailing in the official marketing channels and those in the traditional marketing channels, and also between the prices in the domestic market and those in the world market,[9] reflects distortions in the marketing system. Such price differentials imply that either the consumers or the producers are being subsidized or taxed (penalized) by the official marketing and pricing policies. More equitable policies would thus be warranted. However, not much is known about the impact of such price differentials and the importation of cheap dairy products on the development of the local dairy industry in different countries of sub-Saharan Africa, even though some recent work in Mali has revealed a *negative impact* (von Massow 1984 (b)).

9. After duly accounting for the local marketing costs in order to bring domestic and world market prices at comparable levels.

Trends in consumption

2.41. Fast population growth, an increasing degree of urbanisation and rising per caput incomes in sub-Saharan Africa have generally led to a situation whereby effective demand for dairy products in the region has outstripped the local production of these products. This situation has made it necessary to make massive imports of dairy products into sub-Saharan Africa in order to satisfy demand in the region—see the previous subsection on "trends in trade" for a fuller discussion of this aspect of trade.

2.42. A survey by Paulino and Young (1981) suggests that the per caput consumption of milk from goats, sheep and camels in Eastern Africa generally declined while the total consumption of cow's milk in sub-Saharan Africa, especially in the Western Africa subregion (Nigeria in particular), generally increased during the last two decades. The data presented in Tables 4 and 9

appear to support these general observations with regard to cow, sheep and goat milk. Paulino and Yeung (1981) further suggest that about 90% of the total amount of milk and milk products that are either produced in or imported into sub-Saharan Africa are utilized for food purposes. If this figure is taken as a reasonable approximation of the utilization patterns of dairy products in sub-Saharan Africa, then one could hypothesize that any acute shortages of dairy products in this region could adversely affect the nutrition of the people in the region.

2.43. Table 13 gives a breakdown of the developments in the total consumption -of the major traded dairy products in sub-Saharan Africa between 1970 and 1980. The data presented in the table indicate that the total consumption of *fresh* milk in the region grew at relatively moderate rates (between 1.0% and 1.9% per annum) between 1970 and 1980 in all the subregions of the sub-Saharan Africa, which recorded an average growth rate of 1.4% per annum for fresh milk consumption during that 10-year period. Total consumption of fresh liquid milk actually grew fastest in Central Africa and experienced the lowest growth rate in Southern Africa, with Eastern Africa and Western Africa each recording an average growth rate of 1.4% per annum. Total consumption of *dry* milk (inclusive of dry skim milk and buttermilk and dry whole cow milk) actually recorded the highest increase during the 10-year period. The subregional range for the growth rates in total consumption of dry milk was from 7.9% per annum (for Southern Africa) to 15.9% per annum (for Eastern Africa) during the 10-year period, resulting in an average rate of growth for the sub-Saharan Africa of 13.5% per annum. In 1970, the total consumption of dry milk in the region constituted only about 5.8% of total consumption of dairy products in terms of whole milk equivalents (WME), but the share of dry milk consumption (in WME) in the regional total consumption of dairy products (in WME) had risen to about 15.4% by 1980 (calculations based on the conversion factors described under Table 14). Further analysis of consumption will be based on the data presented in Table 13 after converting them into whole milk equivalents.

Table 13. *Total consumption[a] of dairy products[b] in sub-Saharan Africa by subregions and type of product in 1970 and 1980 (quantities in 1000 metric tons).*

Subregion/country grouping (No. of countries)/product	Total consumption		% Annual growth rate (1970–1980)
	1970	1980	
1. Eastern Africa (9):			
(i) Fresh/liquid milk	4,172.7	4,785.7	1.4
(ii) Dry milk	12.5	53.3	15.9
(iii) Evaporated & condensed milk	9.2	10.4	1.2
(iv) Cheese & curd	43.7	59.8	3.2
(v) Butter & ghee	30.4	34.0	1.1
2. Central Africa (8):			
(i) Fresh/liquid milk	253.7	305.3	1.9
(ii) Dry milk	7.3	26.0	13.5
(iii) Evaporated & condensed milk	8.2	17.8	8.1
(iv) Cheese & curd	20.2	4.4	– 14.1

(v) Butter & ghee	2.6	3.9	4.1
3. Western Africa (16):			
(i) Fresh/liquid milk	1,334.2	1,537.5	1.4
(ii) Dry milk	27. 6	105.1	14.3
(iii) Evaporated & condensed milk	82.2	238.9	11.3
(iv) Cheese &. curd	17.1	17.7	0.3
(v) Butter & ghee	24.5	41.4	5.4
4. Southern Africa (11):			
(i) Fresh/liquid milk	604.0	665.1	1.0
(ii) Dry milk	12.1	25.8	7.9
(iii) Evaporated & condensed milk	23.7	4.3	–15.7
(iv) Cheese & curd	9.0	8.0	–1.2
(v) Butter & ghee	7.9	10.2	2.6
** Sub-Saharan Africa (44):			
(i) Fresh/liquid milk	6,364.7	7,293.5	1.4
(ii) Dry milk	59.5	210.2	13.5
(iii) Evaporated &. condensed milk	123.3	270.3	8.2
(iv) Cheese & curd	90.0	90.0	0
(v) Butter & ghee	65.3	89.6	3.2

a. Derived as sum of production and imports less exports.
b. Excludes camel milk and milk products.
Source: Calculations by the author, based on statistics from *FAO Production Yearbooks* and *FAO Trade Yearbooks* (1973 and 1981), and which are presented as Appendix Table A.5.

2.44. The growth in total dry milk consumption reflects the massive imports of dry skim milk into sub-Saharan Africa which have been made during the 1970s in order to satisfy the growing demand for milk in the region. Such dry skim milk has normally been recombined with appropriate amounts of imported butteroil in order to produce liquid milk, primarily for the liquid milk urban markets. Hence the total consumption of butter and ghee (which includes the consumption of the imported butteroil) has also experienced significant growth during the 1970s for most subregions in the sub-Saharan Africa. However, total consumption of cheese and curd has been on the decline, with Eastern Africa being the only subregion where significant consumption growth occurred, and with close-to-zero growth rate in Western Africa and negative growth rates in Central and Southern Africa subregions. Consequently, cheese and curd consumption recorded an overall zero growth rate for the sub-Saharan Africa region during the 1970–1980 period.

2.45. Consumption is derived as the sum of production and net imports (where net imports simply refer to imports less exports) in a situation where there are no carry-over stocks (as is the case for sub-Saharan Africa as far as dairy products are concerned). Therefore, a discussion of

trends in consumption of dairy products in sub-Saharan Africa can be summarized by examining trends in production and net trade position, on a subregional and regional basis, both in total and per caput level basis. Table 14 gives the 1970 and 1980 human population data for sub-Saharan Africa and then presents the developments in both total and per caput dairy production, net trade (net imports in this case) and consumption by subregions during the 1970-1980 period.

2.46. The average per caput consumption of dairy products in whole milk equivalents (WME) in sub-Saharan Africa as a whole appears to have remained relatively stable (close to about 30 kg per head per annum) during the 1970s (Table 14). However, the data presented in Table 14 indicate that there have been variations and changes in the levels of per caput consumption of dairy products in different subregions during that period. Those changes were as follows:

i. 8.8% decrease for Eastern Africa;
ii. 11.6% decrease for Southern Africa;
iii. 13.1% increase for Central Africa: and
iv. 17.2% increase for Western Africa.

Table 14. *Human population and production, net imports and consumption[a] of all dairy products in whole milk equivalents (WME) for sub-Saharan Africa by subregions in 1970 and 1980 (mT = metric tons)*

Region/subregion parameters	Human population (1000 people)	Production		Net imports		Consumption	
		Total (1000 mT)	Per caput (kg)	Total (1000 mT)	Per caput (kg)	Total (1000 mT)	Per caput (kg)
1. Eastern Africa:							
1970	77,119	4,557.2	59.1	90.7	1.2	4,647.9	60.3
1980	102,745	5,202.3	50.6	449.0	4.4	5,651.3	55.0
2.Central Africa:							
1970	44,620	318.1	7.1	91.0	2.0	409.1	9.1
1980	57,230	318.8	5.6	261.9	4.6	580.7	10.2
3. Southern Africa:							
1970	33,149	664.5	20.0	165.1	5.0	829.6	25.0
1980	43,737	692.5	15.8	277.1	6.3	969.6	22.1
4. Western Africa:							
1970	107,847	1,541.1	14.3	400.5	3.7	1,941.6	18.0
1980	145,497	1,771.2	12.2	1,402.1	9.6	3,173.3	21.8
** Totals for sub-Saharan Africa:							
1970	262,735	7,080.9	27.0	747.4	2.8	7,828.3	29.8
1980	349,209	7,984.7	22.9	2,388.4	6.8	10,373.1	29.7

a. Consumption is derived as sum of production and net imports (where net imports = [imports - exports]).
b. Includes fresh milk, dry milk, evaporated and condensed milk, cheese and curd, and butter and ghee. All expressed in whole milk equivalents (WME). The figures are based on aggregates of cow, sheep and goat milk and milk products (i.e. camel milk and milk products are excluded).
c. Milk products were converted into WME using the following "average" conversion factors: 7.6 for dry milk, 2.0 for evaporated and condensed milk, 3.2 for cheese and curd, 7.3 for butter and ghee, and, of course, 1.0 for fresh milk. These "average" conversion factors were derived from the standard conversion factors which are presented in App. Table A.7 of this paper.
Source: Calculations by author, based on Statistical Data from *FAO Production and Trade Yearbooks*, 1973 and 1981. Also see the basic Statistical Data in Table 13 and Appendix Table A.5.

Table 14 further indicates that of the four subregions in sub-Saharan Africa; Eastern Africa has the highest per caput consumption of milk and milk products, followed by Southern Africa. The share of per caput net imports in per caput consumption is also lowest for Eastern Africa. Table 15 illustrates the developments in the share of per caput net imports in per caput consumption of dairy products in sub-Saharan Africa during 1970s.

Table 15. *Share of per caput net imports in per caput consumption of dairy products[a] in Sub-Saharan Africa by subregions, 1970 and 1980.*

Region/subregion		Per caput Net imports (kg)	Per caput Consumption (kg)	% Share of net Imports in consumption
1. Eastern Africa:	1970	1.2	60.3	2.0
	1980	4.4	55.0	8.0
2. Central Africa:	1970	2.0	9.1	22.0
	1980	4.6	10.2	45.1
3. Southern Africa:	1970	5.0	25.0	20.0
	1980	6.3	22.1	28.5
4. Western Africa:	1970	3.7	18.0	20.6
	1980	9.6	21.8	44.0
Averages for Sub-Saharan Africa:	1970	2.8	29.8	9
	1980	6.8	29.7	22.9

a. Aggregates of cow, sheep and goat milk and milk products in whole milk equivalents.

Source: As for Table 14.

2.46. Central Africa, which has the lowest level of per caput consumption of dairy products, has the highest share of net imports in consumption. Generally, all four subregions of sub-Saharan Africa have experienced increases in the share of net imports in consumption during the 1970s.

2.47. As suggested elsewhere, increased consumption of dairy products in sub-Saharan Africa is partly attributable to increased demand for these products due to rapid population growth. Table 16 indicates the rates of growth in human population and in both total and per caput production, net imports and consumption of dairy products (expressed in whole milk equivalents, WME) in sub-Saharan Africa during the 1970s.

Table 16. *Rates of growth in human population, and production, net imports and consumption of dairy products (in WME) in sub-Saharan Africa by subregions, 1970–1980.*

Region/subregion	Annual % rates of growth, 1970–1980						
	Human population	Production		Net imports		Consumption	
		Total	per caput	Total	per caput	Total	per caput
(No. of countries included)	(% p.a.)	(% p.a.)		(% p.a.)		(% p.a.)	
1. Eastern Africa (9)	2.9	1.3	–1.5	17.3	13.9	2.0	–0.9
2. Central Africa (8)	2.5	0.0	–2.3	11.1	8.7	3.0	–1.1
3. Southern Africa (11)	2.8	0.4	–2.3	5.3	2.3	1.6	–1.2
4. Western Africa (16)	3.0	1.4	–1.6	13.3	10.0	5.0	1.9
Averages for sub-Saharan Africa (44)	2.9	1.4	–1.6	12.3	9.3	2.9	0.0
Source: Calculations based on data in Table 14.							

2.48. The data presented in Table 16 indicate that population in sub-Saharan Africa grew at the rate of 2.9% p.a. during the 1970s, while total dairy production and consumption grew at the rates of 1.4% p.a. and 2.9% p.a. respectively. Hence per caput production declined while net imports (both total and per caput levels) increased throughout all four subregions of sub-Saharan Africa during the same period. Per caput consumption of dairy products generally declined in Eastern and Southern Africa and increased in Central and Western Africa during the same period. The overall per caput consumption level for dairy products in sub-Saharan Africa remained more or less constant during the 1970s.

2.49. Conceptually, one would expect that there will be some urban/rural differences in per caput consumption of imported dairy products, depending on the proportion of dairy imports which is destined for consumption in urban areas. Generally speaking, one can assume that the socio-economic and infrastructural factors in most countries in sub-Saharan Africa are such that most of the dairy imports are consumed within urban areas. However, urban population constitutes only a small proportion of the total population in most countries in sub-Saharan Africa. If one is interested in deriving the differences between urban and rural per caput-consumption of an imported commodity, both the proportion of the imported item that is retained

for consumption in urban areas and the proportion of the total population that lives in urban areas should be taken into account. The following general formula is applicable when deriving statistics to indicate rural/urban per caput consumption differences:

$$(1) \quad PCRC = \frac{[pc.M]}{[pr.N]}$$

and

$$(2) \quad PCUC = \frac{[(1-pc).\ M]}{[(1-pr).\ N]}$$

Where:

(i) PCRC and PCUC are the respective per caput rural and urban consumption levels;

(ii) pc = proportion of imported item that is destined for consumption in rural areas;

(iii) pr = proportion of the total population that lives in rural areas;

and

(iv) N and M are the total population and the total amount of the imported item respectively.

2.50. Recorded trade statistics normally relate to volumes and values of total imports and exports. Therefore, M has to be derived from such statistics when one wishes to apply the above formula. Little is known about the exact amounts or proportions of imported commodities in any country in sub-Saharan Africa that are consumed in urban areas. However, as a provisional working assumption, we guesstimate that 80% of such imported commodities will be consumed in urban areas, given the infrastructural and socio-economic conditions that prevail in most countries in the region. Therefore, a value of 0.20 for pc will be used in the calculations of urban and rural per caput consumption of imported dairy products in the region. Based on some statistics for 1980 on the degree of urbanisation (i.e. percentage of population that lives in urban areas in some individual countries of sub-Saharan Africa, one can deduce the following crude average figures for the degree of urbanisation in different subregions of sub-Saharan Africa (Table 17 (a)):

Table 17 (a). *Degree of urbanisation in different subregions of sub-Saharan Africa, 1980*

Subregion[a]	% of Population that is Urban (=(1-pr)in the formula presented above)
1.Eastern Africa	18
2.Central Africa	31
3.Southern Africa	20
4.Western Africa	24
**Average for sub-Saharan Africa	23

a. The percentage of population that is urban in the individual countries for which statistics are available can be found on pages 260 and 261 of the *World Development Report 1984.* Actual subregional averages for the degree of urbanisation are crude in the sense that they are not weighted to reflect populations in individual countries.

Source: Calculations by the author, based on the statistics quoted in a above.

Given the data which are presented in Table 17(a) the values of 0.82, 0.69, 0.80, 0.76, and 0.77 will be substituted for pr in the calculations of rural and urban per caput consumption of imported dairy products in Eastern, Central, Southern, Western, and sub-Saharan Africa respectively. Table 17(b) attempts to illustrate variations in the levels of per caput consumption of imported dairy products between rural and urban areas of different subregions in sub-Saharan Africa. The data presented in Table 17(b) suggest that Western Africa subregion had the highest levels of both rural and urban per caput consumption of imported dairy products during the 1980 period.

Table 17(b). *Guesstimated urban/rural differences in per caput consumption of net dairy imports[a] for sub-Saharan Africa by subregions during 1980 (consumption in kg per head of population)*

Region/subregion	Per caput consumption of net dairy imports[a]	
(Magnitudes pr, pc)	Urban	Rural
	1980	1980
	(kg)	(kg)
1. Eastern Africa (0.82, 0.20)	19.42	1.07
2. Central Africa (0.69, 0.20)	11.81	1.33
3. Southern Africa (0.80, 0.20)	25.34	1.58
4. Western Africa (0.76, 0.20)	32.12	2.54
** Average for sub-Saharan Africa (0.77, 0.20)	23.79	1.78

a. Aggregates of cow, sheep and goat milk and milk products, expressed in whole milk equivalents.
Source: Calculations based on data in Tables 14 and 17(a) and under the assumptions and procedures given in paragraph 2.50.

2.51. A comparison of the per caput consumption of net dairy imports by region and subregion as presented in Tables 14 and 17(b) suggests that there may be large variations in the levels of rural and urban per caput consumption of imported dairy products and that these levels may be quite different from the average national, subregional or regional per caput consumption of the imported dairy products. The data presented in Table 17(b) further suggest that the ratio of rural to urban per caput consumption of net dairy imports in sub-Saharan Africa is around 0.07, this result being an outcome of the assumptions made above.

2.52. Milk consumption appears to be characterized by a relatively low income elasticity of demand, which is positive in most developing countries but usually negative in developed countries. For developing countries, the values of income elasticity of demand appear to lie somewhere between zero and one, even though one may expect large variations between countries, depending on the differences in levels of disposable per caput income. The income elasticity of demand for milk in sub-Saharan Africa is estimated to be about 0.8, based on a 1975–2000 projection (see Table 18). The subregional variability of income elasticities of demand for milk typically ranges from 0.53 (for the Sahel group of countries in Western Africa) to 1.09 (for Central African countries). The breakdown of these variations is given in Table 18. The data presented in Table 18 indicate that income elasticities of demand for milk in most sub-Saharan African countries are positive and close to one. Therefore, one can expect effective demand for milk in the region to continue to increase as the individual countries in the region make progress toward higher levels of economic growth.

Table 18. *Variability in income elasticities of demand for milk in sub-Saharan Africa, by subregions and selected countries, based on projections for the 1975–2000 period.*

Region/country	Value (IED*)
Western Africa	
Sahel	0.53
Nigeria	1.20
Rest	1.23
Central Africa	1.09
Eastern Africa	0.90
Sudan	0.77
Southern Africa	0.95
Sub-Saharan Africa**	0.82

* IED = Income Elasticity of Demand for Milk.
** Based on estimates for Tropical African Countries (i.e. excludes the tiny Indian and Pacific Ocean islands).
Source: Adapted from Jahnke (1982), p. 4

2.53. The preceding analyses and review generally indicate that total consumption of dairy products in sub-Saharan Africa has been increasing over the last two decades, per caput consumption has been stable, and per caput production has been declining (Tables 14 and 16). When the amounts of milk and milk products were expressed in terms of whole milk equivalents (WME), it was observed that the overall rate of growth in the consumption of dairy products in sub-Saharan Africa has been of the order of 2.9% during the 1970s, while the corresponding overall rate of growth in the production of dairy products in the region has been of the order of about 1.4% p.a. during the same period (Table 16). This trend in the growth of the sub-Saharan Africa dairy industry may be expected to persist in the future, i.e. consumption will continue to grow much faster than production. Paulino and Yeung (1981) have estimated that the demand for dairy products by the year 2000 in sub-Saharan Africa would be about 8.3 million tons of whole milk equivalents and that this would exceed the projected level of regional dairy production in year 2000 by about 60%. This state of affairs is of immediate concern for development planning and related programmes.

Dairy development and internal dairy marketing structure: Policies, performance and options

Introduction and background

3.01. When evaluating internal dairy marketing systems, a marketing system may be described in terms of the major types of enterprises that are involved in marketing and the types of functions that these enterprises undertake. Such a description thus focuses on the marketing structure, i.e. an analysis of the network of the various competitive and complementary marketing channels between the producers and the consumers, and should include an account of the direction of product flows as well as the amounts of the product that flow in different marketing channels. The extent of government involvement in the marketing system very much determines the kinds of marketing structures that prevail in different countries. The available literature suggests that most countries in sub-Saharan Africa have dairy marketing systems that comprise both a government-controlled channel, which will be referred to as the formal marketing subsystem, and a non-government (i.e. private) marketing channel, which will be referred to as the informal marketing subsystem.

3.02. Few countries in sub-Saharan Africa appear to have well documented national dairy development and marketing policies, let alone an account of the national food policy. However, an indication of what these policies are can often be derived from the broad statements which one often finds in the national development plans and/or government sessional papers on development prospects and problems.

3.03. The term "policy" in general can mean almost anything, depending on the context. For analytical purposes, however, the term "policy" will be defined simply as a set of government decisions, often embodied in legislation, taken at a national level and which usually apply to a country as a whole rather than to one part of it.[10] Marketing policies will refer to any government decisions that affect one or more of the main marketing functions, where a marketing function is defined as any specialized activity that is undertaken to ensure that a particular product flows in an orderly manner from the initial point of production to the ultimate consumers. The main marketing functions are normally classified into three categories:

i. exchange functions, which are further subdivided into buying and selling functions. The buying function also includes product assembly, i.e. collection from producing sites;
ii. physical functions, which comprise transportation, processing and storage functions; and
iii. facilitating functions, comprising standardisation, financing, risk-bearing, market intelligence (information-gathering), and management (entrepreneurial) functions.

10. ILCA Livestock Policy Unit Programme Review and Protocols for 1984 (Addis Ababa, 1983).

Clearly, governments have a lot of scope to intervene in marketing, given the wide range of functions that are undertaken in marketing. Marketing policies do not only influence the

functions carried out but also the *performance* of the marketing system for a given product. The *performance* of a marketing system may be evaluated in terms of the extent to which the particular marketing system succeeds in achieving the goals set for it over a specified time period. In discussing marketing policies, it is helpful to distinguish between objectives and instruments in policies. The objectives are the "ends" or overall purposes which policy-makers seek, while the instruments are the particular "means" by which policy-makers try to achieve their objectives.

3.04. Given the problem of getting well documented national accounts of dairy development and marketing policies, this paper draws quite heavily on mission reports made by the ISCDD[11] of the FAO for a number of sub-Saharan African countries and on an interim report on FAO Expert Consultation on Agricultural Price Policies.[12] The review of such documents indicates that most governments of the countries in sub-Saharan Africa aim to promote local dairy production, even in those countries where the potential for local dairy development would appear to be relatively low, especially for market production (e.g., Mali and Botswana, where local conditions would tend to favour beef production under extensive grazing systems). In many countries, dairy development is geared toward achieving higher levels of self-sufficiency in dairy products in order to reduce or curb imports of dairy products. Imports of dairy products in many of sub-Saharan African countries constitute a large proportion of total food imports. Hence the dairy development policies in these countries would appear to be geared toward an eventual substitution of dairy imports. Sometimes, the instruments used to implement dairy development and marketing policies also aim to improve rural standards of living, since dairy production is also seen as a means to generate some income to smallholders, creating some employment in the rural sector, and provide highly nutritive diet ingredients.

11. International Scheme for Coordination of Dairy Development (ISCDD) Country Mission Reports (FAO, Rome, Various Countries and Years).

12. Held in Rome, Italy, between November 29 and December 2,1983, but final report not yet published.

3.05. Conflicts often arise between the food production and marketing policies of individual countries of sub-Saharan Africa. For instance, a food imports substitution policy often will not be compatible with a policy that aims at providing food to the urban population cheaply, yet most food and agricultural development policies in developing countries, especially in those of sub-Saharan Africa, are often geared toward ensuring provision of cheap food to urban - consumers. Policy conflicts usually arise out of the fact that promotion of local food production would require the governments to offer or create some producer incentives, usually by way of fixing remunerative producer prices in addition to pursuing marketing regulations that make it attractive for the producers to be market-oriented in their production decisions: yet the same governments wish to fix and maintain consumer prices for food at reasonably low levels, usually without state food consumption subsidies. In brief, food production and marketing policies in most sub-Saharan African countries are in direct contrast to those policies that are pursued in most developed countries, especially those in Western Europe and North America, where the main objective appears to be the stabilization and maintenance of producer incomes, usually through farm price-support programmes. In most African countries, the urban population often has more

contacts with government officials than does the rural population. Hence the urban consumers tend to have more lobbying power and can often influence the policy-makers to ensure that food is available at retail prices that most of them can afford.

3.06. Promotion of local food production through a pricing policy to create producer incentives while attempting to keep prices of food supplies to urban consumers low with no direct state subsidies is unrealistic. In essence, consumers must ultimately meet the full cost of the products that they aspire to consume, unless governments are in a position to support farm prices and/or subsidize consumption in order to keep retail food prices low. Many governments in developing countries find subsidies to agriculture too costly, and a number of them have formally declared their intentions not to subsidize agriculture. Such an intention is implicitly stated in Kenya's National Food Policy document (Sessional Paper No. 4 of 1981, Republic of Kenya), which implies that consumers must bear the cost of their food if production is to be maintained or even expanded. Hence a strategy of local dairy development through the creation of producer incentives by a pricing policy (price controls, both at farm and retail levels) in most countries of sub-Saharan Africa has as its major limitation the need to strike a balance between the levels of producer price and consumer (retail) price.

Some experiences of dairy development and marketing policies in sub-Saharan Africa

3.07. The objectives of dairy marketing policies in most sub-Saharan African countries are intrinsically linked to the objectives of the national dairy development policies. Regions and even individual countries will often differ substantially in terms of their production potential, and this factor may be associated primarily with differences in geo-climatic as well as bio-technical conditions as one moves from one region and country into another. Even though many countries in sub-Saharan Africa state that the major objective of their dairy development and marketing policies is to promote local dairy production, one may expect substantial variations in the types and precise effects of the policy instruments which different countries in the region have adopted and deployed in order to try and achieve the objective of promoting local dairying.

3.08. The livestock production sector in sub-Saharan Africa can be described under two subcomponents:

i. the traditional livestock production subsector; and
ii. the modern livestock production subsector.

The terms "traditional" and "modern" are used to denote whether production is mainly geared toward producing for family consumption (under the traditional production systems) or for the market (under the modern or commercial production systems). The traditional livestock production subsector in sub-Saharan Africa is dominated by indigenous livestock breeds, while the modern livestock production subsector has some improved (crossbred. or upgraded) as well as exotic livestock breeds.

3.09. Most of the output of dairy products in the traditional livestock production subsector in sub-Saharan Africa is, by definition, consumed within the producing households. The modern

dairying subsector, which produces mainly for the market, is relatively small in terms of its share in the estimated total regional output of dairy products. Generally, production and marketing of dairy products in the so-called modern subsector are organised more or less along the lines of commercial dairying in the advanced countries, and the terms "modern dairy marketing" and "traditional dairy marketing" in sub-Saharan Africa have often been used to describe dairy marketing activities in the modern and traditional livestock production subsectors in the region respectively. Since dairy production in the traditional livestock production subsector is primarily geared toward meeting basic family requirements of dairy products, only small and fluctuating amounts of surplus milk and milk products are usually available for marketing.

3.10. Dairy marketing in the traditional livestock production subsector often involves small-scale producers and some local traders (usually pedlars). However, dairy marketing in the modern subsector will usually involve the output of several producers, both small-scale and large-scale, as well as a number of marketing enterprises, ranging from small-scale individual traders or cooperative organizations to large-scale private and public organizations. Therefore, one can state that:

i. traditional dairy marketing will often be effected through direct sales by producers to consumers, or through the sales of consumers by small-scale local traders who procure their supplies directly from producers; and
ii. modern dairy marketing often attempts to integrate production and marketing activities by linking often distant rural production areas with the major urban consumer centres.

As a corollary to (ii) above, one can state that the modern dairy marketing system will often entail:

i. the collection of milk from distant rural production areas,
ii. the transportation of such milk to the dairy processing plants, which are often located in urban consumer centres, and
iii. the processing and distribution of milk and milk products to the ultimate consumers.

3.11. The so-called modern dairy marketing systems tend to favour commercial producers, even though producers from the traditional livestock production subsector with only small and often fluctuating surpluses for sale can use the modern systems as long as they can organize themselves to deliver their supplies at the receiving ends for those channels. Considering the small amounts involved, most producers in the traditional subsector often find it more convenient and rewarding to use the traditional marketing channel as their sales outlet, unless this channel can no longer handle their produce, or unless government regulations force them to use the official and often large-scale dairy marketing channels.

3.12. Many livestock specialists believe that management is a major constraint to dairy development under both traditional and modern production and marketing systems in sub-Saharan Africa. Production in the traditional subsector is based on extensive grazing systems, which generally exist under a communal land tenure system. The communal land tenure system has been favourable to transhumant pastoral livestock production systems in the past, but such systems are not conducive to modern dairy production in which improvement in milking herd

productivity is a major consideration. Improvements in milking herd productivity must entail investments in land improvements in order to raise fodder or feed production. Many traditional livestock production systems are seriously handicapped by feed shortage, yet communal grazing (under communal land tenure systems) only tends to worsen the feed supply problem.

3.13. Many livestock specialists also believe that increased milk production in sub-Saharan Africa can be achieved only through the introduction of improved livestock in the traditional livestock subsector. However, the role of good livestock husbandry in raising milk output even from traditional cattle herds cannot be overemphasized. Whatever livestock development strategy is to be pursued, such a strategy must be preceded or accompanied by the establishment of facilities or infrastructure that enhance good livestock management, particularly with regard to livestock nutrition and health. Further, it must be recognized that improvements in the production system must call for complementary improvements in the marketing system in order to ensure that there are sufficient outlets for the producers' milk (and other milk products). Official producer prices (subject to government control) must also be fixed at levels that ensure remunerative returns to producers. Therefore, government policies should not only focus on the installation of a modern marketing infrastructure (to ensure milk collection, processing and distribution), but such policies must also ensure the viability of investments in the dairy industry, through the adoption and use of the most effective policy instruments, given the objectives of the dairy development and marketing policies

3.14. There are substantial differences between sub-Saharan African countries in the objectives of their dairy marketing policies, policy instruments which they use, and the precise effects of these instruments on marketing systems. Such differences reflect the different political, economic, and social circumstances which these countries face as well as the idiosyncrasies of their policy makers. Nevertheless, while there are few generalisations about dairy policies which apply precisely and uniformly to all sub-Saharan African countries, useful lessons can be learnt from experiences in different countries. A review of the overall national dairy development policies for Kenya, Ethiopia, Burundi, Zambia and Nigeria suggests that the major objectives that are often associated with dairy marketing policies include the following:

i. To provide higher prices to producers;
ii. To provide more stable prices to producers;
iii. To secure reliable milk supplies for urban areas at reasonable prices;
iv. To reduce marketing costs;
v. To improve hygiene and quality of products;
vi. To ensure minimum nutrition levels to certain sectors of the population by ensuring that they get easy and cheap access to milk;
vii. To raise and channel investment funds into dairy production by using profits made from the resale of materials obtained as concessional imports or food aid, and
viii. To provide consumers with convenient services at prices they can afford (or are willing to pay)— an indicator of economic efficiency.

3.15. The major policy instruments which countries deploy in order to try and achieve their objectives of marketing policies include the following:

i. Setting up of monopoly/monopsony organizations, either private (e.g. cooperative) or parastatals, in order to:
    a. Secure economies of scale;
    b. Operate monopsonistic/monopolistic trading practices;
    c. Achieve improvements in hygiene/product quality by direct government action through its own controlled parastatal corporations;
ii. Licensing and inspection of competing traders to ensure achievement of minimum hygiene and quality standards — as stipulated in law (or rules and regulations that govern trade in dairy products);
iii. Subsidies to producers and/or consumers;
iv. Encouragement of competition by making access to information, skill and capital easier;
v. Provision of processing and storage facilities (e.g. for butter), constructed at government expense, to private traders at cost or at subsidized prices; and
vi. Use of milk-buying chains to distribute dairy production inputs, thus facilitating the dairy production process.

3.16. The preceding account of the objectives of dairy marketing policies and the policy instruments that have been used in order to try and achieve some of these objectives is in no way all-inclusive. The account is merely illustrative of the range of policy objectives and instruments which have commonly been associated with dairy marketing policies in a number of countries. One can expect that a given country will have to base its choice of the policy instruments to be used to achieve its objectives on local circumstances. Hence there may be no single policy instrument which will prove effective in promoting dairying under different sets of circumstances.

3.17. One of the major policy instruments which a large number of countries in sub-Saharan Africa have adopted as a means to try and achieve their dairy marketing objectives is the establishment of large-scale and often parastatal marketing enterprises, which, in turn, have usually been given both monopsonistic and monopolistic powers over both the domestic and external trade in dairy products. Even though some countries have used other policy instruments, ranging from the imposition of restrictive dairy trade practices to the manipulation of domestic prices for dairy products with a view to cushioning and encouraging local dairy development, it appears that the question of what types of marketing systems should be adopted to accompany different dairy development projects under different sets of circumstances deserves some special consideration.

3.18. Many dairy development projects in sub-Saharan Africa in the past have been launched prior to detailed evaluations of the types of marketing systems that would best handle the marketable surpluses of dairy products which would accrue to such projects, and the same trend appears to continue even now. Where such projects have been established, they have usually been accompanied by the establishment of government marketing organizations to collect, process and resell milk and milk products. In some cases, such governmental organizations have been given responsibility to handle the factors of production. Some of these organizations appear to have been relatively successful, but others have had serious problems. In some cases they have initially been established primarily to serve the interests of large-scale farmers and have only later been charged with serving small-scale farmers as well. Such government dairy marketing

organizations have tended to seek and have usually been granted monopolistic and monopsonistic powers which they have justified by reference to the interest of both consumers and producers. In a number of countries other *non*-government marketing systems exist; sometimes they occupy different sectors of the marketing chain to the governmental organizations; sometimes they operate in direct and often illegal competition with the government organizations in the same area, in the same section of the marketing chain and at the same time. Little is known of the costs and efficiency (including matters of hygiene, range of services offered, convenience etc.) of these private marketing systems relative to the ones owned by government. In some countries strong cooperative dairy marketing organizations also exist, and these may complement activities of the government marketing organizations or operate independently.

3.19. Relative efficiency of alternative dairy marketing systems can be examined and evaluated in terms of several criteria which include:

i. reliability and stability of the services offered to consumers;
ii. level of marketing costs;
iii. convenience and responsiveness to consumer demand;
iv. contribution to the improvement of the income of producers; and
v. contribution to the achievement of certain goals which may be prescribed for the marketing system over a specified time period.

The ability of marketing systems to provide both an attractive producer price and a reasonably low consumer price simultaneously may be said to be an important criterion in the evaluation of the relative efficiency of alternative marketing systems. However, other criteria are equally important. Even though many countries often have both small-scale and large-scale dairy marketing enterprises, be they private or parastatal, operating alongside each other, little is known about the merits and demerits of alternative dairy marketing channels in sub-Saharan Africa in terms of the criteria listed above. However, it appears that the governments tend to pursue policies that favour the large-scale enterprises, even though some evidence suggests that small-scale enterprises often incur lower marketing costs and are thus able to offer higher prices to producers. The large-scale and often state-owned marketing enterprises often face stiff competition from private traders or vendors when trying to secure raw milk supplies for processing in those areas or countries where private vendors are free to supply raw milk directly to urban consumers. For instance, Kakunze (1983) cites this as a major reason for the low levels of milk intake by the Bujumbura dairy plant in Burundi.

3.20. The establishment of large-scale dairy marketing enterprises with virtual monopsonistic and monopolistic powers over dairy marketing in many sub Saharan African countries has often been justified on the grounds that such marketing channels are relatively more efficient than alternative marketing channels, in spite of the lack of evidence to support that "justification". In fact, the outbidding of the modern large-scale dairy plants by private vendors when competing for raw milk supplies suggests that the setting-up of such large-scale marketing firms as a policy instrument designed to achieve economies of scale has not been effective in most cases. When faced by stiff competition for raw milk supplies from private vendors, the modern dairy plants have often resorted to government protection instead of making efforts to improve their

efficiency, lower their operating costs, and hence becoming more competitive with private vendors. Such marketing firms have often used the fact that they have to pay producer prices and operate on marketing margins fixed by the government as the excuse for their financial difficulties. To protect modern dairy plants, governments often find it easy to bare sales of raw milk in urban areas by private vendors (e.g. KCC and the urban markets in Kenya). Even though the marketing policy briefs in many countries recognize the need to have a competitive marketing system as the basis for enhancing or improving marketing efficiency, government often tend to pursue policies that favour and usually end up protecting a few marketing firms in the industry. The example given in the previous paragraph whereby governments protect high-cost dairy operations through the banning of the participation of petty traders and other private vendors in dairy marketing raises an important and fundamental issue regarding the appropriate policy options.

3.21. The issue is whether governments adequately monitor the effectiveness of their selected policy instruments in terms of their achieving the policy objectives they are meant to serve, or whether the survival and continuation of the chosen instrument sometimes become an end in itself. For instance, does the ban of raw milk sales by private traders really contribute to or hinder the intended promotion of domestic dairy production, and what other options are available? Should the private/traditional marketing channels be free to compete along with or complement the activities of the large-scale marketing enterprise, and if so, under what conditions? Even if the small-scale marketing channel is less costly in its operations and can pay more remunerative prices to producers, can the channel meet certain minimum product quality requirements? Clearly, there is no universal answer to these questions, since the answer will depend on situations in different countries. What appears to be clear is that an adoption of simpler and cheaper dairy processing, packaging and marketing methods could enable governments to fix more attractive milk producer prices while ensuring that the urban milk consumer prices are maintained at reasonable levels. The Indian dairy industry has achieved considerable success in this respect, primarily by integrating private milk vendors in the overall milk collection, processing and distribution system.

3.22. The preceding paragraphs have indicated that there has been quite a range in the types of policy instruments which many countries in sub-Saharan Africa have used in order to try and achieve the objectives of their dairy development and marketing policies. However, information on the effectiveness of these instruments on dairy development in different countries is relatively scanty, as will be discerned from the discussion which follows of experiences of dairy development and marketing policies in some selected individual countries in sub-Saharan Africa.

3.23. Pursuing a policy that aims at local dairy development is politically sound. However, circumstances may encourage individual countries to adopt policy instruments that encourage a deviation from the objectives of the original policies. Sub-Saharan Africa has become a vast food-deficit region during the last two decades; the availability of cheap food imports (i.e. food imports at concessional rates or prices) and food aid, for instance from the EEC, United States of America (under PL 480 Programme), and the World Food Programme (WFP), appears to have made food imports look an attractive option to the intensification of local food production, especially in the face of increasing domestic demand. This situation seems to have affected the dairy Industry in sub-Saharan Africa whereby the WFP and the EEC have made it particularly

easy for many countries to establish modern dairy processing facilities in major urban areas to recombine dried milk and butteroil. Such dairy recombining materials have often been imported by way of food aid (from the WFP) or as "imports at concessional rates" (from the EEC), and they have enabled the recipient countries to supply cheap fluid milk to the urban consumers. However, there are risks in establishing modern dairy plants in urban areas just because cheap imports of dried milk and butteroil (for recombination) can be secured to keep the plants operating. Modern dairy plants entail heavy investments, and they should be installed if there are good prospects of obtaining raw material for processing from local sources in the medium-term or long-term future, particularly because a steady flow of imported raw material cannot always be guaranteed, and failure to keep such dairy plants operating for any appreciable length of time is costly to the society. This kind of situation appears to have crippled the only dairy plant in Madagascar in the mid-1970s.

3.24. Basically, there is nothing wrong with taking advantage of cheap food imports, as long as this does not result in the overlooking of the need to promote local food production. However, recent tendencies for most countries in sub-Saharan Africa to depend heavily on cheap dairy imports could very easily lead to a situation whereby local dairy production and dairy marketing development projects to serve rural production areas are no longer given priority. One should note here, however, that the WFP food aid in dairy products (usually recombining materials) is usually geared toward the support of the recipient country's efforts in local dairy development. A number of countries appear to have failed to take advantage and utilize the WFP commodities to achieve that objective. Madagascar offers an example of a situation where the only dairy plant in the country's capital city had to close down following lack of raw material to keep the plant in operation after the imports of dairy recombining materials were no longer forthcoming. There is a need to identify what went wrong in such an instance and determine if some alternative policies could have led to success in the development of the local dairy industry.

A review of some experiences of dairy development and marketing in some selected countries in sub-Saharan Africa

3.25. Even though the effects of different policy instruments on dairy development and marketing in sub-Saharan Africa are likely to have differed between countries, there is still something to be learnt from the different experiences. This review gives the experience of Kenya as an example of a country in sub-Saharan Africa where dairy development and marketing policies appear to have had some success. The discussion of the Kenyan experience is also followed by a brief review of the state of dairy development and marketing systems in some other selected countries in sub-Saharan Africa.

A. Dairy development and marketing policies in Kenya

3.26. The development of the modern dairy industry in Kenya dates back to the late 1920s when the European settlers in the Kenya Highlands introduced exotic dairy cows into the country. The virtually monopsonistic and monopolistic dairy processing and marketing organization in Kenya, the Kenya Cooperative Creameries Limited (the KCC), was established in the late 1920s to serve the marketing interests of these early European commercial dairy farmers in Kenya. Legally, the dairy industry in Kenya is now regulated through the Dairy Industry Act of Kenya. Under this

Act, the Kenya Dairy Board (KDB) was set up "to organize, regulate, and develop efficient production, marketing, distribution and supply of dairy produce in Kenya, while taking into account the various types of dairy produce that are required by different classes of consumers" (Chapter 336, Laws of Kenya).

3.27. Kenya's latest dairy development and marketing policies are embedded in the Sessional Paper No. 4 of 1981 on Kenya's National Food Policy, whose broad objectives are: (i) to maintain a position of broad self-sufficiency in basic food stuffs; (ii) to ensure a reasonable degree of food security in all parts (regions) of the country; and (iii) to ensure that every citizen has a reasonable degree of access to a nutritionally balanced diet, through improvements in the marketing infrastructure and the distributive process, and through some social welfare programmes. These objectives apply to the general agricultural sector in the country, but the specific marketing policies are expected to be achieved through a combination of: (a) the promotion of increased rural production of milk, and (b) improvements in the dairy marketing system. With smallholder dairy farmers now being the main producers of milk (about 90% of total production) in Kenya, dairy development programmes aim to strengthen and maintain smallholder milk production through provision of AI (to improve animal productive capacity) and veterinary and extension services (to improve animal health and husbandry standards). Through a pricing policy, dairy producers are guaranteed a regular price review (once a year) to ensure that the prices they get for their dairy products reflect changing cost structures and that they remain remunerative enough to enhance increased dairy production. Consumer prices for milk and milk products are usually adjusted simultaneously to reflect changes in milk producer price, which ensures economic viability of the milk processing and marketing institutions. Failure to reconcile the two prices can have damaging effects. For instance, a 6-month delay in the adjustment of dairy produce consumer prices after the milk producer price had been increased at one time in the mid-1970s adversely affected the operations and profitability of KCC. The Government of Kenya also encourages the development of regional cooperative dairies, which are expected to enhance improvements in dairy marketing. Promotion of stall-feeding (zero-grazing) systems in high potential, high population density areas (where most of the Kenyan population is found) is also seen as a means of sustaining the growth in dairy production.

3.28. Kenya managed to maintain a position of broad self-sufficiency and also export some dairy products up to the late 1970s. In fact, the country was able to inaugurate a school milk feeding scheme (SMFS) for children in primary schools in 1979, primarily as a means to dispose of surplus stocks of dry milk which had accumulated during the last couple of years. However, like most other African countries, Kenya was hit hard by a spell of drought during the 1979/80 period and production of all major agricultural commodities declined substantially. Any carry-over stocks were depleted fairly rapidly by the end of the 1980. With shortages of basic foods, it became difficult to maintain the new school milk feeding programme, and local milk supplies had to be supplemented through imports of milk powder and butteroil, which were recombined and distributed as liquid milk. Towards the end of 1983, the nationwide dairy marketing institution in Kenya (KCC) claimed that Kenya was producing more raw milk than could be disposed of in the local market (personal communication, November 1983). However, the same dairy marketing corporation was quoted as stating that consumers would have to put up with reconstituted fluid milk, effective April 1984, until such time as raw milk supplies, which

became adversely affected by the bout of dry weather during the first third of 1984, would be forthcoming from the producers *(Kenya Times,* April 6, 1984).

3.29. The above account of the experience of Kenyan dairy development and marketing throws some light on how the vagaries of weather can get a market that was relatively stable out of balance. The extra demand for milk created through the SMFS in 1979 certainly aggravated the milk demand and supply situation in the face of milk shortages that were caused by drought conditions, but the question that faces planners relates to what should be done in order to cope with such unforeseen circumstances. This question touches on the issue of food security strategies which is beyond the scope of this review. However, Kenya was able to cope with the situation through emergency importation of dairy products (dry skim milk and butteroil), but can this always be a viable solution to such a situation? We leave the answer to this question to be sought through country-specific case studies, since the answer has to be based on dairy production potential and other socio-economic conditions in individual sub-Saharan African countries.

3.30 An argument has been advanced elsewhere in this paper that the extent of direct government involvement in the marketing of a given commodity will influence the types of marketing systems that prevail for that commodity in different countries. There are some other factors which are equally important in influencing marketing systems, and these other factors include the *location* and *volume* of *production* in relation to the *location* and *concentration* of consumer centres, and the *proportion* of total output that is actually marketed, including the extent to which international trade in the given commodity occurs in different countries. For instance, Kenya has a relatively better developed internal dairy marketing system to link rural production and urban consumer centres when compared with the system in Nigeria, primarily because:

i. the Kenyan dairy industry is tightly controlled by the government;
ii. about 40% of total dairy output in Kenya enters the formal marketing system, and only about 11% of total consumption of dairy products (in whole milk equivalents) in Kenya is derived from dairy imports; while
iii. well under 10% of total dairy output in Nigeria can be said to enter the formal marketing system, and about 66% of total consumption of dairy products (in whole milk equivalents) in Nigeria is derived from dairy imports, which cater primarily for urban dairy consumers.

The above estimates of the proportion of dairy imports in total dairy consumption are for the 1980/82 period (von Massow 1984 (a)).

B. Experiences on dairy development and marketing in some other countries of sub-Saharan Africa

(i) The case of Ethiopia in Eastern Africa

3.31. Using the terms "formal" and "informal" to describe "government-controlled" and "non-government controlled" (private) marketing systems respectively (as defined elsewhere), the dairy marketing system in Ethiopia can be classified in two subsystems:

i. a formal dairy marketing subsystem;
ii. an informal dairy marketing subsystem.

The formal dairy marketing subsystem caters primarily for commercial dairy producers (both small-scale and large-scale farmers), including the commercial dairy enterprises that are organized and operated through the Dairy Development Enterprise (DDE) of Ethiopia. The informal dairy marketing subsystem involves the marketing of milk and milk products (which may include butter and cottage cheese—called "Ayib" by Ethiopians) by smallholder producers, who may include pastoralists. Sales through the informal marketing subsystem may be effected through (i) inter-household sales, or farm-to-house arrangements, and (ii) trading at local centres in dairy products.

3.32. The farm-to-house arrangement for milk marketing usually involves a contractual type of arrangement in which individual producers may offer to deliver raw milk directly to the consumers at their homes or at some convenient location. This arrangement is especially common in the case of milk producers who are located in and around large cities, such as Addis Ababa. Rural areas which are distant to big cities have limited or little, if any, markets for liquid milk, and milk surplus in such areas will be converted into butter and/or ghee, and sometimes cheese, and sold in local markets. Such sales in local markets are usually made through established local traders, who may buy directly from producers at farm-gate. Prices of butter and ghee, and cheese, vary within and between places, usually depending on season. Hence prices tend to be highest during the dry seasons.

3.33. The DDE is involved in both the operation or management of the state-owned large-scale dairy farms and the collection, processing and distribution of milk in the country. Milk collection is accomplished through about 40 established collection centres, which typically have no milk cooling facilities, and which are located within about 150 km from Addis Ababa, but all are along the five main roads that lead to Addis Ababa. Milk suppliers to the DDE (and the share of respective suppliers in total deliveries) comprise state-owned large-scale farms (48%), medium and large-scale private farms (15%), and smallholders (34%).

3.34. A 1981 ISCDD[13] Mission Report cites the main dairy development and marketing policies for Ethiopia as:

i. provision of technical assistance to the farmers' cooperatives and/or individual peasant farmers, aimed at increasing their milk production substantially;
ii. construction of milk processing units around larger towns which would function as ready buyers of the increased supply of milk production;
iii. paving the way for processing methods for milk which would best fit the established rural organization;
iv. creation of an outlet for the surplus milk produced by livestock owners far from the centres of consumption;
v. improvement of the hygiene standards of rural milk products; and
vi. establishment of large-scale state dairy farms so that at least the most urgent demand for hygienic, fresh milk in larger towns can be satisfied.

13.The FAO International Scheme for Coordination of Dairy Development Mission Report on Ethiopia, March 1981, p. 41.

3.35. As observed in the ISCDD Mission Report, milk produced by farmers close to urban centres, such as Addis Ababa, Asmara and Asella, where the DDE operates, commands a fairly reliable market, but such conditions do not generally exist for milk produced in the interior of the country. The general practice by the DDE is to collect fresh milk from collection centres, and from large-scale state and individual farms and to transport that milk for processing at its dairy plants before distribution. The only exception is the Asmara (ECCE) dairy plant, where the producers deliver milk directly to the factory. Generally, the dairy plants in Ethiopia receive uncooled milk, because cooling facilities do not exist at the collection centres and farms, a factor that is associated with a certain degree of wastage before processing. Generally, the main objective of dairy development and marketing policies in Ethiopia is to ensure that the development of regional dairy production is planned in such a way that any surpluses of dairy products over the needs of the local market can be channelled through to an ultimate market. Such an ultimate market is to be provided for primarily in the form of creating adequate manufacturing facilities, which are now managed by the DDE.

3.36. The DDE has dairy processing facilities at Addis Ababa and Asmara. The Addis Ababa dairy plant has a total processing capacity of 60,000 litres of milk per day; the facility can recombine milk powder and butteroil. The Asmara dairy processing facilities are within two units: the Asmara Milk Plant, which has a capacity to process 7000 litres of pasteurized milk per day, and, the Asmara Meat and Dairy Products Factory, which can process between 1500 and 2000 litres of raw milk per day into butter and cheese. The DDE also operates a small-scale dairy processing unit at Assela in the Arsi Rural Development Unit's farm. This facility can process up to 1000 litres of pasteurized milk per day. The DDE milk processing operations involve standardisation of liquid milk to 2.7%–3.0% butterfat content before this milk is pasteurized and distributed as fresh milk. The butterfat recovered in the process is used in the production of butter. The DDE's pasteurized milk officially sells at prices much lower than those for the raw liquid milk that is sold through the farm-to-house delivery system, yet many observers believe that the raw liquid milk is of questionable quality and is often contaminated and/or adulterated. Nevertheless, it is estimated that between 10,000 and 15,000 litres of raw liquid milk are sold in Addis Ababa through the farm-to-house milk delivery system every day. There is no doubt that the DDE is trying to implement the policies spelt out for the Ethiopian dairy industry under paragraph 3.23 of. this paper, through its dairy development and marketing activities as briefly highlighted in paragraphs 3.25 and 3.27 above. However, Ethiopia still has a long way to go before fully realizing its objectives of the dairy development and marketing policies. The estimated total milk production in Ethiopia is about 650,000 metric tons per annum. The liquid milk market is believed to account for only about 10% of the total milk production. This market for liquid milk is located mainly in provincial towns and metropolitan areas (Addis Ababa and Asmara). The 1978 population census in Ethiopia indicated that only about 1396 of Ethiopia's population is urban, i.e. living in towns having populations of at least 2000). Further, Addis Ababa accounts for 4% of the total population, so that only 9% of the Ethiopian urban population lives in urban areas other than Addis Ababa. Despite the small proportion of the population that is urban, demand for liquid milk will often tend to be higher in urban areas than in the country as a whole, mainly as a result of the large concentration of such institutions as schools, colleges,

hospitals, military establishments and industries or factories in such areas. Hence urban areas often tend to be under-supplied with fresh milk. However, per caput consumption of liquid milk in Ethiopia, which is estimated to be about 19 kg of milk per head per annum by the International Dairy Federation (IDF), is believed to be the highest in Africa.

3.37. With only about 10% of total milk production going into liquid milk sales, the market for non-liquid milk products in Ethiopia must constitute an important outlet for dairy produce, which is sold as butter, ghee or cheese. The market for such milk products is particularly important in the rural or traditional markets, where the sale of liquid milk is almost negligible. Conversion of milk into butter, ghee and/or cheese increases the product's shelf life and thus facilitates marketing especially in rural areas. Transformation of butter into seasoned butteroil, which is a preferred ingredient in the preparation of "wott", the traditional meat and vegetable stew is another significant milk processing technology in Ethiopia. Butter also tends to be used as a hair cosmetic in some sections of the Ethiopian community. Ayib, which is an Ethiopian type of cottage cheese, also constitutes an important diet ingredient for Ethiopians. Generally, Ayib is prepared by heating buttermilk (a byproduct in butter manufacturing) in order to coagulate the curd, and is similar to but more grainy than the conventional cottage cheese; it has a short shelf life due to its high acidity. Therefore, consumption of Ayib tends to be highly localized (in production areas). Except for small amounts of Gouda and Edam cheese that are produced in Addis Ababa and Asmara mainly for hotels and supermarkets, hard cheese is not manufactured in Ethiopia.

3.38. The preceding discussions indicate that Ethiopia has a relatively complex system of dairy processing and marketing in the sense that the modern (fairy processing facilities, which cater for the formal marketing subsystem, only handle a relatively small amount of marketed production of milk products. As such, the system involves quite a number of market intermediaries, both private traders and the official DDE system. However, little is known about the relative marketing efficiency and performance of the informal and the formal (urban DDE-dominated) dairy marketing subsystems in Ethiopia. Nevertheless, it is evident that the structure of dairy marketing in Ethiopia will vary according to whether one is looking at rural, provincial or metropolitan markets.

(ii) The case of Burundi in Central Africa

3.39. Burundi typifies a relatively underdeveloped dairy marketing system in the Central African subregion. However, Burundi has a high potential for dairy development, and some efforts have been and are being made to improve the marketing infrastructure in order to tap as much milk as possible from the rural areas for the supply of liquid milk to urban areas, where demand for liquid milk is growing rapidly. Production of milk in Burundi is primarily based on traditional livestock farming systems which involve extensive grazing systems on communal lands. However, Burundi is making efforts to modernize the dairy industry and some improved (exotic) dairy cattle breeds have been introduced in the country, primarily in the large state farms at Kiryama in Bututsi-land and at Gifurwe in Imbo-land, which have Friesian dairy cattle. Some small traditional farms also keep some exotic cattle dairy breeds, primarily the Jersey dairy breed.

3.40. An assessment of the development of the dairy industry in Burundi by FAO (1980) suggests that the dairy development and marketing policies for Burundi can be summarized as:

i. to gradually transform the traditional extensive cattle raising husbandry which would satisfy the basic livestock production requirements of the population;
ii. to improve the procurement and marketing of dairy products by providing the population in urban areas, especially that of the capital city of Bujumbura, with wholesome, hygienic milk products of controlled quality; and
iii. to supply milk to vulnerable groups at subsidized prices.

Therefore, promotion of local milk production and the improvement of cattle (through artificial insemination) are seen as major dairy development programmes, which are to be supported through activities to improve the collection and marketing of milk, particularly in the rural areas.[14]

14. FAO/WFP I*nterim Evaluation Summary Report on Dairy Development in Burundi* (Rome, October 1980).

3.41. Reliable data on milk availability in Burundi are difficult to establish because most of the milk which is produced in the country is consumed directly by the producing households, and the little surplus that there may be is sold through a rural inter-household marketing system whose operations and performance are difficult to evaluate. However, there are two large dairies in Burundi whose capacities and milk intakes can give an idea of the amount of milk that enters the formal (modern) milk marketing system in Burundi. The two dairies are:

i. the cheese processing plant at Kiryama; and
ii. the Central Milk Processing Plant at Bujumbura.

The Kiryama dairy plant has an annual processing capacity of 120,000 kg of milk, while the Central Dairy Plant at Bujumbura has an annual processing capacity of 1.6 million kg of milk.

3.42. Demand for liquid milk is relatively high in urban areas in Burundi, especially in the city of Bujumbura, where supplies of liquid milk can hardly keep up with demand, particularly during the dry season. The city of Bujumbura, which has a population of about 150,000 people, is estimated to have a per caput milk consumption of 0.07 litres per day (1983 estimate by Kakunze—see the list of selected references). This consumption estimate for 1983 does not appear to differ substantially from the 1980 FAO estimate, which placed the potential total demand for milk in Bujumbura at 10,000 litres per day in 1980. FAO emphasizes the deteriorating milk production situation in Burundi in 1980 by stating that while demand has constantly increased, the production of fresh milk has progressively decreased. This statement is supported by the observation that about 10,000 litres of milk a day were available in 1970 within a radius of 70 km of Bujumbura, but that the quantity available in 1980 was estimated to be in the order of about 6000 litres of milk a day.

3.43. Marketing of milk in Burundi involves both a formal (official channel) and an informal (private channel) marketing subsystem. The dairy processing plants represent the formal

marketing subsystem. Both the private vendors and the dairy plants are involved in milk collection and distribution to ultimate consumers. As noted earlier on, there are only two dairy processing plants in Burundi (1983 situation).

3.44. The Kiryama dairy plant gets its milk supplies primarily from the Kiryama state-owned farms in Bututsi-land, while the Bujumbura dairy plant primarily relies on the Gifurwe state-owned farms in Imbo-land. However, the Bujumbura dairy plant also receives between 1000 and 1500 litres of raw milk per day from some farmers from neighbouring Zaire. The Central Dairy Plant at Bujumbura operates some organised milk collection and distribution routes. However, the plant faces stiff competition from private traders or hawkers, especially in the Ruzizi plain, and this factor often forces the Bujumbura dairy plant to seek out milk from the more remote areas of the flatland. This plant normally uses bicycles and lorries (especially when wet) to collect and distribute milk.

3.45. Table 19 gives an idea of the performance of the Bujumbura dairy plant in terms of milk intake during the 1978–1982 period.

Table 19. *Milk intake by the Central Dairy Plant at Bujumbura, 1978–1982*

Rated plant capacity:	(1)1.6 million kg* of milk per year				
	(ii)About 4384 kg of milk per day				
Year	1978	1979	1980	1981	1982
Intake: (i) Annual	632,028	631,485	681,945	585,081	671,445
(litres) (ii) Daily	1 732	1730	1 868	1 603	1 840

*A litre of standard fresh milk weighs nearly one kilogram, so that capacity in kg or litres poses no problem for comparison purposes.
Source: Adapted from Kakunze (1983).

The milk intake figures presented in Table 19 clearly indicate that the Bujumbura milk plant has been operating below capacity most of the time during the 5-year period. This factor may be attributable to two major factors: (i) lack of sufficient production to supply the plant; and (ii) the inability of the dairy plant to compete with local traders or hawkers within the periphery of Bujumbura because the private traders or hawkers can offer more competitive prices to producers in the neighbourhood of Bujumbura city.

3.46. The Bujumbura plant has to buy milk from producers at a price fixed and controlled by the Government, whereas private traders (vendors) vary their prices according to supply and demand. Hence these vendors will often outbid the dairy plant for milk supplies. By law, the Bujumbura dairy plant has to operate on a fixed margin of 18%, but Kakunze (1983) observes that private vendors' marketing margins may vary from 27% up to 42%. The official milk producer price in Burundi used to be FBu[15] 25 per litre before July 1982, and Kakunze (1983) blames the low producer price levels as the main cause of the low milk intakes by the Central Dairy Plant before 1982 (see Table 19). Milk intake by the plant improved substantially after the milk producer price was raised from FBu 25 to FBu 45 per litre. The level of the new producer

price is said to have been so attractive that it immediately led to more raw milk supplies, even from the neighbouring dairy farmers in the Republic of Zaire.

15. FBu refers to Burundi francs, the currency of Burundi.

3.47. With the demand for liquid milk in Burundi outstripping local milk supplies, Burundi has been importing some dry milk, butteroil, butter and cheese, mainly from Kenya and the EEC, in order to try and meet local demand for milk and milk products. The dry milk and butteroil have normally been recombined and sold as liquid milk by the Bujumbura dairy plant. Table 20 illustrates the development of the imports of different dairy products into Burundi during the 1977–1980 period and indicates that the value of dairy imports by Burundi almost doubled during the 4-year period. The table also indicates that the imports of dry milk (and butteroil for recombination) have constituted the bulk of the dairy imports, implying that there is a fast market for liquid milk in the country which cannot be satisfied from local production. A comparison of annual milk intake by the Bujumbura dairy plant (Table 19) and the annual volume of dairy imports into Burundi (in whole milk equivalents, DIWME; Table 20), most of which are no doubt consumed in the major towns, especially in Bujumbura, clearly indicates the high degree of dependence of Burundi on dairy imports in as far as the consumption of dairy products that are procured through the marketing system is concerned.

3.48. Even though not much information is available about the product flows and market shares of the different marketing channels (marketing intermediaries), it is apparent that Burundi has a largely rural dairy marketing system, with the formal marketing subsystem that serves primarily urban areas handling only a small proportion of total milk production in the country. The rural inter-household marketing arrangements appear to be relatively important in Burundi, but there are no data to support this proposition. Peri-urban to urban product (milk) flows through private traders/hawkers are an important means of getting raw liquid milk to urban consumers. Only the Central Dairy Plant at Bujumbura and the Cheese Plant at Kiryama appear to be involved in processing and distribution of milk and milk products. Little information is available on the forms in which milk in the rural traditional areas of Burundi is utilized (i.e. whether as fresh, sour, or processed milk products).

Table 20. *Dairy imports by Burundi, 1977–1980*

Year	Product type	Quantity (kg)	c.i.f. Value (FBu* 1,000)
1977	Whole milk powder	367,332	59,260
	Skimmed milk powder	15,745	1,737
	Fresh butter	41,902	7,533
	Butteroil	2,507	350
	Cheese	44,356	18,411
Total	DIWME**	3,603,161	87,291
1978	Whole milk powder	465,033	66,589
	Skimmed milk powder	30,609	1,634

	Fresh butter	63,300	7,494
	Butteroil	971	202
	Cheese	36,881	11,000
Total	DIWME**	5,354,704	86,919
1979	Whole milk powder	1,187,511	132,428
	Skimmed milk powder	50,840	4,525
	Fresh butter	51,067	12,461
	Butteroil	5,443	752
	Cheese	349,259	77,096
Total	DIWME**	11,328,793	227,262
1980	Whole milk powder	664,205	124,964
	Skimmed milk powder	10,931	1,491
	Fresh butter	38,400	18,126
	Butteroil	49,135	5,994
	Cheese	21,136	13,938
Total	DIWME**	5,870,552	164,513

Note: *FBu refers to Burundi francs.
** DIWME refers to the Gross Amount of Dairy Imports in Whole Milk Equivalents (calculation by author).
Source: Kakunze (1983).

(iii) The case of Zambia in southern Africa

3.49. The development of the dairy industry in Zambia reflects the trends of events in the country prior to independence. The dairy industry exhibits a dichotomous structure of a traditional sector and a modern sector. The modern dairy sector is still largely owned by European farmers, who own large farms through written tenure, while the traditional dairy sector consists of small-scale family farm units, which are. owned through customary tenure arrangements. It was originally envisaged that the railway line in Zambia would serve the farming areas occupied by European settlers during the pre-independence era. Consequently, the modern dairy sector has developed "along the railway line", while the traditional dairy sector has developed "off the railway line".

3.50. Commercial dairying in Zambia dates back to the 1920s, when the European settlers in the country introduced exotic dairy breeds. These early dairy farmers continued to contribute to the steady bulk of marketed milk production until 1964 when Zambia became politically independent. Since 1964, many of the European commercial dairy producers have either left the country or stopped milk production, a situation which has resulted in a steady decline in the supply of marketed milk in the country. In illustration, we note that marketed milk fell from 16 million litres in 1964 to about 10.5 million litres in 1974. Realizing the declining trends in local production of milk for the market, the Government of Zambia began establishing dairy farms in

the late 1960s, but it appears that these farms have not performed as well as they were expected to.

3.51. Generally, dairy production in Zambia is relatively small in relation to the large domestic market for dairy products. The country was estimated to have about 600,000 small-scale milk producers (traditional dairy subsector) and about 100 large-scale commercial producers (modern dairy subsector) in 1982. The 600,000 small-scale producers basically provide for on-farm milk consumption by their households, and the estimated milk production from this subsector in 1982 was 28 million litres of milk. The 100 commercial large-scale dairy farms, including 11 state farms that are operated by the Zambia Agricultural Development Limited (ZADL), were estimated to have produced about 10.5 million litres of milk during the same period.[16] Generally, marketed milk production is estimated to satisfy only about 30% of the domestic demand for liquid milk, as determined by demand in the formal (official) marketing subsystem, so that 70% of that demand has to be met through sales of recombined and/or reconstituted liquid milk from imported dry milk and butteroil. Generally, milk production from the traditional subsector is estimated to be twice the volume or the quantity of the milk produced in the modern (commercial) subsector, but little of that milk is marketed (Kaluba 1983).

16. All these estimates are as reported in the FAO/ISCDD Draft Report on Mission to Zambia, June 1982 (FAO, Rome, June 1982).

3.52. Dairy development and marketing policies in Zambia aim to establish a sound basis on which the dairy industry can develop and expand in order to meet the ever-growing demand for dairy products in the country. The Government of Zambia recognizes the need to encourage milk production in places adjacent to the centres of demand, with a scheme that involves African farmers to the maximum. Since most African farmers are small-scale producers, promotion of increased domestic dairy production is not only seen as a means for improving farm incomes and substitution of imports, but also as a means to improve the nutrition of the people of Zambia. Within the overall national dairy development framework, a high priority is accorded to the development of marketed milk production in the traditional subsector[17]. By June 1982, the Government of Zambia had already formulated a major programme for rural milk production and collection in an effort to implement the dairy production development and marketing policies.

17. Dairy Development Plan, as spelt out in the Third National Development Plan (Zambia), 1979-83, as summarized in ISCDD (FAO) Mission Draft Report, 1982.

3.53. The Dairy Produce Board (DPB) of Zambia is the statutory agency that executes the marketing policies in the country. The DPB was formally established in 1964 with the power to control the buying, manufacturing, importation and marketing of dairy products in Zambia. This statutory agency affects dairy marketing in Zambia through the operation of a number of milk depots at the main urban centres in the country, which are located "along the railway line", where the commercial dairy producers bring their milk for sale. The only exception to this formal marketing arrangement are the milk sales which are made by (i) individual producers (primarily in the traditional cattle areas); (ii) cooperative organizations (notably the Zambezi Cooperative Dairy in Livingstone, which was estimated to handle about 1 million litres of milk in 1981 when the DPB handled about 12.1 million litres of milk from local production); and (III) state dairy

farms that are located in areas "off the railway line". For the state dairy farms that are located "off the railway line", their milk sales are made through established retail shops. Kaluba (1983) reports that there are some individual producers in Zambia who operate milk delivery services, by either hawking milk around the villages adjacent to production areas or trekking for several kilometers on foot or on bicycle to seek out buyers for their milk.

3.54. Commercial dairy producers are estimated to provide about 66% of the fresh milk intake by the DPB. For instance, such farms delivered 8 million litres of fresh milk to the DPB in 1981, when the total intake of fresh milk by DPB was about 12.1 million litres. The rest of the fresh milk intake by the DPB is from the 11 state dairy farms.

3.55. Commercial dairy farmers in Zambia appear to be very sensitive to the level of milk producer price. For instance, the daily intake of fresh milk by the DPB increased from an average of 17,000 litres in 1980 to about 30,000 litres in 1982 following substantial increases in the milk producer price (FAO, 1982). The substantial increase in daily milk deliveries to the DPB are believed to have resulted from the decision by individual commercial dairy producers to supply less and less milk to the informal dairy marketing subsystem as the price obtainable from the formal (official) dairy marketing subsystem became more and more remunerative.

3.56. With the domestic production of dairy products being far below the levels needed to satisfy domestic market demand for liquid milk, Zambia has had to depend on imports of dairy products to bridge that gap. The main dairy imports have been by way of food aid from the EEC in recent times. The EEC has been donating dry skim milk and butteroil to the Government of Zambia, which, in turn, has sold such dairy recombining material to the DPB in order to generate funds for further local dairy development. Generally, products made from recombined liquid milk have been sold at prices much lower than those for products made from locally produced fresh milk. There have been large fluctuations in the volume of sales of recombined liquid milk in Zambia since 1974. For instance, the recorded sales of recombined liquid milk (by DPB) were 20 million litres in 1974, 30 million litres in 1976, 11.2 million litres in 1980, 8.9 million litres in 1981, and an estimated 14 million litres in 1982. The major problem in maintaining sales of recombined liquid milk is not the lack of recombining material, but is associated with the fact that Zambia has not been in a position in recent years to raise enough foreign exchange to purchase sufficient packaging material for the final products. The donated (food aid) dairy recombining material from the EEC has to be packaged (after recombination) in imported material (tetrapak paper).

3.57. The foregoing account of dairy marketing in Zambia suggests that the marketing structures in Zambia are fairly similar to those characterizing the dairy industry in Burundi. However, there is some evidence that any surplus milk from the traditional sector in Zambia will often be sold as sour milk, which does not appear to be the case in Burundi. For instance, a class of dairy market intermediaries who specialize in buying milk, mostly sour, from the cattle owners far away from markets in Mougu area and selling it in the settlement areas along the Zambezi plains is said to have sprung up in recent years (Kaluba 1983). The sales of fresh milk in the traditional sector are often made using ¾ - litre bottles, but sometimes it is sold in 2½ - litre containers, while sour milk is sold in ¼ to ½ -litre cups. Government offices, schools, hospitals and rural trading centres or stores constitute the main market outlets for milk from the traditional cattle sector. The

prices obtained in the traditional dairy sector, therefore, tend to decline with increasing distance from the location of these market outlets. Like Burundi, Zambia does not produce enough dairy products to meet domestic demand. Consequently, the volume of imports of dairy products into Zambia has continued to grow during the last two decades. The major items constituting these dairy imports are dry milk and butteroil for recombination into liquid milk.

3.58. The decline in commercial milk production in Zambia since 1964 is, to some extent, associated with the mass exodus of European settlers from the country after political independence. However, there is evidence too that the decline in production is associated with the declining competitiveness of dairying as an enterprise vis-a-vis alternative farm enterprises. The pricing system for dairy produce is said to have been relatively unresponsive to changing cost - price relationships in the dairy industry. For instance, FAO (1982) observes that milk producer prices in Zambia were not reviewed frequently prior to 1981, and that price increases did not cover the increased cost of production. The dramatic increase in the daily intake of fresh milk by DPB from 17,000 litres in 1980 to 30,000 litres following a substantial producer price increase in January 1982 is perhaps a good evidence for the preceding observation. In 1980 the milk producer price was K 0.25[18] per litre, and in January 1982 it was fixed at K 0.43 per litre.

18. K stands for Kwacha, the Zambian national currency, which exchanged at about K 0.9 per 1 US dollar in 1982.

(iv) The case of Nigeria in Western Africa

3.59. Like Ethiopia, Nigeria has a relatively large and important traditional livestock sector which accounts for the major part of local milk production in the country. Local milk production in Nigeria is from indigenous cattle breeds, which are kept primarily by the transhumant pastoralist tribesmen. The transhumance element in traditional pastoralist livestock production systems is a feature that is common to all extensive grazing systems. The main emphasis in all traditional or pastoralist production systems seems to be milk production for family consumption, and the management system appears to be intended to ensure a year-round supply of milk from the herd. Unfortunately, not much literature is available on the livestock production and dairy marketing in Nigeria, so that only a synoptic view of the situation that existed during the 1970s is presented in this review.

3.60. According to an official report[19], 97% of the national herd of cattle in Nigeria comprises the indigenous cattle breeds, and the average milk production per cow is only about 0.74 litres per day, ranging from 1.27 litres of milk per cow per day during the wet season to 0.36 litres of milk per cow per day during the dry season. Milk production under modern intensive and semi-intensive systems in Nigeria contributes only about 3% of the national output of milk and is confined almost entirely to government and other institutional experimental farms. Nigeria is estimated to have been producing only about 50% of its total domestic requirements for dairy products by the mid-1970s, and the country has continued to be the largest importer of dairy products in Western Africa during the last two decades.

19. The Federal Ministry of Agriculture (FMOA) and the Green Revolution National Committee (GRNC) *Livestock Production Plan for Nigeria*, 1981—hereafter referred to as FMOA/GRNC, 1981.

3.61. The major traditional cattle producers are the Fulani tribesmen. Traditionally, the Fulani women decide how much milk goes to family consumption and how much is sold. Increasing opportunities for the Fulani people to make contacts with the modern or formal sector in urban areas have increased the propensity of the Fulani to purchase consumer goods from such areas. This factor appears to be changing the traditional pattern whereby most milk was retained for family consumption towards the present situation whereby the Fulani women sell a greater proportion of their daily milk allotments from their husbands. Traditionally, men do the milking, after which they apportion and distribute the milk amongst their wives[20]. Generally, women with younger children appear to retain a larger proportion of milk for the family than that retained by women with comparable numbers of older children.

20. Waters-Bayer, A. (1983). "Small-scale Dairy Production Among the Fulani Pastoralists in Nigeria." ILCA Internal Communication (ILCA Subhumid Programme, Kaduna Nigeria).

3.62. The intensive and semi-intensive livestock production systems which constitute what might be called the modern dairy sector in Nigeria, even though this is very small in terms of its contribution (3%) to total national milk output, commenced with the establishment of a number of government Livestock Improvement and Breeding Centres (LBC) in different parts of the country during the late 1940s and early 1950s. The trend continued into the 1960s and started to attract a number of farmers in the private sector, who now engage in some mixed farming enterprises, either as individuals or in group cooperatives. Though cattle production in the mixed farms was initially influenced by the Fulani systems, the mixed-farm systems have an element of specialization (either into beef or into milk production)—see FMOA/GRNC Report (1981).

3.63. Farms in the modern dairy sector are stocked primarily with imported (exotic) breeds of cattle, mainly Friesian/Holstein, Jersey and Brown Swiss breeds. Some farms maintain purebred herds, while crossbreeding to improve milk production from the indigenous zebu cows has been attempted in some of the experimental farms, such as Vom, Shika, Agege and the University of Ibadan farm. Improvements (crossbreeding) have been effected through exotic bulls and artificial insemination (Al), though the results are not impressive yet. The cattle in the modern sector are maintained on cultivated pastures, with supplementary feeding with concentrates. The average herd size in this sector varies from 30 to 50 head of cattle in the experimental farms, and from 50 to 200 head of cattle in the urban dairy farms that are operated by the various State Ministries of Agriculture. The cattle in the modern sector are usually housed, and standard milk recording is practised in most farms. Milking is by hand or machines, and the farms have modern dairy processing facilities (FMOA/GRNC 1981).

3.64. FAO (1975) cites the following as the major factors that limit dairy development in Nigeria:[21]

i. nomadic way of cattle production;
ii. unfinished land reform;

iii. seasonal deficit of feed and overstocking of grazing land;
iv. low genetic potential for milk production from local cattle;
v. cattle diseases, such as trypanosomiasis and streptothricosis, as well as infertility problems;
vi. inefficient extension work in dairying and animal husbandry;
vii. inadequate marketing organization for milk and milk products;
viii. seasonal shortages and high prices for milk and milk products, which restrict expansion of consumption;
ix. shortage of trained staff;
x. lack of coordination and effective organization of dairy industry;
xi. lack of legislation, standards and control of milk and milk products; and
xii. negative attitude toward dairying among some authorities.

21. FAO/ISCDD *Country Mission Report on Nigeria* (Rome, September, 1975), page 50.

3.65. Whereas not all of the above factors are mutually exclusive (for instance points (vi), (vii) and (x) are clearly interrelated), these factors have been cited by FAO and other dairy specialists as being the major ones limiting dairying in a number of other countries in sub-Saharan Africa, for instance in Ethiopia. Since 1975, Nigeria appears to have made some steady progress toward overcoming some of these bottlenecks to dairy development (FMOA/GRNC, 1981).

3.66. Nigeria does not appear to have had a coherent policy for local dairy development for a long time, since the country has been following a liberal imports policy despite efforts to establish government Livestock Improvement and Breeding Centres (LBC) to act as the nucleus for livestock development in different parts of the country since the late 1940s (see paragraph 3.56 of this paper). However, a framework for dairy development which is integrated within the Third National Development Plan (1975–80) of Nigeria suggests that the major objectives of dairy development and marketing policies in Nigeria are:[22]

i. to ensure adequate food supplies and to increase animal protein intake, with a view to meeting the growing consumer demand for dairy products and improving the nutritional status of the population;
ii. to pay special attention to the development of cattle production and make fuller use of existing potential for expanding the domestic milk output;
iii. to improve rural employment and incomes by providing more productive work opportunities and by promoting an equitable distribution of the national income and a higher standard of living in the rural areas; and
iv. to enhance self-sufficiency by encouraging dairy imports substitution.

22. As summarized in the FAO/ISCDD Nigeria Country Mission Report of September 1975.

3.67. With the demand for milk and milk products being nearly twice the level of domestic production of these products, Nigeria is viewed as a country where imports of dairy products will continue to play an important role in bridging the local supply and demand gap for dairy products in the foreseeable future. With this understanding in the background, the FAO (1975) mission recommended that the liberal dairy imports policy should be continued while standing

ready to regulate trade, if necessary, in order to avoid any interference in the steady expansion of the domestic production of milk and milk products. The need to improve domestic reconstitution/recombining and milk packages industry was also emphasized.

3.68. Generally, Nigeria has a relatively free-enterprise dairy marketing system, with minimal state interference. On the basis of the mode of production (traditional versus modern dairy production subsectors) and the marketing of imported dairy products, three dairy marketing subsystems can be identified:

i. the traditional dairy marketing subsystem;
ii. the modern dairy marketing subsystem: and
iii. the dairy imports marketing subsystem.

3.69. Milk is an important ingredient of the staple diet of the people who produce milk in the traditional system, primarily the Fulani. However, milk has also become an important source of cash income for these people. Dairy marketing in the traditional sector is primarily undertaken by women, and the sale of milk and milk products among the Fulani people is becoming increasingly important with the monetarization of the traditional livestock economy. The Fulani women go to local markets regularly to sell sour milk (called "nono") and butter (called "mai") along with millet and sorghum flour balls (called "fura"). Little or no trade in fresh milk occurs in the traditional dairy markets. The "fura" is eaten with "nono". Hence the two products ("fura" and "nono") are usually sold together by the vendors, and are usually consumed on the spot. Household heads also often attend local markets, and the pattern of trading has been such that there has developed a natural affinity between herd movements and the location of population centres and local markets. The traditional dairy marketing subsystem thus caters primarily for rural dairy producers and consumers.

3.70. As noted in paragraph 3.62, the modern livestock production subsector, which may be said to be the commercial livestock production subsector in Nigeria, is estimated to contribute no more than 3% to the estimated total output of dairy products in the country. For this reason, dairy marketing in the modern livestock production subsector has remained relatively simple in the sense that all farms that produce milk within the modern subsector are generally located within easy marketing distance of the consumption centres. Milk in the modern sector is usually processed before distribution to consumers. The objective of dairy development in the modern subsector in Nigeria is to organize dairying along the lines of a typical commercial dairy enterprise in the developed countries, but there is still a lot to be done toward achieving this objective.

3.71. Marketing of imported dairy products occupies an important section of the overall dairy marketing system in Nigeria. Imported dairy products, which contribute more than 50% of all dairy products that are consumed in Nigeria, are marketed by private companies. Even though there is a considerable degree of competition for the domestic market amongst these private companies that import and market dairy products in Nigeria, FAO reckons that dairy products have remained beyond the reach of a large part of the population in Nigeria because the majority of the population have low purchasing power, while the prices of the available imported dairy products are relatively high. The Government of Nigeria would like to see the dairy products

reach as many groups of the population as possible, yet it would be fairly difficult to rationalize the dairy marketing policies in order to direct the flow of marketed dairy products to achieve that objective when the distribution system is controlled by private companies.

3.72. Even though the efforts by the Government of Nigeria to introduce intensive and semi-intensive livestock production systems since the late 1940s (see paragraph 3.52) to serve as the nuclei for modern livestock production systems in various parts of the country do not appear to have made a major impact yet, there are indications that some changes in the traditional livestock production systems have been occurring gradually during the last couple of decades. For instance, the FMOA/GRNC Report (1981) notes that there has been an important structural transformation of the traditional livestock production system during the last few decades. Of the traditional Fulani graziers who used to practice transhumant pastoralist livestock production systems, 40%–50% are now settled (sedentary), while another 20%–30% are estimated to be semi-settled. Thus only about 20%–40% of the Fulani tribesmen still follow the traditional transhumant livestock production practices. The Federal Government of Nigeria views these developments with great interest because they suggest that there is now more scope than ever before for the transformation of the traditional subsistence-oriented dairy production systems into systems geared toward producing milk and milk products primarily for the market.

(v) A recapitulation of dairy development and marketing systems in sub-Saharan Africa

3.73. The review of the dairy development and marketing patterns in Kenya and Ethiopia (for Eastern Africa), Burundi (for Central Africa), Zambia (for Southern Africa) and Nigeria (for Western Africa) generally suggests that only a small proportion of the total output of dairy products in sub-Saharan Africa actually enters the marketing system. Most of the output of dairy products is consumed within the producing households, and this is particularly true in the case of the traditional livestock production subsector, which is dominated by indigenous livestock breeds and whose production goal is normally to meet the household requirements of dairy products. The modern dairying subsector, which produces mainly for the market and has some improved (upgraded or crossbred) as well as exotic livestock breeds, is relatively small in terms of its share in the total regional output of dairy products.

3.74. Sub-Saharan Africa has become a large net importer of dairy products over the last two decades, and it appears that the region will continue to depend on dairy imports to close the gap between domestic production and effective demand for dairy products for some time in the foreseeable future. Most of the countries in the region will, no doubt, continue to import dry milk and butteroil as recombining material for the production of liquid milk to be supplied particularly to the urban areas. Therefore, measures to improve the marketing infrastructure and to facilitate the linking of rural and urban areas in order to improve the efficiency of the distribution of both locally produced and recombined dairy products should be accorded a high priority. Even though one can expect that a large proportion of imported dairy products will be consumed in urban areas, there is no doubt that it will often be necessary to distribute some of these products, especially the recombined liquid milk, to the rural areas as well.

Conclusion: Critical issues in dairy development and marketing policies and implications for further research

Overall assessment

4.01. A major objective of the dairy development policies in most countries of sub-Saharan Africa appears to be the promotion of local dairying in order to satisfy the basic requirements for dairy products by the population and hence to curb dairy imports which tend to place a heavy burden on the already scarce foreign exchange reserves. Within this broad objective which emphasizes the improvement of nutritional standards are such implicit goals as:

i. improvement of incomes of rural dairy producers, through the provision of an assured and remunerative outlet for their dairy products;
ii. creation of gainful employment in rural areas, since dairying at smallholder level tends to be labour intensive; and
iii. such marketing policy objectives as stabilization of farm incomes and consumer prices, provision of convenient services at prices the consumers can afford, provision of hygienic (wholesome) dairy products (particularly to urban consumers) at reasonable prices, and to ensure, on social welfare grounds, the supply of milk to vulnerable groups at subsidized prices (—see paragraphs 3.27, 3.34, 3.40, 3.52, and 3.66 for a discussion of these policies and objectives on a country basis, and especially paragraphs 3.14 and 3.15 for a summary of the major objectives which are often associated with dairy marketing policies and the instruments (measures) available to achieve certain desirable objectives).

Basically, points (i) and (ii) above aim at promoting an equitable distribution of the national income and a higher standard of living in the rural areas by improving rural employment and incomes through enhanced dairy production and marketing.

4.02. The pricing problem appears to be at the core of dairy development and marketing improvement programmes. Prices determine the attractiveness of investment in dairying. Yet many developing countries appear to encourage dairy development and marketing along the lines which make modern dairy plants high-cost operations, and this tends to erode the potentially high prices that could be paid to producers given the fact that the government policy is to ensure that urban milk consumer prices do not exceed certain upper limits. In the face of all these problems, many governments in developing countries have found it easier to ban the sales of raw milk to urban consumers (thus attempting to eradicate the more competitive traditional marketing system) in order to protect supplies of milk to the modern dairy plants. However, this line of attack raises some important and fundamental questions, which are subject of policy analysis. For instance, does the ban on raw milk sales solve the milk marketing problems of developing countries, such as those of sub-Saharan Africa? What other options are there? Should the private/traditional marketing channel be free to compete along with or complement the activities of the official marketing channel, and under what conditions? Clearly, there is no universal and direct answer to this problem, since the answer will have to depend on conditions in different countries.

4.03. A major goal of most development-oriented policies should be to try and achieve improvements in both operational (technical) and economic (pricing) efficiency of both the production and marketing systems. This proposition does not, in any way, neglect the importance of other goals which may be associated with any development programme, especially in the area of dairy development. If there are any significant seasonal supply fluctuations and differences in product quality, then a price which does not reflect supply variations or give a premium for quality differences can hardly be expected to enhance investments in the industry. There is some evidence that milk producers are responsive to the levels of producer price, and the low levels of milk deliveries to modern dairy processing firms that pay a producer price that is fixed by the government are often blamed on the unrealistically low levels of such fixed producer prices (see Kakunze 1983; Kaluba 1983). Both Kakunze (1983) and Kaluba (1983) cite dramatic increases in the daily intakes of milk by the Bujumbura dairy plant in Burundi and the Dairy Produce Board of Zambia respectively when the milk producer prices were adjusted upwards following several years of fixed prices.

4.04. Modern dairy plants have often viewed milk producers as suppliers of raw material, which should be supplied at prices as low as possible, and little meaningful contacts or interactions exist between the milk processors (modern dairy plants) and the milk producers. This kind of sentiment has often been voiced by the critics of the Kenya Cooperative Creameries Limited (KCC), the modern dairy processing and marketing organization in Kenya. Such critics have been individual milk producers, politicians or observers. Apart from the need to consider ways and means of reducing costs, for instance through simpler dairy processing and packaging methods, and pay more to the producers for their milk, the dairy plants must actively involve producers and also be involved in the collection of milk in the rural areas. If possible, producer price differentials based on differences in quantities of milk delivered by a given client (i.e. quantity premiums) could be considered. Such quantity premiums would probably encourage large-group or cooperative participation in dairy marketing, and the move might even stimulate large-scale dairying.

4.05. Governments are often sensitive to the level of food prices, particularly for the urban poor. Therefore, governments often fix and maintain producer prices of the staple food commodities at certain levels in most cases in order to ensure that in turn urban consumer prices do not exceed certain upper limits, and governments may prefer large-scale parastatal enterprises precisely because it is easier to ensure their adherence to fixed prices than that of a multitude of small-scale private traders. Generally, it is understandable why governments tend to be sensitive to the level of food prices, particularly for the poor groups within urban dwellers. However, the urban poor may be unable to afford to buy dairy products even at low fixed consumer prices and the fixed price system may really favour better-off urban consumers at the expense of poor producers in particular and of economic development in general. This is because low consumer prices encourage domestic consumption while simultaneously discouraging domestic production. The consequence is that imports are sucked in and foreign exchange needed for investment programmes is diverted to finance current consumption. Rather than perpetually depress producer prices in order to ensure cheap milk supplies to the urban dwellers, such options as the variation of the quality of the products offered for sale, whereby prices charged are based on the quality of the products being sold to different consumers, could help achieve certain desirable objectives of marketing policies, for instance, ensuring the supply of milk to different sectors of

the population. Once again, India offers a good example of a country where some progress has been made in this direction: the introduction of TONED (more expensive) and DOUBLE-TONED (less expensive) liquid milk in the country has made it possible to sell pasteurized milk to both high-income and low-income groups of consumers in the metropolitan areas of India. The model of dairy development in India has been relatively successful in achieving its major objectives over a relatively short period (about one decade), and it would appear worthwhile for the countries of sub-Saharan Africa to try and evaluate that model and assess if there are some aspects which could prove applicable to the development of the dairy industry in sub-Saharan Africa. In particular, the Indian dairy industry has been able to integrate milk petty traders (pedlars or hawkers) into the overall milk collection and distribution system, thus enhancing a complementary rather than competitive relationship among the marketing intermediaries in the dairy industry in the country. Introduction of cheaper marketing technologies such as mobile vending machines in India has also ensured that liquid milk reaches consumers at reasonable prices.

Some concluding observations and remarks on dairy marketing policies and impacts

4.06. This review has suggested that marketing policies will not only influence the functions undertaken in marketing but also the structure and performance of a marketing system. Even though the types of policy instruments used and their precise effects on the marketing system may be expected to vary between countries and regions, the following general observations appear to be pertinent to the situation regarding the impact of dairy marketing policies in sub-Saharan Africa:

i. Many countries have a regulated dairy industry, whereby large-scale enterprises with modern dairy plants dominate the formal marketing channel. Such enterprises operate on government-fixed prices. Despite the fact that such firms are given a monopoly they often face illegal competition from private traders, and they usually cannot compete with such traders for raw milk supplies —private traders often offer higher prices to producers. Therefore, governments have in most cases not succeeded in providing higher and more stable prices to producers; the stable prices have been achieved at the expense of plant capacity utilization, since the dairy plants have been unable to attract raw milk supplies at the government-fixed producer prices.

ii. Governments have in some cases succeeded in ensuring reliable urban milk supplies at low consumer prices at the expense of offering remunerative producer prices. Depressed producer prices are probably responsible for low levels of local milk production in many countries, even though firm evidence of this is scanty. The maintenance of milk supply levels to urban consumers has often been achieved through dairy imports.

iii. Most countries cannot strictly enforce hygiene and quality standards for dairy products, since most of the internal trade in dairy products occurs in informal channels, where rules and regulations are rarely observed. However, in most cases, governments have been able to ensure proper hygiene and quality standards for those products that flow through large-scale marketing enterprises,

iv. One could argue that the large-scale marketing enterprises have often provided convenient services to consumers of dairy products, for instance by presenting the

products in attractive packages; but these enterprises often incur high costs, which often are borne by producers who have to settle for low prices.

v. There is little evidence that many governments have succeeded in ensuring a reasonable degree of access to dairy product to vulnerable groups of the population, who often are the ones with least purchasing power. Perhaps an exception to this would be the Government of Kenya which has mounted a school milk-feeding scheme for primary school children since May 1979, although little is yet known of the nutritional impact of the programme.

4.07. Given the above observations, it is evident that the setting-up of monopsonistic and/or monopolistic marketing organizations may have achieved improvements in product hygiene and quality but not economies of scale. The enforcement of licensing and inspection of competing firms or traders in most cases has tended to favour and protect the few already established firms or traders in the industry, at the expense of encouraging market competition and the expected improvements in marketing efficiency.

Dairy marketing policies in sub-Saharan Africa: Implications for further research

4.08. This review of dairy marketing in individual countries has clearly indicated that hardly any detailed dairy marketing studies have been undertaken in sub-Saharan Africa. Alternative dairy marketing systems will most likely differ in their efficacy in terms of achieving alternative objectives of dairy marketing policies, yet little is known about the merits and demerits of alternative dairy marketing systems in sub-Saharan Africa. Nevertheless, many dairy development projects in the region in the past have been launched prior to detailed evaluations of the types of marketing systems which would best handle the marketable surplus of dairy products which would accrue to such projects. Such projects have usually been accompanied by the establishment of government marketing organizations that have been given responsibility over collection, processing and marketing of dairy products. In some countries, such government marketing organizations have also been given responsibility for handling factors of production, such as animal feedstuffs, over and above their other responsibilities. The setting-up of government marketing organizations has usually been regarded as the best means of ensuring that the interests of both producers and consumers will be safeguarded, even though the performance of parastatal organizations in most cases does not appear to support this view.

4.09. The above expositions support the proposition that the types of dairy marketing systems that sub-Saharan African governments should adopt is and will continue to be an important policy issue. The review also indicates that there is a need to undertake dairy marketing studies in some individual countries of sub-Saharan Africa in order to determine the relative efficiency of alternative dairy marketing systems in terms of their contribution to the attainment of the desired objectives of dairy marketing policies. Even though there is some evidence that the private marketing organizations do often offer stiff competition to government marketing organizations in the procurement of raw milk supplies by offering higher prices to producers, the fact remains that not much is known about the operating costs and efficiency of either the private dairy marketing systems relative to the ones that are owned by the government or the small-scale enterprises relative to large-scale ones. ILCA is already involved in field research on dairy

production in Ethiopia and, to a lesser extent, in Nigeria, and has been involved in modelling work relative to the choice of dairy or beef production in Botswana. The work in Ethiopia has already involved some preliminary studies of dairy marketing, but there is a need to undertake more comprehensive and detailed dairy marketing studies both in Ethiopia and other countries, on a case study basis, in order to generate details which would be useful to decision-makers as an aid when deciding on what types of dairy marketing systems to establish to accompany dairy development projects under different sets of circumstances or conditions.

4.10. Ideally, the study of dairy marketing systems should focus on the marketing structures and evaluate them in terms of their contribution to marketing efficiency. The relative efficiency of different marketing systems can be examined and evaluated in terms of various criteria, which may include:

i. reliability and stability of the services offered to consumers;
ii. level of marketing costs;
iii. convenience and responsiveness to consumer demand;
iv. contribution to the improvement of producers' incomes; and
v. contribution to the attainment of certain (specified or stated) goals of the marketing policies.

The study should also aim at analysing the relative suitability of different marketing systems for different sets of circumstances.

4.11. When considering differences in marketing systems, the following are some of the important factors which should be considered:

i. the types of organizations involved in marketing (individuals, cooperatives, commercial companies, parastatals etc.);
ii. the services provided by different organizations in marketing (e.g. credit; production support systems; extension; collection; processing; delivery at wholesale or retail outlets, or door steps etc.);
iii. single-product (e.g. raw milk) versus multiple-product (e.g. milk, butter and cheese) marketing systems; competitive versus monopolistic and/or monopsonistic marketing environment etc.

4.12. The terms "marketing systems" and "structures" have generally been used in this paper to refer to the network of competitive and complementary marketing chains or channels between producers (at farm-gate) and ultimate consumers, the main focus being on the various types of intermediaries who are involved in executing marketing functions. The paper has laid emphasis on the analysis of marketing systems, but a comprehensive marketing study would, ideally, not only focus on the analysis of marketing systems but also on supply, demand and price analyses. Prices and the conditions of supply and demand influence the overall performance of a marketing system, and an analysis of supply, demand and prices, including their outlook (future developments), should constitute an important aspect of research in marketing.

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Appendices

Table A.1. Trends in production of dairy products by world country groupings and sub-Saharan Africa, 1961–1980, in 100 metric tons*

Region/country grouping & type dairy product		Period and quantities produced		
		1963	1970	1980
1.	World:			
	(i) Total liquid whole milk	3,530,560	3,970,500	4,686,730
	(ii) Cow liquid whole milk	3,229,780	3,646,820	4,263,930
	(iii) Dry whole cow milk	5,807	9,813	16,635
	(iv) Dry skim milk and buttermilk	19,595	30,230	42,184
	(v) Evaporated and condensed milk	41,334	45,407	46,943
	(vi) Cheese	71,172	76,690	113,634
	(vii) Butter and ghee	55,626	59,160	69,306
2.	Developed countries:			
	(i) Total liquid whole milk	1,926,620	2,015,480	2,295,310
	(ii) Cow liquid whole milk	1,893,780	1,980,180	2,253,110
	(iii) Dry whole cow milk	3,973	5,934	10,147
	(iv) Dry skim milk and buttermilk	18,387	27,649	34,565
	(v) Evaporated and condensed milk	34,686	32,556	28,670
	(vi) Cheese	35,810	47,081	71,656
	(vii) Butter and ghee	30,769	30,301	31,926
3	Developing countries:			
	(i) Total liquid whole milk	615,550	739,950	1,001,031
	(ii) Cow liquid whole milk	389,110	485,210	657,601

	(iii) Dry whole cow milk	656	2,270	3,982
	(iv) Dry skim milk and buttermilk	554	128	420
	(v) Evaporated and condensed milk	3,995	6,366	9,192
	(vi) Cheese	21,823	10,621	13,351
	(vii) Butter and ghee	9,854	11,539	14,797
4.	Sub-Saharan Africa:			
	(i) Total liquid whole milk	55,090	63,610	72,550
	(ii) Cow liquid whole milk	44,380	49,610	56,510
	(iii) Dry whole cow milk	5	31	22
	(iv) Dry skim milk and buttermilk	10	31	19
	(v) Evaporated and condensed milk	0	78	2
	(vi) Cheese	248	815	829
	(vii) Butter and ghee	485	543	593

* Rounded to the nearest unit in relation to 100 metric tons.
Note: 1963 = 1961/65 average; 1970 = 1969/71 average; 1980 = 1979/81 average.
Source: FAO Production Yearbooks, 1973 and 1981.

Table A.2. Trends in production of dairy products in sub-Saharan Africa by subregion/country group, 1961–1981 period in 100 metric tons*

Region/country group (No. of countries) and type of product		Period and quantities produced		
		1963	1970	1980
1.	Eastern Africa (9):			
	(i) Total liquid whole milk	34,400	41,730	47,830
	(ii) Cow liquid whole milk	27,870	31,860	36,240
	(iii) Dry whole cow milk	5	22	13
	(iv) Dry skim milk and buttermilk	10	22	11

	(v) Evaporated and condensed milk	00	28	2
	(vi) Cheese	213	433	595
	(vii) Butter and ghee	300	283	288
2.	Central Africa (8):			
	(i) Total liquid whole milk	2,750	2,530	3,020
	(ii) Cow liquid whole milk	2,610	2,420	2,840
	(iii) Dry whole cow milk	0	0	0
	(iv) Dry skim milk and buttermilk	0	0	0
	(v) Evaporated and condensed milk	0	0	0
	(vi) Cheese	2	183	25
	(vii) Butter and ghee	9	09	12
3.	Western Africa (16):			
	(i) Total liquid whole milk	11,750	13,310	15,230
	(ii) Cow liquid whole milk	7,840	9,496	11,170
	(iii) Dry whole cow milk	0	9	9
	(iv) Dry skim milk and buttermilk	0	9	8
	(v) Evaporated and condensed milk	0	0	0
	(vi) Cheese	23	146	158
	(vii) Butter and ghee	131	205	253
4.	Southern Africa (II):			
	(i) Total liquid whole milk	6,190	6,040	6,470
	(ii) Cow liquid whole milk	6,060	5,840	6,260
	(iii) Dry whole cow milk	0	0	0

	(iv) Dry skim milk and buttermilk	0	0	0
	(v) Evaporated and condensed milk	0	50	0
	(vi) Cheese	10	53	51
	(vii) Butter and ghee	45	46	40

Note: 1963 = 1961/65 average; 1970 = 1969/71 average; 1980 = 1979/81 average.
* Rounded off to the nearest unit in relation to 100 metric tons.
Source: FAO Production Yearbooks, 1973 and 1981.

Table A.3. World population and milk production, 1977

Region/country grouping	Population (Millions)	Milk[b] production (Million Tons)
World	4,205 (100)	449 (100)
Developed countries[a]	1,139 (27)	351 (78)
Developing countries:		
– Total	3,066 (73)	99 (22)
– Sub-Saharan Africa	311 (7)	6 (1)
– Other regions	2,755 (66)	93 (21)

Figures in parentheses represent percentages of the world total.
a. Country grouping follows the FAO classification.
b. Aggregate for cow, sheep and goat milk, thus excludes camel milk.
Source: Paulino and Yeung (1981; p. 4)

Table A.4. Composition of milk production and consumption in sub-Saharan Africa, 1977

Milk[c] source by animal species	Production		Consumption[a]	
	Volume (1000 Metric Tons)	Proportion[b] (Percent)	Volume (1000 Metric Tons)	Proportion[b] (Percent)
Cow (Cattle)	4,556.0	77.9	6,077.1	81.7
Sheep	222.9	3.8	275.4	3.7

Goats	757.2	12.9	771.6	10.4
Camel	313.3	5.4	313.4	4.2
TOTAL	5,849.5	100.0	7,437.4	100.0

a. Consumption refers to total domestic utilization in terms of primary commodity equivalent.
b. Proportions of major commodity group, e.g. 5.4% of milk produced is camel milk
c. Quantities are given in whole milk equivalents.
Source: Paulino and Yeung (1981; p. 6).

Region/country grouping (No. of countries) and product type		1970			1980		
		P (100 mT)	NM	C (10 mT)	P (100 mT)	NM	C (10 mT)
1.	Eastern Africa (9):						
	(i) Fresh milk and cream	41,730	(-257)	417,274	47,830	2,654	478,565
	(ii) Dry milk and cream	44	8,134	1,253	24	50,894	5,329
	(iii) Evaporated & Condensed Milk	28	6,365	917	3	10,197	1,040
	(iv) Cheese and Curd	433	423	4,372	595	316	5,982
	(v) Butter and Ghee	283	2,065	3,037	288	5,225	3,403
2.	Central Africa (8):						
	(i) Fresh milk and cream	2,530	742	25,374	3,020	3,307	30,531
	(ii) Dry Milk and Cream	0	7,326	733	0	25,975	2,598
	(iii) Evaporated & Condensed Milk	0	8,242	824	0	17,784	1,778
	(iv) Cheese and Curd	183	1,891	2,019	25	1,870	437
	(v) Butter and Ghee	9	1,651	255	12	2,695	390
3.	Western Africa (16):						
	(i) Fresh Milk and Cream	13,310	3,169	133,417	15,230	14,466	153,747
	(ii) Dry Milk and Cream	18	25,762	2,756	17	103,439	10,514
	(iii) Evaporated & Condensed Milk	0	82,187	8,219	0	238,872	23,887
	(iv) Cheese and Curd	146	2,537	1,714	158	1,870	1,767
	(v) Butter and Ghee	205	3,980	2,448	253	16,128	4,143
4.	Southern Africa (II):						
	(i) Fresh milk and cream	6,040	30	60,403	6,470	18,057	66,506
	(ii). Dry milk and cream	0	12,116	1,212	8	25,785	2,579
	(iii) Evaporated & Condensed Milk	50	18,706	2,371	8	4,251	425
	(iv) Cheese and Curd	53	3,687	899	51	2,910	810
	(v) Butter and Ghee	46	3,261	786	40	6,202	1,020

Sub-Saharan Africa (44) totals:							
	(i) Fresh milk and cream	63,610	3,684	636,468	72,550	38,484	729,348
	(ii) Dry milk and cream	62	53,338	5,954	41	206,093	21,019
	(iii) Evaporated and condensed milk	72	115,500	12,330	2	270,104	27,030
	(iv) Cheese and curd	815	8,538	9,004	829	7,049	8,995
	(v) Butter and ghee	543	10,957	6,526	593	30,250	8,955

P = Production; NM = Net Imports = (Imports)-(Exports); C = Consumption = P + NM; and mT = Metric Tons.
* Consumption (C) is derived as sum of production (P) and net imports (NM). Net imports for Eastern Africa for 1970 period are indicated as negative, implying a net export to trade surplus situation in 1970
Source: Calculations by author, based on statistics compiled from *FAO Production Yearbooks* (1973 & 1981) and *FAO Trade Yearbooks* (1973 and 1981).

Table A.5. Calculation of trends in consumption* of dairy products in sub-Saharan Africa, 1970–1980 (all quantities in metric tons)

Table A.6. Value of dairy imports into sub-Saharan Africa and for selected countries, 1960–80, in US$ 2000

Region/country*	All dairy products			Milk** only		
	1960	1970	1980	1960	1970	1980
Sub-Saharan Africa:	41,349	103,846	705,055	28,432	90,582	619,785
within which						
Angola	2,510	3,588	25,850	1,520	2,891.	23,600
Botswana	–	250	10,189	–	–	9,450
Cameroon	949	2,905	14,405	499	2,476	10,580
Congo	834	735	5,669	321	490	4,635
Djibouti	–	–	8,450	–	–	6,800
Ethiopia	537	1,332	9,773	200	1,143	8,058
Gabon	338	856	9,300	114	584	6,400

Ghana	3,761	8,999	7,495	3,263	8,753	4,375
Ivory Coast	2,141	7,959	82,700	1,284	7,224	72,000
Kenya	689	3,262	14,556	621	937	13,935
Lesotho	–	87	8,080	–	87	7,900
Liberia	604	895	5,718	403	763	4,973
Madagascar	2,984	3,760	6,903	1,896	3,136	4,914
Mauritania	–	672	19,570	–	578	16,410
Mauritius	1,436	2,282	18,549	979	1,953	12,571
Mozambique	2,378	2,506	6,300	1,379	1,360	4,200
Nigeria	5,944	19,498	282,920	5,282	19,160	277,760
Reunion	1,240	3,546	25,097	665	2,495	12,686
Senegal	3,049	5,289	18,748	2,325	4,768	14,611
Sierra Leone	887	2,563	8,760	650	2,405	6,707
Somalia	114	199	11,500	33	112	9,500
Sudan	354	1,964	6,613	349	1,936	6,446
Tanzania	1,854	5,483	12,401	1,625	5,058	10,207
Uganda	440	2,987	5,480	425	2,854	5,180
Upper Volta	48	696	13,690	32	616	11,840
Zaire	3,133	8,571	18,600	1,577	7,648	16,100
Zambia	–	4,600	5,821	–	4,260	3,074

Summary:- Growth rates for dairy imports into sub-Saharan Africa:
(1) All dairy imports:

(a) 1960–70 = 9.6% p.a.
(b) 1970–80 = 21.1% p.a.
(c) 1960–80 = 15.2% p.a.

(2) Milk only:

(a) 1960–70 = 12.3% p.a.
(b) 1970–80 = 21.2% p.a.
(c) 1960–80 = 16.7% p.a.

*Details are not given for countries with less than US$5 million worth of dairy imports in 1980, but the value of their dairy imports are included in the sub-Saharan Africa total
**Milk includes fresh, dry, evaporated and condensed forms.
Source: *FAO Trade Yearbooks* (1963, 1975 and 1981), with the calculations for import growth rates by the author.

Table A.7. Standard FAO conversion factors for dairy products into liquid whole milk equivalents

Type of dairy product	% Total milk solids content	Conversion factor*
1. Liquid whole milk	12.5	1.0
2. Liquid skim milk	8.5	0.7
3. Liquid whey	6.2	0.5
4. Condensed & evaporated:		
i) Whole milk	26.0	2.1
ii) Skim milk	24.0	1.9
5. Milk powder (whole and skim)	95.0	7.6
6. Whey powder	95.0	7.6
7. Cassin	90.0	7.4
8. Cheese (excluding cottage cheese)	55.0	4.4
9. Cottage cheese	25.0	2.0
10. Butter	82.0	6.6
11. Butteroil	100.0	8.0

* The standard conversion factors have to be adjusted for liquid whole milk of significantly different dry matter content (e.g. for those countries with large proportions of breeds such as Jersey or buffaloes etc.), with the standard liquid whole milk total milk solids content at 12.5% *as* the basis
Source: FAO, "Milk and Milk Products: Supply, Demand and Trade projections 1985." *FAO Commodity Projections 1985.* FAO, Rome, June 1978.