CONSUMPTION OF DAIRY PRODUCTS IN WEST AFRICA:
PAST TRENDS AND FUTURE PROSPECTS

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Introduction


2. Preliminary indications are that much of the consumption of dairy imports in West Africa occurred in humid and sub-humid areas where most of the countries which relatively are highly urbanised and have high incomes are located. A priori, this would indicate an already established market for increased domestic production to capture. And a recent policy response to the growing importance of dairy imports in total dairy consumption has been for governments to encourage domestic milk production.

3. In practice, policies of this kind face several limitations. For one thing, there is little empirical evidence on which to base them. For another, dairy demand and supply situations are highly heterogeneous within West Africa. For instance, the importance, pattern and distribution of dairy consumption, and the factors which motivate consumers to use different types of dairy products or marketing channels vary sharply between countries, ecological zones, rural and urban areas, and under different economic and social circumstances. Another limitation relates to the comparative advantage of domestic milk production. It is often argued that in the particular context of West Africa, returns to dairying are not as attractive as those from other livestock and cropping activities. However, there are also indications that for selected areas and dairy products, cost-reducing investments, improvements in milk processing and marketing, and appropriate pricing and exchange rate policies could significantly offset the comparative disadvantage of domestic milk production. In view of the above, it is difficult to endorse policies for promoting domestic milk production unequivocally without looking into the specific milk supply and demand situations of West Africa.

4. Against this background, this article proposes to investigate whether critical assumptions about the nature, scale and location of dairy demand and about the substitutability of fresh liquid milk for imported dairy products are adequately based to launch milk production programmes in the moist areas of West Africa. It describes past trends in dairy production, imports and consumption and examines the evidence on factors influencing dairy consumption patterns in West Africa. On this basis, it provides projected 1988 estimates of dairy consumption by product type and origin, by ecological
zone and rural/urban category. It then compares these projections with actual figures for 1985/87 and draws policy implications for increased dairy consumption and domestic milk production in West Africa.

**Past trends in production, import and consumption**

**Production trends**

5. Data on milk production in Africa are scarce and often unreliable. Very little is in fact known about the quantity of milk produced, left for calf feeding and human consumption, processed into different types of dairy products, consumed at home or sold through formal and/or informal marketing channels.

6. Nevertheless, aggregate FAO milk production statistics provide general indications about regional production patterns. For the period from 1974/76 to 1985/87, the following patterns were evident:

(i) A sharp distinction exists between drier and moister areas with respect to levels of domestic production. Drier areas exhibit relatively higher levels of production. In 1983/85, the total volume of dairy produce amounted to 1,112,000 t LME in dry areas and to 562,000 t LME in moist areas; the corresponding figures for 1985/87 were 1,070,000 t LME and 575,000 t LME respectively (FAO 1984a, 1985a and 1987a);

(ii) Some differences are also apparent in the types of dairy products produced in dry and moist areas. Fresh milk is clearly the major dairy produce in both areas. Butter and cheese accounted for an average 11% of total 1983/85 dairy production in dry areas and for 18% in moist areas, suggesting that the latter place relatively more emphasis on the production of these items than do drier areas (FAO 1984a and 1985a);

(iii) Between 1974/76 and 1983/85 growth in total dairy output was generally slow in West Africa (2% p.a.). Over the same period, the growth rate in per caput dairy production averaged -1% p.a. for the region as whole. Figures for 1985/87 indicate a further decline in dairy production largely as a result of reduced production in dry areas and only slight increases in moist areas.
Import trends

7. Imports of milk and milk products in West Africa have been substantial and have grown fast. In 1983/85, total net imports of milk and milk products into West Africa were valued at about US$ 266 million (average over 3 years) corresponding to a volume of 1,356,000 t LME. This volume of imports declined to 938,000 t LME in 1985/87 (FAO 1984b, 1985b and 1987b).

8. In sharp contrast to the picture drawn for milk production, moister countries imported over twice the volume of dairy products imported by drier countries in 1983/85. This picture appears to have changed in 1985/87 with the moister countries, and more particularly Nigeria, having substantially cut down on imports (FAO 1984b, 1985b and 1987b).

9. In volume terms, dairy imports grew faster in drier compared to moister countries during the 1974/76-1983/85 period, their annual growth rates being 12% and 9% respectively. Furthermore, the growth in dairy imports exceeded by far the estimated domestic production growth rates in almost all West African countries, suggesting that increasing dairy demand was mostly met through imports.

Consumption trends

10. Aggregate consumption of milk and milk products in West Africa can roughly be estimated by adding up aggregate dairy production and net import figures. On this basis, aggregate dairy consumption in West Africa amounted to about 3 million t LME in 1983/85 and to 2.6 million t LME in 1985/87.

11. Although these totals were almost equally distributed between drier and moister areas, a sharp division can be seen in the extent to which dairy consumption in these areas was supplied by domestic production or imports. While the majority of West African countries were importers of dairy products, in 1983/85, net dairy imports accounted for an average 62% of total dairy consumption in moister areas and for only 28% of consumption in drier areas. The equivalent proportions for 1985/87 were 46% and 29% respectively.

12. Per caput consumption levels suggest that dairy consumption patterns roughly follow production patterns though average per caput consumption of domestically produced milk appears to be declining in most of West Africa. In 1983/85 per caput dairy
consumption averaged 11 kg LME in moister areas and 45 kg LME in drier areas. Although per caput consumption was relatively low in moister areas, its growth rate over the 1975-1985 decade, at 2% p.a., was the same as that calculated for the drier areas during the same period. Thus, it seems that milk consumption has gained importance in moister areas despite the considerable constraints posed on livestock production (e.g. tsetse). But one should also stress that dairy imports in moist areas were far more significant in total consumption than domestic milk production.

13. The trends outlined above give useful first indicators for what may be characteristic differences in consumption between dry and moist zones of West Africa. The following section will look more specifically at some of the factors which have affected consumption in the region.

Factors determining aggregate demand for dairy products

Demographic trends

14. When estimating milk consumption in West Africa, it is important to take account of the regional distribution and growth of human populations. Population growth tends to increase the potential demand for milk. Similarly, since urban consumption is often supplied through imports rather than domestic production, urbanisation can be expected to boost the demand for imported dairy products, provided that incomes increase.

15. Based on UN population statistics, on Jahnke (1982) and on a review of "the allocation of urban populations in West Africa to different ecological zones" (ILCA 1987), Table 1 presents projected 1988 estimates of rural and urban populations living in different ecological zones of West Africa.

16. Thus, in 1988 about 190 million people were living in West Africa. While West Africa as a whole was experiencing a major transformation from a largely rural to an urban area, urban populations predominated in the sub-humid and humid zones where most of the countries with relatively high incomes are located. Nigeria alone accounted for 100% of the highland urban population, for almost 80% of the urban population in the sub-humid zone, and for over 55% of the urban population in the humid zone. Compared with these areas, arid and semi-arid zones remained very much rural.
Table 1. Aggregate distribution of West African human populations in 1988 by ecological zone and rural/urban category (thousands and percentages)

<table>
<thead>
<tr>
<th>Population living in:</th>
<th>Arid zone</th>
<th>Semi-arid zone</th>
<th>Sub-humid zone</th>
<th>Humid zone</th>
<th>Highlands</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural population</td>
<td>11898</td>
<td>51514</td>
<td>27023</td>
<td>45645</td>
<td>3165</td>
<td>139245</td>
</tr>
<tr>
<td>(91%)</td>
<td>(82%)</td>
<td>(65%)</td>
<td>(66%)</td>
<td>(92%)</td>
<td>(73%)</td>
<td></td>
</tr>
<tr>
<td>Urban population</td>
<td>1177</td>
<td>11150</td>
<td>14905</td>
<td>23498</td>
<td>260</td>
<td>50990</td>
</tr>
<tr>
<td>(9%)</td>
<td>(18%)</td>
<td>(35%)</td>
<td>(34%)</td>
<td>(8%)</td>
<td>(27%)</td>
<td></td>
</tr>
<tr>
<td>Total population</td>
<td>13075</td>
<td>62664</td>
<td>41928</td>
<td>69143</td>
<td>3425</td>
<td>190235</td>
</tr>
<tr>
<td>(7%)</td>
<td>(33%)</td>
<td>(22%)</td>
<td>(36%)</td>
<td>(2%)</td>
<td>(100%)</td>
<td></td>
</tr>
</tbody>
</table>


17. Between 1980 and 1985, human populations increased by an average rate of 2.6% in drier areas and by 3.2% in moister areas of West Africa, while urban population growth rates in these areas approached 5 and 6% respectively (UN 1986). Over the 1974/76-1983/85 period, aggregate dairy consumption in West Africa increased at an annual rate of 4% in drier areas and 6% in moister areas (FAO 1976a, 1976b, 1985a and 1985b). Part of this increase in dairy consumption can be attributed to population growth and to rapid urbanisation, especially in the case of moister areas.

Changes in incomes

18. Changes in income can be expected to cause significant shifts in the nature, scale and location of demand for milk. One indicator of differences in expenditure patterns of various income groups is provided by the calculation of the ratio of the value of food and milk expenditures to total household consumption expenditure. Available information from consumer surveys for selected West African countries indicates that the proportion of total household expenditure spent on food declines as income rises.
19. Though variable among countries and income groups located in differing areas, the average share of expenditure on dairy products by urban households in West Africa appears to be low, approximating 2% (within a range of 0.3% and 4%) as against 44% for the proportion spent on all food items. The findings also suggest that, up to certain income levels, increasing incomes do not necessarily result in increased expenditure on dairy products.

20. To give but a few examples, the FAO/ISCDD (1975) reports that the income elasticity of demand for all milk in Zaria (Nigeria) was 0.6 which implies that a 10% rise in income in this area will result in a less than proportionate increase in milk consumption of 6%. Household survey information for urban Chad (Enquête budget 1972) also shows that, at very low income levels (< 10,000 FCFA/month), relative expenditure on milk actually falls as income rises, suggesting that there are other food and/or household priorities to fulfill. For income levels exceeding 10,000 FCFA/month, the proportion of expenditure on milk increases consistently with income while at the same time there appears to be a switch from curd towards more fresh milk consumption, and supplementation with condensed milk as income goes up.

21. Thus, available evidence from consumer surveys in West Africa, though not providing a definite picture about the exact relationship between income and milk consumption, suggests that dairy consumption patterns are influenced by income growth and its distribution between differing regions and consumer groups. Furthermore, past trends in milk consumption and aggregate statistics for West Africa indicate that the demand for dairy products rises with income. According to FAO 1975-2000 projections, income elasticities of demand for milk are positive and appear to lie between 0.50 and 1.20 in most of West Africa (Jahnke 1982). From 1965 to 1980 the average annual growth rate in GDP approximated 3.3% in sub-Saharan Africa though this sharply declined to 0.4% between 1980 and 1987 (World Bank 1989). Part of these increases in incomes would have occurred in West Africa, especially in the 1960s and 1970s when coastal countries of the region were very prosperous. Purely in terms of these income developments, it can thus be assumed that dairy demand in West Africa has increased in the last two decades.

22. But even if one accepts this general conclusion, there is a need to take account of the differential response of dairy demand to income growth and its distribution, and to changes in supply and demand situations. In many West African countries, purchasing power is concentrated in urban areas and government income policies have largely been unsuccessful in significantly narrowing inter-sectoral income gaps. Under such circumstances, one would hardly expect dairy demand to increase without any disparities.
23. In fact, evidence for West Africa suggests that, except for traditionally milk consuming areas, dairy demand is strongly biased towards urban areas and relatively high income consumers. For instance, consumer survey data for Nigeria suggest that self-employed households with lower incomes, spend more on food than wage earners but less on dairy products (Nigeria 1983). In Mali, those employed in the private sector appear to be the main consumers of milk (OMBEVI 1976). In Côte d'Ivoire, civil servants and qualified employees were found to be the major consumers of yoghurt, cheese and fresh milk although consumption of packed milk was common among all occupational groups in Abidjan (Enquête budget consommation 1979).

24. It is also important to note that income changes in West Africa have often been accompanied by changes in the actual structure and composition of milk demand. With rapid urbanisation and income growth, a certain attraction has taken form for imported dairy products like dry, evaporated and condensed milk, which are now quite widely consumed in urban areas. And there would appear to be good reasons for the preference accorded such items. For one thing, they are more readily and regularly available than the often small and seasonal volumes of milk supplied by the domestic sector. For another, they can be processed into forms which can be purchased easily, with the added advantages of better hygiene and preservation. But it seems unlikely that their spread would have been so rapid had more regular, plentiful and better quality local supplies been available or had past developments in income and policy not been as favourable to their consumption.

25. On the whole, in the last two decades, West Africa's dairy demand has been characterized by a virtual stagnation of rural milk consumption, even in the traditionally milk producing areas, and by changes in the structure of demand which have taken place in urban areas where incomes are higher. The 1970s was a period of relative prosperity for some West African countries and most of urban demand was then met through dairy imports which were mainly consumed by middle and high income groups. In recent years, income growth has slowed down and the prosperous oil-producing countries and primary commodity exporters of the 70s are now facing sharp falls in world prices for their exports, the build-up of external debts and foreign exchange shortages. It it is thus highly likely that large reductions in dairy imports will occur in the future despite the fact that populations are large and urbanisation increasing in West Africa. This will probably have a more negative impact on milk consumption by lower income groups who have come to be used to imported dairy products and who have no local milk supplies to fall back on.
Prices

26. Prices reflect not only underlying market forces but also qualitative differences in consumption and in policy interventions, the effects of which are hard to quantify. In the particular context of West Africa, differences in consumption habits, in milk quality, in marketing and in price policies, render the measurement of milk consumer price response a difficult task. An additional problem is the lack of reliable cross-country price data over a sufficient period of time. The following discussion is therefore more indicative rather than in any way conclusive and will look, very generally, at domestic and international dairy prices and at related developments which might have influenced dairy demand in West Africa.

(i) Consumer prices

27. Prices are an important determinant of dairy demand. The little evidence that is available on milk consumer prices in West Africa does not allow to discern a particular direction to generalize for the region as a whole. Table 2 gives a few examples of consumer and border equivalent prices per kg of LME²/ for some dairy products in a number of West African countries. For convenience, all prices in the table are expressed in US dollars converted at the official exchange rates prevailing in the countries and years in question (FAO 1985b). Border price equivalents are unit c.i.f import values calculated from FAO trade yearbooks (various years). For reconstituted milk and yoghurt, the calculation of border prices takes into account the c.i.f price of dry milk and the international f.o.b price of butter-oil in the corresponding years, and the costs of marketing, processing and recombining milk³/. No adjustments are made for overvaluation of currencies and inflation.

28. Table 2 highlights the difficulties involved in an assessment of milk prices in West Africa. In all four of the countries considered, the domestic retail prices of imported dairy products were higher than their border price equivalents, implying that the consumption of these products has been taxed. However, given the inadequacy of the data on which the calculations in Table 2 are based, it is difficult to accept this conclusion without reservations. The actual price situation may for instance be different if more accurate, product and country specific, figures on processing and marketing costs were used.
### Table 2. Consumer and border equivalent prices of milk products in some West African countries (in US $ per kg of LME).

<table>
<thead>
<tr>
<th>Country</th>
<th>Nature of Milk Product</th>
<th>Year</th>
<th>Consumer Prices on: a)</th>
<th>Border Equivalent Prices</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Local market</td>
<td>Official market</td>
</tr>
<tr>
<td>Niger</td>
<td>Local fresh milk</td>
<td>1982/83</td>
<td>0.46</td>
<td>0.65</td>
</tr>
<tr>
<td></td>
<td>Yoghurt b)</td>
<td>1982/83</td>
<td>0.59-0.68</td>
<td>0.79</td>
</tr>
<tr>
<td>Mali</td>
<td>Local fresh milk</td>
<td>1984</td>
<td>0.52</td>
<td>0.46</td>
</tr>
<tr>
<td></td>
<td>Reconstituted milk</td>
<td>1983</td>
<td>-</td>
<td>0.41</td>
</tr>
<tr>
<td></td>
<td>Dry milk in cans</td>
<td>1983</td>
<td>-</td>
<td>0.17</td>
</tr>
<tr>
<td>Côte d'Ivoire c)</td>
<td>Local fresh milk</td>
<td>1985</td>
<td>0.39</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Pasteurised and reconstr.</td>
<td>1985</td>
<td>0.33</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Sterilised milk</td>
<td>1985</td>
<td>0.58</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Yoghurt</td>
<td>1985</td>
<td>0.54-0.73</td>
<td>-</td>
</tr>
<tr>
<td>Nigeria</td>
<td>Local fresh milk d)</td>
<td>1981</td>
<td>0.75</td>
<td>1.07</td>
</tr>
<tr>
<td></td>
<td>Local sour milk e)</td>
<td>1986</td>
<td>0.60</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Evaporated milk f)</td>
<td>1985</td>
<td>1.53</td>
<td>1.27</td>
</tr>
</tbody>
</table>

a> Urban retail prices of milk sold by traders direct to consumers (local market) or by government dairies (official market).

b> Women in Niamey buy milk powder to manufacture yoghurt at home. Yoghurt of this type is sold on a per ladle basis or in gourds (Sidibe 1982).

c> Average retail prices of various brands of pasteurised, reconstituted and sterilised milk in different department stores. For yoghurt, the minimum and maximum of observed prices are given (Atse-Atse 1987).

d> For fresh milk, the local market price is an average of retail prices in Funtua, Gusau, Gombe, Abet and Kurimin Biri; the official market price is an average of factory gate prices for milk processed by six government dairies (Nwoko 1986).

e> For sour milk, the 1986 litre price in Zonkwa rural town is indicated (Waters-Bayer 1986).

f> For evaporated milk, the local market price is the 1985 retail price of unsweetened evaporated milk in Lagos (World Bank 1987); the official market price is the 1984 government subsidised price of "Peak" evaporated milk to public institutions in Anambra State (Nwoko 1986).

29. In spite of their limitations, the data in Table 2 indicate that milk consumer prices have varied widely across countries, markets and types of dairy products and over time. In the cases of Mali and Côte d'Ivoire, the prices of reconstituted and pasteurised milk were lower than those of local fresh milk. On the other hand, sterilised milk and yoghurt in Côte d'Ivoire were expensive products while in Mali, dry milk in cans was the cheapest form of dairy consumption. In Niger and Nigeria, prices of processed local, and even imported dry milk, on the official market were also higher than prices charged on the local market. In fact, the price of dry milk-based yoghurt sold on the local market in Niamey was not only lower than its official market price but also close to its border price equivalent. It is also to be noted that in some localities of Nigeria, sour milk appears to be cheaper than fresh milk. But evaporated milk was, in all cases, the most expensive product in Nigeria even if its price was lower on the official market.

30. These data can be supplemented with other information which show that the absolute price of milk has often been high in West Africa. For example, Bachmann (1979) reports that the production price of a litre of milk varied from 12% to 111% of the 1978 average daily wages of skilled and unskilled labourers in the urban areas of Chad and Niger. Instances where powdered milk for infant feeding was overdiluted in order to make it last longer have been observed in Côte d'Ivoire and Ghana (FAO 1979). von Massow (1989) also maintains that consumer welfare gains, resulting from the Malian government's dairy import policy (e.g. subsidized retail prices on some imported items), have been relatively small and have mainly been captured by higher income urban consumers. Thus, it would appear that milk consumer prices in most of West Africa are beyond the reach of the vast majority of urban, let alone rural, consumers.

31. Furthermore, the price of milk has been high relative to other food staples. As an example, rough estimates by ILCA (1979) show that milk/cereals price ratios in Ghana, Senegal and Mali ranged from 8.3 to 4.5 in 1975-76. Given the growing importance of cereals in West African food diets, it is unlikely that this situation has been reversed in recent years. However, it is worth noting that these price ratios were more favourable for traditionally milk producing/consuming countries.

32. To a large extent, such prices are the result of West African governments' market, trade and exchange rate policies. A number of studies have shown that government policies, which result in subsidizing urban milk consumption with low priced imported milk and in overvaluing exchange rates, have stimulated the demand for imported dairy products in West Africa. According to von Massow (1989), as much as a third of the changes in commercial dairy imports in sub-Saharan Africa during the 1970s could be explained by factors other than increases in human population and per capita income. These other factors were mainly related to import prices and government
policies. For the period 1984-86, Williams (1989) calculated average nominal protection coefficients (NPCs) of 0.59 and 3.27 for milk consumers in Mali and Nigeria respectively, suggesting that consumers were subsidized in Mali. In Nigeria, consumers were taxed in spite of the provision of milk at subsidized prices to public institutions like schools, cooperatives and department stores (Nwoko 1986).

33. Trade and exchange rate policies pursued by West African governments should also have favoured the consumption of imported dairy products, often at the expense of locally produced milk products. For instance, explicit or implicit tariffs on imports, though variable between countries and categories of milk products, have been kept low on items like condensed and evaporated milk in Côte d'Ivoire (Atse-Atse 1987), in Mali (von Massow 1989) and in Nigeria (Nwoko 1986). At the same time, the overvaluation of exchange rates, prevalent in several West African countries, will have reduced the costs of dairy imports relative to domestically produced milk. The failure of some West African countries to raise prices of dairy products in line with their high inflation rates may also have contributed to declines in real domestic prices and to increases in dairy imports.

34. While the foregoing implies that West African government policies have generally favoured low consumer prices for imported milk products, it does not say much about their actual effects on dairy consumption. The exact extent to which policy interventions have influenced dairy prices, and subsequently consumption, has in fact not been sufficiently analyzed. Only a few empirical studies, and these dealing mostly with imports in a few West African countries, are available on these issues.

35. Despite the above, the evidence appears conclusive that government policies in West Africa have, in the past, generated patterns of urban milk consumption which have proved to be incompatible with domestic capacity to supply milk. In many cases, dairy imports have enabled governments to keep prices to urban consumers relatively low, without in any way improving the efficiency of local marketing channels or increasing local milk supply.

36. All this underlines the need for considering differences in consumer preferences, in the share of milk in consumption baskets, in the constraints to existing dairy production systems, in marketing channels etc, when designing and implementing policies that aim to influence dairy consumption through prices.
(ii) **International prices**

37. Changes in international prices for dairy products can be expected to affect dairy import levels. As indicated earlier, a major feature of West African dairy consumption has been a widespread tendency to import dairy products from developed countries. World trade in dairy products is dominated by the EEC which, in 1985, accounted for over 50% of world dairy exports, this proportion rising to as much as 70% for skim milk powder (Raikes 1986).

38. In such a context, an important determinant of the pattern of world dairy trade relates to EEC dairy policies. Thus, OECD (1987) simulation models showed that the impact of reducing EEC assistance to the dairy sector by a modest 10% would be a 2.81% rise in the world price of milk in 1979-1981. It is notable that the expected rise in world prices in this study was greatest for milk among all other subsidized animal products considered.

39. In the late 1970s and early 1980s, the world dairy market was characterised by heavy EEC export surpluses and depressed prices for dairy products. As a case in point, the world price of skim milk powder declined from US$ 800/t in 1976 to US$ 600/t in 1985 (Atse-Atse 1987). The late 1980s saw substantial changes in the world dairy market; total world milk supplies decreased and in the first half of 1988 the price of skim milk powder rose to a level approaching double the GATT minimum export price of US$ 900/t (IDF 1988). In this period, EEC policies had acted to restrain dairy production and to restore market balance through lower production quotas and reduced stocks of butter, cheese and particularly skimmed milk powder.

40. Such developments appear to have influenced import demand in West Africa where the aggregate volume of dairy imports more than doubled between 1974/76 and 1983/84 and fell sharply after 1983/85 as prices of dairy products rose on the world market (FAO 1976b, 1985b and 1987b). Thus, in terms of international prices, the overall outlook for West Africa is one of declining dairy imports, with the likelihood that domestic milk production will grow in some countries to meet part of the unfulfilled demand that will arise from reduced imports. Whether increased domestic production will succeed in achieving this will largely depend on West African governments' commitment and ability to design, adopt and implement appropriate policies.
Aggregate 1988 dairy demand

Levels of milk consumption

41. A quantitative assessment of aggregate dairy demand by ecological zone and by rural/urban category requires precise information on milk consumption levels, human populations, incomes and prices in the urban and rural areas of different ecological zones. Detailed information of this kind is not available for West Africa. The following estimation of levels of milk consumption in different areas of West Africa is mainly based on aggregate FAO dairy production and import figures. As such, the estimates should only be taken as indicative.

42. The major assumptions made in estimating rural/urban differences in per capita milk consumption within each of the ecological zones of West Africa were that:

- Milk consumption is conditioned by milk availability which is determined by domestic production and imports;
- Local milk production is predominantly rural and follows the distribution of milk producing livestock populations by ecological zone;
- Consumption of imported dairy products follows the distribution of urban populations by ecological zone since evidence for West Africa shows that a substantial proportion of dairy imports (as much as 80% according to Mbogoh 1984) is consumed in urban areas;
- Differences in the importance of milk in food consumption; in the availability and marketing of local and imported milk products; in the state of storage, transport and distribution prevailing in differing areas, determine the volume of milk actually consumed in rural and urban areas of each ecological zone.\(^6\)

43. Average rural/urban per capita milk consumption levels, estimated on the basis of these assumptions, are presented in Table 3. Since FAO milk production and import data, for the period after 1985, were not available at the time of this study, the estimates were calculated for 1983/85.
Table 3. Estimates of rural and urban per caput milk consumption levels in different ecological zones of West Africa 1983/85.

<table>
<thead>
<tr>
<th>Ecological zone</th>
<th>Consumption balance a&gt; ('000 t LME)</th>
<th>Human populations ('000)</th>
<th>Per caput consumption (kg LME/pers.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rural</td>
<td>Urban</td>
<td>Rural</td>
</tr>
<tr>
<td>Arid</td>
<td>611</td>
<td>27</td>
<td>11025</td>
</tr>
<tr>
<td>Semi-arid</td>
<td>583</td>
<td>288</td>
<td>46938</td>
</tr>
<tr>
<td>Sub-humid</td>
<td>197</td>
<td>314</td>
<td>24987</td>
</tr>
<tr>
<td>Humid</td>
<td>259</td>
<td>421</td>
<td>41402</td>
</tr>
<tr>
<td>Highlands</td>
<td>16</td>
<td>12</td>
<td>2857</td>
</tr>
<tr>
<td>All zones</td>
<td>1666</td>
<td>1062</td>
<td>127209</td>
</tr>
</tbody>
</table>

a> Rural consumption balance calculated as aggregate 1983/85 milk production net of losses (10% of production) and of production marketed in urban areas, plus imports reaching rural areas.

Urban consumption balance calculated as net dairy imports in 1983/85 minus losses (10% of imports) and imports marketed in rural areas plus production marketed in urban areas.

Proportions of domestic production and net dairy imports marketed in urban and rural areas based on certain considerations regarding the availability and marketing of milk in different ecological zones of West Africa (see footnote 6/ at end of text for more details).

b> Per caput consumption in urban and rural areas i.e. urban and rural consumption balances divided by total population.

Source: Own calculations based on FAO (1985a and 1985b) and Jahnke (1982).
44. Though only approximations, these results highlight some of the prominent features of milk consumption in West Africa, namely that:

(i) except possibly for the arid zone, overall milk consumption levels are low, by developed and even by developing country standards;

(ii) imbalances in consumption occur between ecological zones, average milk consumption levels being highest in the arid zone and lowest in the highland and the humid zones;

(iii) the arid zone excluded, per caput consumption in all other zones is highest in urban areas. On average, urban communities in West Africa consume twice as much milk per caput as rural communities;

(iv) aggregate milk availability is diluted by population pressure, particularly in the densely populated urban areas of the humid and sub-humid zones where per caput milk consumption levels are relatively low.

Scale and nature of 1988 demand

45. Using the information in Table 1 on West African human populations in 1988 and assuming that 1983/85 milk consumption levels will prevail until 1988, aggregate 1988 dairy demand by ecological zone and rural/urban category, can be roughly estimated. On this basis, total 1988 demand for milk and milk products in West Africa amounts to about 3.1 million t LME, almost 60% of this total occurring in rural areas and 40% in urban areas.

46. Having got an idea of the scale of dairy demand in 1988, there is a need to determine the composition of this demand. This cannot be done with any precision, but by using aggregate FAO data and other sources of information, one can arrive at some approximate figures for the distribution of dairy demand between different products.
The following percentages were derived from product specific aggregate 1983/85 FAO data for predominantly moist and dry countries of West Africa (FAO 1980b and 1985b):

<table>
<thead>
<tr>
<th>Zone</th>
<th>Dry Zone</th>
<th>Moist Zone</th>
<th>All Zones</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh milk*</td>
<td>50</td>
<td>32</td>
<td>44</td>
</tr>
<tr>
<td>Sour milk*</td>
<td>40</td>
<td>52</td>
<td>44</td>
</tr>
<tr>
<td>Butter</td>
<td>6</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>Cheese</td>
<td>4</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dairy imports</th>
<th>Dry Zone</th>
<th>Moist Zone</th>
<th>All Zones</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh milk</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Dried milk</td>
<td>77</td>
<td>34</td>
<td>48</td>
</tr>
<tr>
<td>Evap./Cond.milk</td>
<td>8</td>
<td>61</td>
<td>44</td>
</tr>
<tr>
<td>Butter/Ghee</td>
<td>12</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Cheese and curd</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

* As FAO makes no distinction between sour and fresh milk production it is assumed that 50% of liquid milk production is consumed as fresh (largely by pastoralists and people in dry areas) and the remaining 50% as sour (by urban consumers of the moist zone and rural consumers of the dry zone).

47. Given these proportions, aggregate 1988 dairy demand in West Africa is disaggregated by product type and origin, by ecological zone and by rural/urban category in Figure 1. As is evident, dry and moist zones differ in the extent to which they have resorted to imported and/or locally produced dairy products and have directed available supply to urban and/or rural areas.

48. In the dry zone, a substantial amount of demand is supplied through domestic production of fresh and sour milk which are largely consumed in rural areas. Dairy imports in this zone mainly consist of dry milk, but are in no way as substantial as in the moist zone. Nevertheless, it appears that imports of dry milk, a product usually reconstituted into liquid milk, used for infant feeding and often donated as food aid, are widely consumed in urban as well as in rural areas of the dry zone.

49. Unlike the dry zone, the moist zone primarily relies on imports of evaporated/condensed and dry milk to satisfy its predominantly urban demand. Several studies also indicate that the consumption of evaporated/condensed milk in moister areas is much higher than that of dry milk. In Nigeria, for example, about 50% of the total population in 1978, mainly tea and coffee drinkers above 15 years of age, were assumed to be potential consumers of evaporated tinned "Peak" milk (Claesson 1978).
Figure 1. Estimated distribution of aggregate 1988 demand for milk and milk-products in West Africa.

Source: Adapted from data in Tables 1 and 4.

50. Imported fresh milk, butter/ghee, cheese and curd are of minor importance in both dry and moist zones, their consumption being closely related to consumers' means and disposition to purchase them. Because of the small quantities involved and of their generally prohibitive prices, the consumption of these products is often restricted to classes of higher officials, private sector employees and foreigners in urban areas. On the other hand, locally produced cheese, butter and ghee are consumed to a greater extent, but these items are generally produced on a small scale and their consumption is limited to certain localities and/or ethnic groups (e.g. the Western Yorubas in Nigeria).
Domestically unmet demand

51. Given the preceding picture of dairy demand in West Africa, the question arises as to how it is to be met. Table 4 relates aggregate 1988 dairy demand estimates to projected 1988 and actual 1985/87 milk supply figures. Domestic milk supply in 1988 is projected from FAO 1983/85 milk production data, at an assumed annual growth rate of 2% (the rate that prevailed in West Africa between 1974/76 and 1983/85).

52. The figures in Table 4 give an idea of how milk supply in West Africa has evolved in relation to dairy demand. Thus, for 1988, the magnitude of dairy demand unmet from domestic supply is of the order of 1.3 million t LME in West Africa as a whole i.e. roughly 42% of estimated total 1988 dairy demand. In terms of "domestically unmet demand", the largest deficit is observed in the moist zone, no doubt reflecting the low level of domestic milk supply in moister areas, and the traditional predominance of livestock and low human population densities in the drier areas of the region.

53. In practical terms, the consumption of milk in the dry zone seems to have been constrained by the slow growth of domestic milk production and the relatively low incomes of countries in this zone. Though rural milk consumption has traditionally been high in drier areas, the 1985/87 figures suggest that this is no more the case. Compared to 1983/85, dairy imports rose modestly and domestic milk supply declined substantially in 1985/87. Thus, the outlook for the dry zone is one of a general decline in milk consumption, with dairy imports meeting a small part of, presumably urban, dairy demand.

54. The substantial amount of domestically unmet dairy demand, calculated for the moist zone should be interpreted with caution since a significant portion of total dairy demand in this zone has until recently been met through imports. In the 1970s and early 1980s, relatively high income countries located in the moist zone could afford to import dairy products on a large scale. However, large deficits occur in 1985/87, as dairy imports decline sharply and domestic milk supply, though increasing, still lags behind demand.
Table 4. Projected 1988 dairy demand, supply and deficits in dry and moist zones of West Africa ('000 t LME)

<table>
<thead>
<tr>
<th></th>
<th>Dry zone</th>
<th>Moist zone</th>
<th>All zones</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Projected 1988 figures a&gt;</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total demand for milk</td>
<td>1664</td>
<td>1443</td>
<td>3107</td>
</tr>
<tr>
<td>Domestic milk supply</td>
<td>1457</td>
<td>354</td>
<td>1811</td>
</tr>
<tr>
<td>Domestically unmet demand</td>
<td>-207</td>
<td>-1089</td>
<td>-1296</td>
</tr>
</tbody>
</table>

| **FAO 1985/87 figures**        |          |            |           |
| Total milk availability        | 1512     | 1071       | 2583      |
| Domestic milk supply           | 1070     | 575        | 1645      |
| Dairy imports                  | 442      | 496        | 938       |

| **Balance 1985/87-1988 b>**    |          |            |           |
| Domestic milk supply           | -387     | 221        | -166      |
| Domestically unmet demand      | -594     | -868       | -1462     |

**Conclusion and policy implications**

55. This article has attempted to provide an overall picture of milk consumption patterns in West Africa and to trace some of the factors which have influenced these patterns in the past two decades. The most general conclusion that emerges is that West Africa's dairy consumption situation derives from a variety of sources ranging from the specific demand and supply conditions of different areas in the region to policies pursued at both domestic and international levels.
56. The evidence presented suggests that domestic milk supply in West Africa has generally failed to meet dairy demand, especially rising urban demand, which has mainly been met through imports. There also appear to be basic differences in the nature and scale of dairy consumption between rural and urban areas, moist and dry zones, and high and low income countries and consumers.

57. In drier areas, milk consumption has traditionally relied on local rural dairy produce mainly in the form of fresh and sour milk. However, recent indications are that this pattern is changing with urbanisation and the decline of traditional dairying. In moister areas, milk consumption is predominantly urban and very much dependent on imports. Here too, milk consumption patterns are changing with the decline in incomes recently experienced by many West African countries.

58. The picture of milk consumption in West Africa drawn in this paper is obviously not sufficient to understand the important links existing between milk consumption and supply in differing areas, and still less to draw policy implications. Clearly, further research and more detailed information on factors affecting milk consumption patterns in West Africa are required to come to valid conclusions regarding the future outlook of milk consumption at a regional level.

59. Nevertheless, some tentative conclusions can be made with respect to the prospects for meeting dairy demand in West Africa through increased domestic milk production and/or substitution of local milk products for imported ones. As far as the dry zone is concerned, the outlook seems bright. If domestic milk production is to be promoted in this zone, there may at first be a case for protecting already established local milk producers against heavily subsidized imports. Much could be done through the setting up of rural milk collection centres to which producers in these areas could sell their milk at attractive prices. Easier access to credit and to inputs e.g. provision of cattle feed, veterinary services, cattle breed improvement, and improved milk marketing and processing facilities, are all crucial issues to be considered if the domestic dairy sector in this zone is to operate efficiently and increase its output. Traditional milk producers at present consume/sell most of the milk they get from their low yielding herds at household/village level. Given some incentives, they could produce reasonably clean and easily distributed products like fresh and/or sour milk, which will find ready markets in urban areas. Production growth may, of course, be slow in the initial stages. But it will have the advantages of fulfilling part of urban demand, of ensuring higher incomes and milk consumption levels to rural producers and of laying the ground for a more sustained development of the traditional dairy sector in this zone.
60. The scope for increased domestic milk production and import substitution in the moist zone appears more limited. Considerable constraints to increased domestic milk production do exist in this zone, some technical (e.g. livestock nutrition, disease and management problems), others socio-economic (e.g. high costs of domestic milk production, orientation of urban consumption habits towards imported dairy products, etc.). However, recent developments in the moist zone suggest increased opportunities for domestic milk production, especially in the immediate vicinity of urban areas, and for increased production of certain local dairy items. In some localities of this zone, items like cheese and sour milk mixed with cereals are already marketed profitably by small traditional dairy enterprises located in remote areas. With some encouragement, e.g. marketing and processing improvements, measures to increase milk yields from traditional herds etc., these items could be produced on a larger scale. Similarly, production of standardised, hygienic, preserved and packaged local dairy products, may well find a market among middle income urban consumers, or even lower-income ones, if the consumption of such locally produced items were actively promoted in public institutions e.g. schools, hospitals etc.

61. The preceding discussion assumes that the technical capacity (through extension and research services) exists to support the expansion of domestic milk production. It also assumes that there is a commitment on the part of West African governments to create the conditions conducive to more sustained milk consumption patterns. Given this, the means by which production and consumption goals are to be achieved should be viewed in the wider socio-economic context of West Africa whereby milk consumption patterns and factors underlying them vary considerably. In some areas of West Africa, milk plays only a minor role in meeting food demand, in others it is the sole means of sustenance. In most urban areas of West Africa, milk is consumed by relatively high income consumers. Under such circumstances, it makes little sense to envisage a single strategy for increasing milk consumption in the whole region. The important thing to stress is that policies that aim to influence milk consumption patterns in West Africa should be based on a sounder knowledge of the specific milk demand/supply situations in the region and consider such aspects as the efficient utilisation of domestic productive resources and the satisfaction of the needs of the large majority of milk consumers.
1/ West African countries can roughly be classified according to whether they are predominantly dry i.e. arid and/or semi-arid (A/SA) or moist i.e. humid and/or sub-humid (H/SH).

2/ t LME = Metric tonnes of liquid milk equivalents.

3/ Calculated using FAO (1978) conversion factors into LME:

- 1 kg dry milk = 7.6 kg LME
- 1 kg butter-oil = 2 kg LME
- 1 kg condensed/evaporated milk = 2 kg LME.

4/ The border price equivalent of a litre of reconstituted milk or yoghurt (expressed in LME) is calculated as 0.1 times the c.i.f price of dry milk plus 0.03 times the f.o.b price of butter-oil in the corresponding years plus an allowance for processing and marketing costs averaging 70% of local retail prices in the countries considered.

5/ The NPC is defined as the ratio of domestic consumer prices to border prices less domestic processing and marketing costs estimated at the official exchange rate.

6/ Marketed milk is defined as locally produced and/or imported milk reaching urban and/or rural areas. Due to the subsistence role of milk in the arid zone and to the very low level of domestic production in the humid zone, it is assumed that all of the milk produced in these zones will be consumed in rural areas. The proportions of local production marketed in urban areas of the semi-arid, sub-humid and highland zones are assumed to be 10, 20 and 30% respectively. Given the state of storage, transport and distribution prevalent in different ecological zones, it has also been assumed that the proportions of dairy imports marketed in rural areas of the arid, semi-arid, sub-humid and humid zones, were 10, 15, 20 and 25% respectively.


ILCA. 1987. Allocation of West African urban populations in towns of 100,000 or more inhabitants to different ecological zones. Draft tables. Livestock Economics Division (LED), Addis Ababa.


