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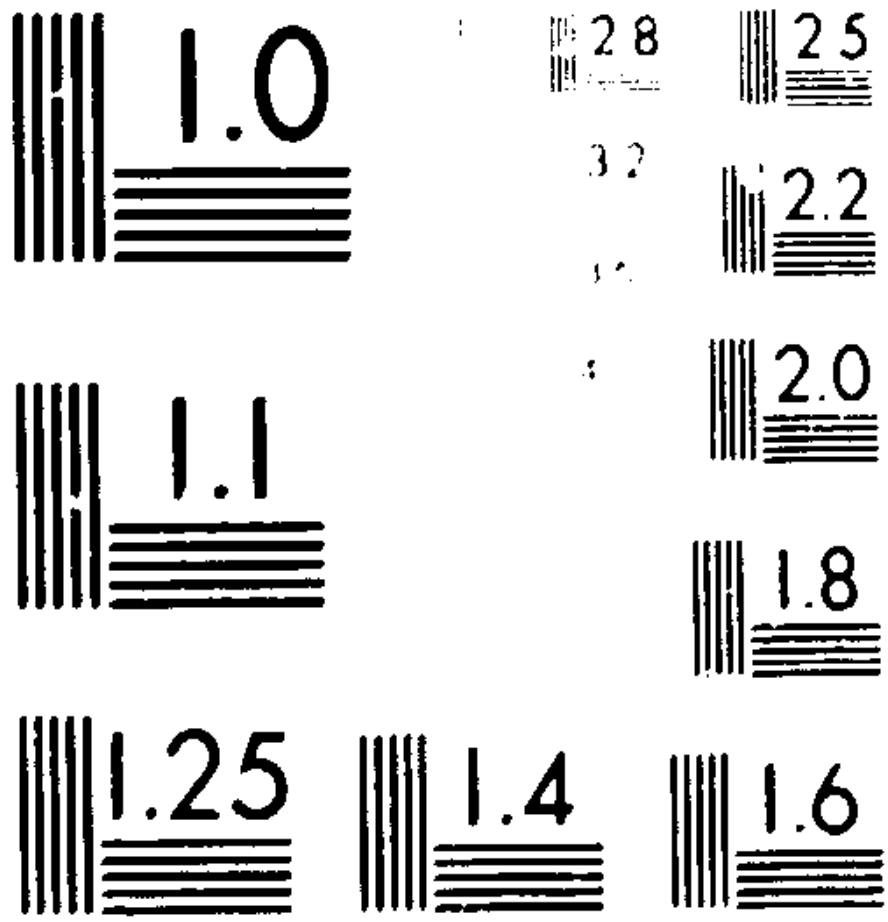
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WORLD-WIDE STUDY OF THE LEATHER AND LEATHER PRODUCTS INDUSTRY

Second Draft

TO BE DISCUSSED AT THE FOURTH SESSION OF THE LEATHER AND LEATHER PRODUCTS INDUSTRY PANEL

A SECTORAL STUDY PREPARED BY THE
INTERNATIONAL CENTRE FOR INDUSTRIAL STUDIES

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INTRODUCTION

Since the adoption of the Lima Declaration and Plan of Action in 1975, the leather and leather products industries have been the focus of considerable attention and effort by organs of the UN. This was based on the widely held assumption that the leather industry sector was an inherently suitable sector for effectuating the long-range objectives of the Declaration. In that context a congeries of unanticipated questions and issues have progressively arisen. These stem mainly from problems of raw material supply, the acknowledged inadequacy of relevant statistics and the relative absence, in the leather area, of in-depth economic studies and evaluation.

At the first Consultation Meeting On The Leather And Leather Products Industry (Innsbruck, November 7-11, 1977) recommendations were adopted to expand the scope of statistical and economic intelligence and to deal with various practical issues of efficiently implementing the Lima Declaration. The meeting had the benefit of the "Draft World-Wide Study of the Leather and Leather Products Industry: 1975-2000" (UNIDO/ICIS.45, September 16, 1977), an effort at comprehensive exposition and analysis of the world leather industry.

In accordance with one of the recommendations of the First Consultation Meeting, UNIDO organized a Panel of qualified and representative experts to guide the furtherance of the program approved by the Meeting. At the last meeting of that Panel, February 5-7, 1979, Vienna, several issues were identified for consideration by a second Consultation Meeting. These include:

(a) Raw material availability and quality.

(b) Development of leather products industries in developing countries.

(c) Problems and prospects for international trade in hides and skins, leather and leather products.

(d) A joint and coordinated program of long-term technical assistance in developing countries by UNIDO, FAO and other international bodies in the area of hides, skins, leather and leather products.

(e) The role of synthetic materials.

OBJECTIVES OF PRESENT STUDY

In the light of the foregoing, objectives of the present study are:

(a) To define and clarify the basic economic factors in the past development and the present structure of the leather and leather products industries of the world with particular emphasis on the availability of raw material now and in the future.

(b) To identify and appraise new trends and factors with a significant bearing on prospective development of the entire sector.

(c) To project raw material supply through 1985 by qualitative judgment as well as statistical methodology.

(d) To appraise the extent by which the implicit purpose of the Lima Declaration was accomplished in the leather and leather products sector as of December, 1978 and the potential remaining for further growth of these industries in the developing countries.

(e) To weigh the role of leather substitutes in the leather economies of the developing and developed countries.

(f) To define the major trade problems confronting developing and developed countries and to suggest possible solutions and a strategy for action at the international and national levels.

CHAPTER I

Summary and Conclusions

Summary of the Study

a. Hides and Skins Economy

An extraordinary situation confronts the world leather and leather products industries in 1979. It is compounded of raw material shortage and unprecedented high price levels of hides and skins. The emergence of this situation, which is not related to the inflation or energy syndromes, requires re-evaluation of the industries' economies and development potentials.

The central fact in the economics of the leather and leather product industries is the unique character of hide and skin supply: it is virtually inelastic, a variable which cannot respond to demand. Moreover, the quality and utility of hides and skins, derived from the same species in different parts of the world, vary tremendously; homogeneity is limited.

Cattlehides are the major raw material of the leather industry, representing 70 per cent of its output, and the mainstay of most leather products. Sheep and goatskins comprise most of the balance. Pigskins are a supply potential which is still far from being realized. Cattlehide supply has been and remains the most vital issue to the leather and leather products industries.

Appraisal of current and future hide and skin supply requires examination of world and regional livestock resources. These are distributed unevenly and without relation to human population. Cattle herds and sheep flocks in the developed regions plus South America represent 62 per cent of the world's raw material resources for production of leather.

In developing areas other than South America, livestock productivity, in terms of hide and skin yield, is extremely low in comparison with output in developed countries. Shortcomings in animal husbandry, slaughter methods, and recovery from fallen animals are responsible.

The quarter century ending in 1977 was a halcyon period of raw material supply. A revolution in beef production methods in North America increased world cattlehide supply more rapidly than in any other period in modern history. It was widely assumed that such almost exponential growth would continue indefinitely but it came to an end in 1977 and was succeeded by sharp contraction.

When and to what extent cattlehide supply will again increase is the major question. In North America the past will not be precedent for the future; the phenomenal expansion of the 50's and 60's was a non-recurrent development. A slow return to production levels of 1977 is expected by 1985 or 1986.

Prospects for important supply growth can be found only in South America where grassland, the prerequisite to cattle production, is available. Everywhere else the outlook is dimmed by lack of pastureland, shortage of animal feed and fodder, non-productive and primitive methods of animal husbandry and the rising contention of human food and animal feed for arable land.

Minor changes in sheep and goat numbers will not affect the basic leather supply equation.

Hope for the future rests mainly on improvement and more effective use of existing resources in less developed regions. Better methods of raising livestock are urgently needed. Better methods of flaying, curing, recovery, storing and transport of hides and skins would translate more potential supply into available supply in developing countries. Unless that primary task is undertaken and accomplished, development objectives aimed at leather and leather product output in developing countries have reached practical limits, except for South America.

There has been a substantial change in trade flow of hides and skins during the last 25 years. Massive exports of raw material by developing countries have ended. In 1978 these countries were, in the aggregate,net importers of cattlehides. Review of the facts, however, indicates that the change was due almost entirely to trade policy and developments in South America and South Asia. These were the large raw material exporting areas in the past who now fully utilize their indigenous hides and skins.

In the developed regions the pattern of hide and skin trade reflects a shift in leather production to Italy and Spain. Exports of cattlehides from the U. S. reached almost 70 per cent of world trade in this commodity.

In hide and skin trade, as well as leather and leather products, the policies of centrally planned economies are difficult to predict. It is noted that "abridgement of the market process" is a new and fundamental problem.

Projections of future trade in hides and skins foresee comparatively little change for three reasons: First, world production in the major types of raw material will increase only modestly. Second, developing countries with important supply have completed the transition to domestic utilization. In fact, tanning capacity in various developing countries is excessive and greater than available hide and skin supply in these countries or contiguous areas. Third, the economies of processing cattlehides at origin will inhibit exports from the U. S.

Leading problems and issues in hides and skins all relate to the improvement of supply in developing countries, national restrictions on access to supply and violent price instability. The first two can be dealt with through international and national action. A strategy for such action is suggested. Price fluctuations and their disruptive consequences are a more difficult issue and, as a first step, international consultation is essential.

b. Leather and Leather Products Economy

By 1977 the developing countries produced 38.4 per cent of the world's leather in rough or finished form. Growth, however, was concentrated in two regions, Latin America and the Far East. Further important increase is anticipated only in Latin America where cattlehide output is projected to expand substantially. Elsewhere in the developed and developing countries raw material supply will permit only minor change by 1985.

Efficiency of tanning plants is defined both in production costs and the consistency of leather required in large-scale manufacture of shoes and other products. Mechanization is associated with both aspects of efficiency. Production and marketing of leather entail constant liaison with manufacturers of leather products. That is particularly important for tanners seeking distribution in developed regions where style currents move rapidly.

Several developing countries have built leather and finished product manufacturing facilities on a base of imported cattlehides, almost wholly from the U.S. Grave difficulties encountered in 1979 attest to the economic merit of integrated development based on utilization of domestic raw material supply.

World leather production will decline from the 1977 level for several years and begin to recover in 1984. Projected total output will be 4.2 per cent higher in 1985 than in 1977, but that gain will not match expected population increase. Per capita consumption of leather would therefore decline fractionally.

Modern tanning is not a labor-intensive industry. Leather can be produced with high labor input, in lieu of mechanization, at a sacrifice of quality or uniformity. High raw material prices de-emphasize the ratio of labor to total cost and underscore the importance of achieving maximum sales value from hides and skins.

Fixed and working capital requirements of a modern, mechanized tannery are substantial. Major working capital is represented by inventory of raw material, the principal cost of production. The amount of working capital immobilized in inventory is directly proportional to hide or skin prices and escalated sharply between 1977 and 1979.

Leather production capacities in developing countries are generally larger than available raw material supply. Hence, with the exception of South America and South Asia, capacity is under-utilized. Similarly, domestic raw material is completely absorbed in South America and South Asia, but under-utilized in Africa and the Near East.

The role of synthetics and other substitutes is explained by these economic facts: Leather supply has always been less than potential demand; price rations its consumption; synthetics fill the gap which cannot be met by leather.

Since all leather is consumed, total production and consumption are broadly identical, barring changes in the pipeline inventories of the industry. An increase of 4.2 per cent in leather production is projected for 1985. The same quantity of

leather, 12,992 million sq. ft., will be consumed, 68.9 per cent by developed countries, 31.1 per cent in developing regions.

Raw material resources and leather output in China are extremely small in ratio to population. Intensive use of arable land for food production will limit greater livestock culture. Industrial development which might entail large import of cattlehides would pose serious problems with respect to the distribution of world supply.

International trade in leather is composed of two main elements: Exchange of finished leathers among the developed nations and export of semi-tanned or crust leather by several developing nations. Argentina and India are pre-eminent in the latter trade, clearly reflecting the scale of their domestic raw material supply.

Exports of all types by developed economies reached $1,577 million in 1977, developing country exports were $724 million, of which $555 million was shipped by India, Argentina and Brazil. Further expansion in manufacture of leather products, for domestic consumption or for export, would reduce the movement of leather from developing areas.

Shoes remain the most important of all leather products, absorbing almost 75 per cent of leather output. In the developed countries, however, volume in other leather products has increased significantly with garments, small leather goods, handbags and upholstery leading the way.

Shoe output and consumption in the developed regions, 72 per cent of the world total, has become stable and the percentage of income expended for footwear has declined. Production of shoes in developing countries has expanded considerably in recent years but to a large extent for export to the developed and industrialized nations. In other leather products developing countries have made great progress in output of leather garments but here, too, output is almost exclusively for export to North America and Western Europe. Per capita

consumption of footwear, leather garments and other leather products in developing countries is only a fraction of the per capita ratio in the industrially advanced countries. Consumption of all leatherproducts correlates directly with disposable income.

Capital requirements for production of leather shoes are considerable to attain optimum levels of productivity. When leather prices rise the ratio of labor cost in production diminishes. In production of garments, handbags and small leather goods, fixed capital requirements are lower than in shoe factories. However, working capital needs in such enterprises are relatively higher due to the quantities of leather required per unit of output. Transfer of technology is not a problem; development of management expertise and labor skills as well as discipline is a greater obstacle to efficient and competitive production of leather products in new areas.

Leather product capacity in developing countries is generally in excess of current output rates. Many installations appear to have been planned without solid marketing preparation or adequate regard for available raw material supply. Greatest progress has been made by regions favored with adequate raw material supply. Countries dependent on the import of raw material or leather for leather product manufacture have recently encountered serious difficulties.

The leather product industries of Japan, the second largest hide-importing country in the world, are an enigma. Per capita shoe production is lower than in the other major developed nations. In China almost all available leather supply is employed in shoe production and output of other leather goods is extraordinarily small.

Indexed to 1977 as 100, it is estimated that world output of all leather products will drop to approximately 97.0 by 1981 and begin recovering thereafter to a rate of approximately 104 by 1985. Total shoe production in 1985 is expected

to reach 3,294 million pairs, an increase of 7 per cent from 1977. Growth will take place mainly in South America and Eastern Europe.

A comparable increase in shoe consumption is forecast with relatively more gain in developing regions than in the developed world. Per capita consumption differences between developed and developing areas will remain extreme. Consumption of all other leather products will continue to be large in the developed countries and lag in developing zones where shoes continue to have priority of demand.

World trade in leather products has shown enormous increase over the past two decades; physical volume increased 600 per cent and monetary turnover almost 12 times. Footwear is the largest item in trade value, accounting for 70 per cent of the total in 1977. Although the share of developing countries has increased, their percentage of world export value in leather products was 24.8 in 1977. Leather shoes ranked first in developing countries' exports, with leather garments a reasonable second.

Several features of trade in leather products by the developing countries are especially notable: The extraordinarily high proportion of exports to the United States; three developing countries accounted for approximately 70 per cent of aggregate exports by all developing regions; a very small fraction of leather goods manufactures was exported by developing countries to other developing nations.

Tariff rates of developed countries are moderate or low, with the exception of Japan, and GSP rates are an advantage to the developed countries. Non-tariff barriers are a more important problem and urgently require international solution.

Progress in these basics is a prerequisite to sound and viable development in the leather and leather products sector. Dependence on the import of raw material or of leather as the base for leather products output is hazardous. Every instance of basic progress in leather and leather products is identified with availability of raw material as the point of departure.

In both the developed and developing areas of the world the expansion of leather processing and of leather product capacity has outstripped basic raw material supply. Over-estimation of future supply growth appears to have been a responsible factor. Substantial production capacity is now under-utilized.

Neither trade barriers nor inability to acquire technology have heretofore been obstacles to development. On the contrary, wherever the precondition of available indigenous raw material supply has been met, developing countries have been able to shift from sale of raw material to production and marketing of leather and leather products.

In spite of the new 1979 multilateral agreement on trade, restrictions and non-tariff barriers are a threat to the efficient functioning of existing industry and further development. Priority of attention should be given to international cooperation in order to restrain escalation of trade barriers and restore equitable terms of trade in hides and skins, leather and leather products for developing and developed countries.

CONCLUSIONS

Developments of the past year have drawn attention to raw material supply as the major problem of the world leather and leather products industries. Two decades of extraordinarily favorable supply of cattlehides, the principal raw material of the leather industry, have been succeeded by supply stringency. This does not appear to be merely a cyclical episode. There are strong indications that it reflects the resumption of a more normal relationship of cattlehide production and human population trends.

Looking forward to 1985 it is difficult to foresee resumption of supply growth at the rate which characterized the last twenty-five years. This change in trend will alter prospects for growth in leather and leather products in developed and developing regions alike. South America is the only region of the world where significant growth prospects in cattlehides can be anticipated for the next decade.

The data of production and trade in leather and leather products demonstrate that developing countries with adequate supply, in quantity and quality, are now fully utilizing their domestic resources. The same countries are also rapidly expanding into the integrated manufacture of leather products. These countries, the largest producers of hides and skins in developing regions, have effectively reached the Lima Declaration goal in leather.

A more difficult and serious problem is apparent in countries with inadequate hide and skin supply due to livestock resources or shortcomings in making hides and skins available for the production of leather. It would seem that these countries must address themselves to fundamentals: Livestock production; improved slaughter methods; better hide and skin recovery and quality.

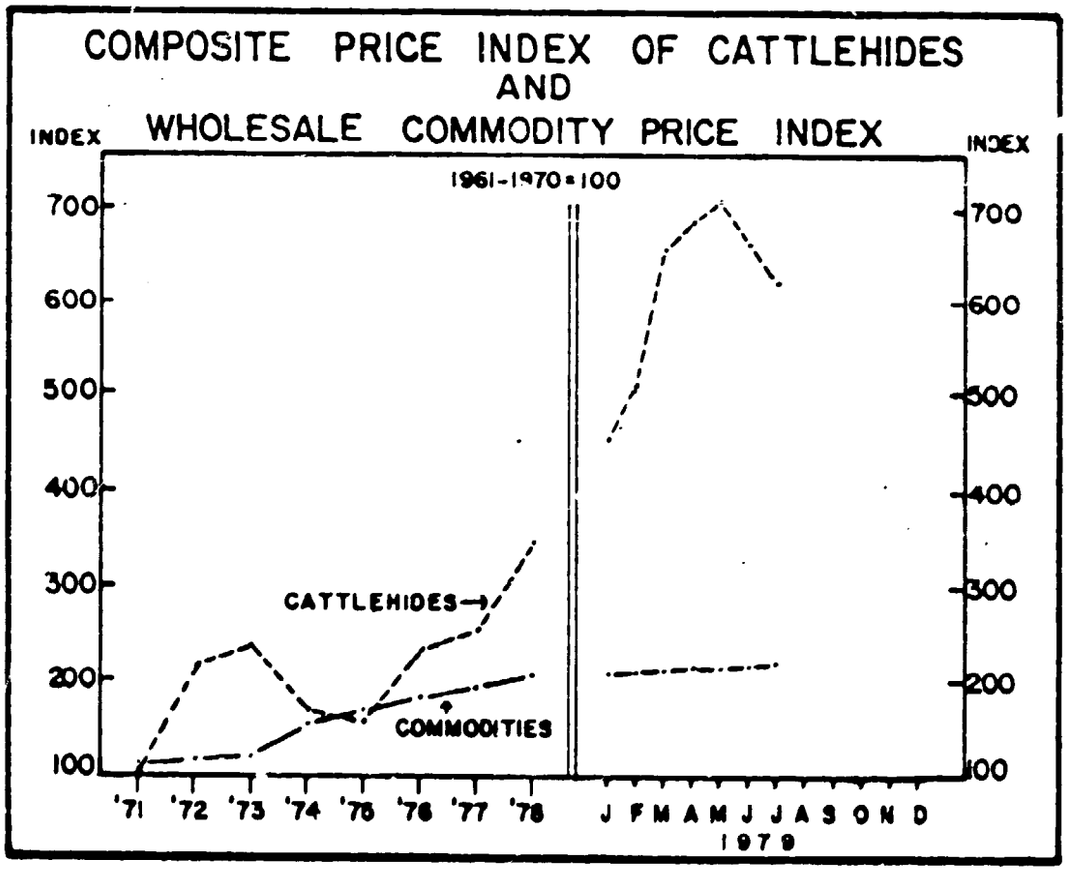
CHAPTER II

HIDES AND SKINS ECONOMY

INTRODUCTION

Although the production of leather may be the most ancient industrial pursuit of mankind, its economics are largely terra incognito compared with contemporary understanding of industries more modern in origin. This observation applies with special force to the economics of hides and skins which are the starting point of the leather industry and the derivative leather products industries. Portentous developments in 1978 and the first half of 1979 highlight the gaps in understanding of hide and skin market economics. In that period cattlehide prices advanced more than 100 per cent in the U. S. and other primary world markets and reached an unprecedented level both absolutely and in ratio to general commodity price

FIGURE 1



indexes. Neither the extent nor rapidity of the advance were anticipated, with very few exceptions, by market practitioners or theorists. (See Figures 1 and 2.)

The implications of the current situation in world hide and skin markets may be much wider and more far-reaching than is generally perceived. Their gravity can be inferred from the single fact that the price level prevailing in April 1979 required 250 per cent more working capital than a year previous to maintain a constant physical inventory in tanneries processing every description of raw material. Is such enormous escalation of hide and skin prices a transitory phenomenon attributable to a recurrent cycle in livestock production or does it reflect the surfacing of unheralded factors? Appraisal of this question, with all its significance for international policy and planning in the leather sector, requires review in this chapter of hide and skin salient economic characteristics. Similar re-examination of the leather and leather products industries is undertaken in the following chapter.

STATISTICAL DATA ON HIDES AND SKINS

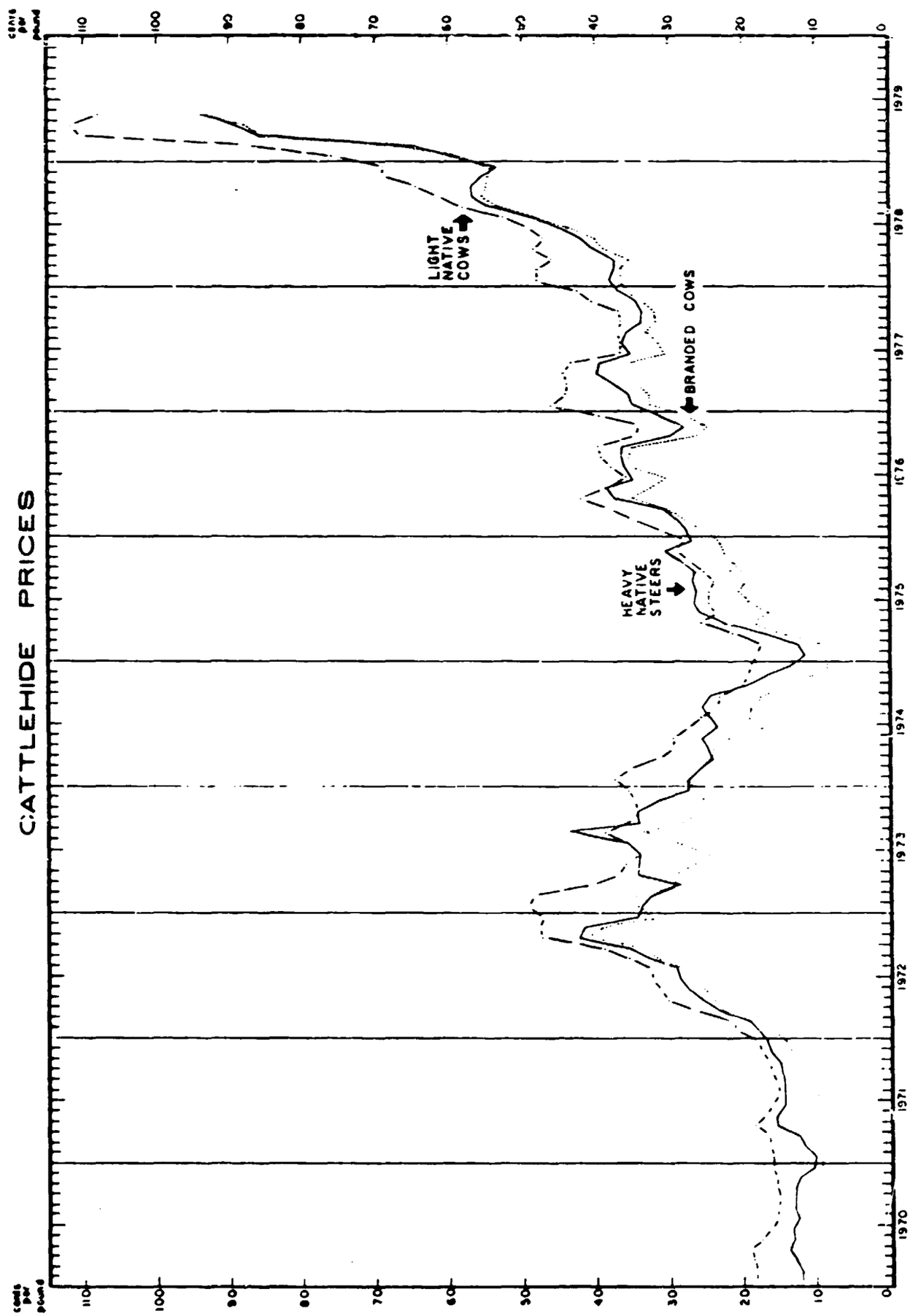
Statistical Limitations

The existing data base of the hide and skin economy leaves very much to be desired for accurate description and analysis. A cogent exposition of the inherent deficiencies was presented to the Ad Hoc Government Consultation on Hides & Skins called by the FAO Committee on Commodity Problems October, 1978.[1/]

In essence, the shortcomings of statistical intelligence in the hides and skins sector include:

1. Exceedingly wide gaps in production, trade and consumption data from a majority of countries and complete absence of official or reliable figures from many. The scope of statistics on available supply varies directly with the

FIGURE 2


CATTLEHIDE PRICES
CENTS PER POUND
110
100
90
80
70
60
50
40
30
20
10
0
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
LIGHT NATIVE COWS
BRANDED COWS
HEAVY NATIVE STEERS

proportion of animals slaughtered for family subsistence or in village abattoirs and with the proportion of supply recovered from fallen animals. Statistics on utilization, trade and consumption are frequently not collected by national statistical services because of the difficulties arising from the heterogeneous nature of this raw material and its derived products. 2/

2. Lack of standard conversion ratios to relate hides and skins of different types and origins by common denominators. Such conversion ratios are essential in the first instance to define the weight equivalents of hides and skins flayed, cured and processed by different methods, i.e., brined, wet-salted, fleshed or non-fleshed, dried, pickled, semi-tanned, wooled or pulled, etc. Conversion ratios are equally indispensable to determine the area or weight yield in leather from hides and skins of given or calculated weight.

3. There are very few statistics on comparative quality or grade of raw material by origin and types. Conventional measures of hide and skin production and trade by gross number or weight provide no insight or guidance with respect to optimum utilization of indigenous supply. Historically, comparative market values played a principal role in funneling supply to the economically most appropriate utilization. To the extent that the importance of the market compass has diminished, greater statistical and economic intelligence is indispensable to avoid inefficient allocation of resources.

Information Framework of Study

In spite of the patent inadequacy of the statistical data now available, meaningful description and analysis of the hide and skin economy and derivative industries is feasible. This assumption rests on a core of reasonably consistent time series, mainly from developed regions but also including several developing nations. Trade data, past and present, provide a basis for verifying, estimating or extrapolating related series essential to depicting the composite structure. Reports by qualified observers, particularly the consultants engaged

in 1978 by UNIDO to survey specific regions, are invaluable in analysis of existing conditions, and their causes, and for gauging future trends. Raw material dealers and brokers, machinery and chemical suppliers, and tanners, of different nationality but all with past or present commercial familiarity with various foreign areas are a great source of uncodified information.

In brief, therefore, this study is based, to the maximum possible extent, on available hard data. However, in appraisal of trends and projection of supply, trade, utilization and consumption volume in 1985, qualitative judgment is invoked to supplement conventional statistical methodology.

SALIENT ECONOMIC CHARACTERISTICS - HIDES AND SKINS

By-Products

It is a truism that hides and skins are the by-products of meat production and, in a parallel sense but lesser degree, of wool and milk output. Since hides and skins from cattle, sheep, goats and pigs account for more than 97 per cent of the world raw material for leather, a unique economic fact follows: Hide and skin supply is virtually not responsive to demand. The qualification refers to the small increases or decreases of available supply imputed to extreme price change under highly unusual circumstances such as the great depression of the early thirties, or, per contra, the price explosion of 1972. Moreover, the supply consequences under such conditions tend to be confined to residual or low-grade supply from remote and under-developed areas.

For all practical and analytical purposes hide and skin supply, therefore, must be described as inelastic. No other commodity of substantial economic importance shares this characteristic in remotely equivalent degree. It has been a central factor in the economics of hides, skins and leather for generations and will become even more vitally important during the next decade. The underlying reason for the inelasticity of supply is obvious:

Realization values for hides and skins are a very small fraction of the cost and value of meat on the hoof or of the yield of milk or wool in the productive span of dairy cows or wool sheep. A few examples will suffice to indicate the value relationship of hides or skins and market value of animals ready for slaughter. In cattle the ratio of hide weight to animal live weight averages 5.8 per cent. Since average hide prices per pound have in the past been lower than the price of beef on the hoof per pound, hides have rarely exceeded 5 per cent of live animal value. The comparable historic average for calfskins of 5.6 per cent is slightly higher as it is for the superior grades of sheep and lamb skins obtained from standardized breeds such as raised in New Zealand. In the absence of meaningful price series for goat or goat meat, correspondents in India provided quotations and estimates. These indicate that in 1977 goat and kidskin prices approximated 5-7 per cent of the value of marketable animals. Data with respect to pigs and pigskins is also scarce. However, according to U. S. Department of Agriculture price reports for pigs and trade quotations for pigskins, the latter represented, in 1978, between 4 per cent and 6 per cent of animal value.

It would not be accurate to draw a generalized stricture from the above regarding the role of hide and skin values in livestock production, animal slaughter, meat marketing or hide and skin availability. The significance of the hide and skin value ratios cited vary enormously with the degree of development in livestock raising and marketing, in slaughter systems and techniques, and in the distribution of major products and by-products.

In the more highly developed countries, and especially those which are market oriented, the incentive to maximize by-products is omni-present. Animal slaughter in such countries is concentrated in packing establishments of large scale and these establishments tend to compete for animal supply and in sale of their products, including hides and skins. To a large packer 5 per cent is a highly significant item on the profit and loss account. So much so, that sale of the

by-products at optimum market price is an incentive toward efficient slaughter, proper flaying and maintenance of quality in hides and skins. A correlative feature of the livestock producing and processing industries in many of the highly developed areas is the prompt and general distribution of price and value information through government offices or commercial trade press and agencies.

An obverse set of conditions prevail in the under-developed and least developed areas of the world. Slaughter is not concentrated or centralized. It is widely dispersed as a household function, among local butchers or small abattoirs. Incentives for the preservation or improvement of quality are conspicuously absent. Communication is diffused through several layers of collectors and buying agents.

Inelastic Supply

In terms of the two extremes described in the preceding paragraphs, more precise economic meaning can be given to "inelasticity of supply" and the value relationship of hides and skins to animal and meat values:

First, the primary fact is that whatever the stage of national development, livestock are not raised and slaughtered to augment hide and skin supply.

Second, in the developed countries available supply consistently and closely approximates the potential maximum supply. Fluctuations in hide and skin prices are not a significant determinant of quality.

Third, in the developing areas of the world price determines in some degree the ratio of available supply to the potential maximum from slaughter and recovery from fallen animals. Price also influences quality, expressed by takeoff, cure, storage and transport, to a greater extent than in the developed countries.

Homogeneity

From the stand point of tanners and leather product manufacturers an ideal characteristic of raw material would be homogenity in hides and skins of various descriptions. That is far from being the actual case in the four major species and even less so in the exotic hides or skins which account for 2-3 percent of aggregate

leather production. In point of fact, hides and skins are heterogeneous within each taxonomic grouping and the principal reasons are: Diversity of breed, age at slaughter, season of kill, animal maintenance, feed supply, flaying systems and equipment, curing methods, storage and transport facilities. Variations in each of the preceding elements can diminish the homogeneity of hides or skins drawn from a common area and ostensibly from the same breed.

It can be correctly inferred that degree of homogeneity correlates directly with the stage of agricultural and industrial development in the nation or areas of hide and skin origin. North America, Western Europe and Oceania are the areas of the greatest progress in that respect and it will illuminate the general problem to note the responsible factors.

In the leather sector the economic criteria of raw material homogeneity are three-fold: Hides and skins of specified origin must be susceptible to standard description and classification, e.g., animal sex, weight, cure, season of takeoff, moisture content and grade. Second, hides and skins so classified meet applicable specifications within agreed tolerances. Lastly, the products of different packing establishments, conforming to standard classifications, can be comingled in the tannery to produce commercially uniform leather.

Prerequisites to Commercial Homogeneity

Essentially these are: Basic homogeneity of animal breed; standardized systems of raising and marketing livestock for optimum yield of meat, milk or wool; consistent availability of grass or fodder and feed grain at costs which normally provide incentive for herd maintenance and growth; a market system based upon respect for recognized standards of hide and skin grade and selection; and, slaughter establishments large enough to sort and sell their hides and skins according to standard classification and grade.

The prerequisites noted above do, in fact, describe major features of hide and skin production in North America, Western Europe and Oceania. These conditions

have evolved over many years against the background of a generally favorable physical environment and the concurrent emergence of an infra-structure providing communication, transport and machine technology. And, it should be added, the constant honing of competititive response has promoted a continuous quest for efficiency among livestock producers and packers. It is scarcely surprising that U. S. hides set a standard for volume trade internationally or that New Zealand pelts play a similar role in the world sheep and lambskin trade.

In the under-developed regions the hide and skin economy is in most respects the antithesis of prevailing conditions and practice in the highly developed areas. The facts have been long known and clearly articulated by the organs of the UN in their effort to accelerate economic development in many areas. Improvement in animal husbandry, flaying, curing, collecting and transport have been repeatedly stressed as essential to enhancing the availability, value and utilization of indigenous raw material.[3/]

The problem is of paramount importance because the available supply of raw material in many areas falls significantly short of the potential supply both in quantity and quality. Many facts of the problem have been documented by consultants charged by UNIDO in 1978 with investigation and analysis of available supply in various countries of Africa, Asia and South America. Again and again these reports emphasize the ubiquitous obstacles: Animal breed and maintenance, grass and fodder, endemic disease, tsetse, ticks, warble fly, inadequate slaughter systems, poor cure, absence of collections and storage facilities, transport and communication deficiencies.[4/]

Classes of Hides and Skins and Relative Importance

Four categories of hides and skins are presently, and foreseeably, of significant economic importance to the world leather and leather products industries. These are: Bovine hides and skins, sheep and lambskins, goat and kidskins, pigskins.

All other types of hides and skins are generally grouped as exotic and represent no more than 2-3 percent of aggregate raw material suitable for production of leather. 5/ It is obvious that the principal categories are by-products of livestock raised for meat, milk or wool whereas the peripheral types are not.

In each of the species, from which the principal categories of hides and skins are obtained, there are a great number of breeds, cross-breeds and even sub-species. All of these differ, and in many instances quite markedly, in size, weight, physical conformation and fibre structure. Moreover, the difference in physical characteristics among breeds is amplified by the differences due to age of animals of the same breed at time of slaughter.

In the bovine group cattlehides are taken from mature animals and calfskins from young stock ranging from new-born to animals several months old. A similar distinction obtains between sheep and lambskins, goat and kidskins. The integument of a mature animal is, of course, much heavier and larger in area than the takeoff from young stock. In addition, the qualitative differences of grain and fibre due to animal age are generally sufficiently extreme to preclude common utilization of cattlehide and calf leather for uniform end products.

Production of cattlehides exceeds calfskin supply approximately ten times, worldwide, with the disparity ranging to 20-fold by nation and region in accordance with the composition of the cattle herd. Calfskins originate primarily from dairy herds through the marketing of excess bull calves for slaughter as veal. Bull calves from beef herds are typically converted to steers for grazing and feeding with only a small proportion retained for reproduction.

Conversely, the slaughter of young stock in both sheep and goat culture is greater than the kill of mature animals. The latter are held during their productive span for wool output or for proven breeding value. In addition, lamb or kid meat is generally deemed more palatable than mutton or goat meat.

Finally and most important - cattlehides are the basis, the sine qua non of the modern leather industry. This central and dominant fact tends to be obscured in

wide ranging discussion of economic strategy for development and availability of indigenous resources. Absent hides, the production of leather would be scarcely more than a minor and even rudimentary industry. Table 1 presents the key data with respect to quantity of principal components in world supply.

TABLE 1

WORLD HIDE AND SKIN PRODUCTION

AND LEATHER EQUIVALENTS

1977

	Million Pieces	Leather Area Million Sq. Ft.	Per Cent Total
Bovine	285	8,895	71.3
Sheep & Lambskins	384	2,738	22.0
Goat & Kidskins	167	834	6.7
		12,467	

Source: FAO 1977 estimated production totals Bovine, Sheep and Goat breakdown and computation of leather area by I. R. Glass (CCP:HS78/2, Part II, August 1978

It should be noted that Table 1 does not include cattlehide splits. Most cattlehides processed into light leather (which includes practically every type but sole, harness and mechanical belting) are split in thickness to separate the topgrain layer from the bottom or flesh side. Splits are a valuable article of commerce and are used for many purposes including shoe uppers, garments, insoles, work gloves, etc. Splits yield on average an additional 32 per cent to the primary or topgrain area of a hide. Hence, it is estimated that the realistic quantity given for cattlehide equivalent area in Table 1 should be approximately 11,000 million square feet.

Apart from quantity per se, other factors are involved in the primacy of cattlehides. First, cattlehides can be used to produce or fabricate almost every conceivable

type of leather or leather product; the utility of other raw materials is much more limited. Second, given equal utility per unit of surface area, the value of raw material increases with size by virtue of economies in leather product manufacture and fabrication. A cattlehide of 40 square feet can be tanned and cut into shoe parts at considerably less expense than eight goatskins. For products requiring large patterns, e.g., upholstery or garments, cattlehides are almost irreplaceable.

AVAILABILITY OF HIDES AND SKINS

It is necessary to define "availability" in the context of this study. Availability is not the maximum possible supply of hides or skins theoretically obtainable from slaughter of livestock or recovery from fallen animals. Availability equates with the supply which moves into sight, through market channels, or by mandate, for utilization by tanners, large or small and whether individual, corporate or publicly owned.

Animal Numbers

Livestock population is the logical and necessary starting point although it can only serve as a crude index of hide and skin production for several reasons. These include: Wide variation in the composition of herds and flocks nominally of the same species; tremendous disparities in productivity, i.e., ratio of slaughter to live animals; percentage of hide and skin recovery from fallen animals. Only a small minority of countries maintain requisite statistical services for a periodic census of total numbers, geographic distribution, age grouping, animal marketing, incidence of death losses and other vital data. Undoubtedly, the most systematic effort to gain such information has been carried on by FAO and its compilations provide highly useful approximation of both numbers as well as national and regional trends.

TABLE 2

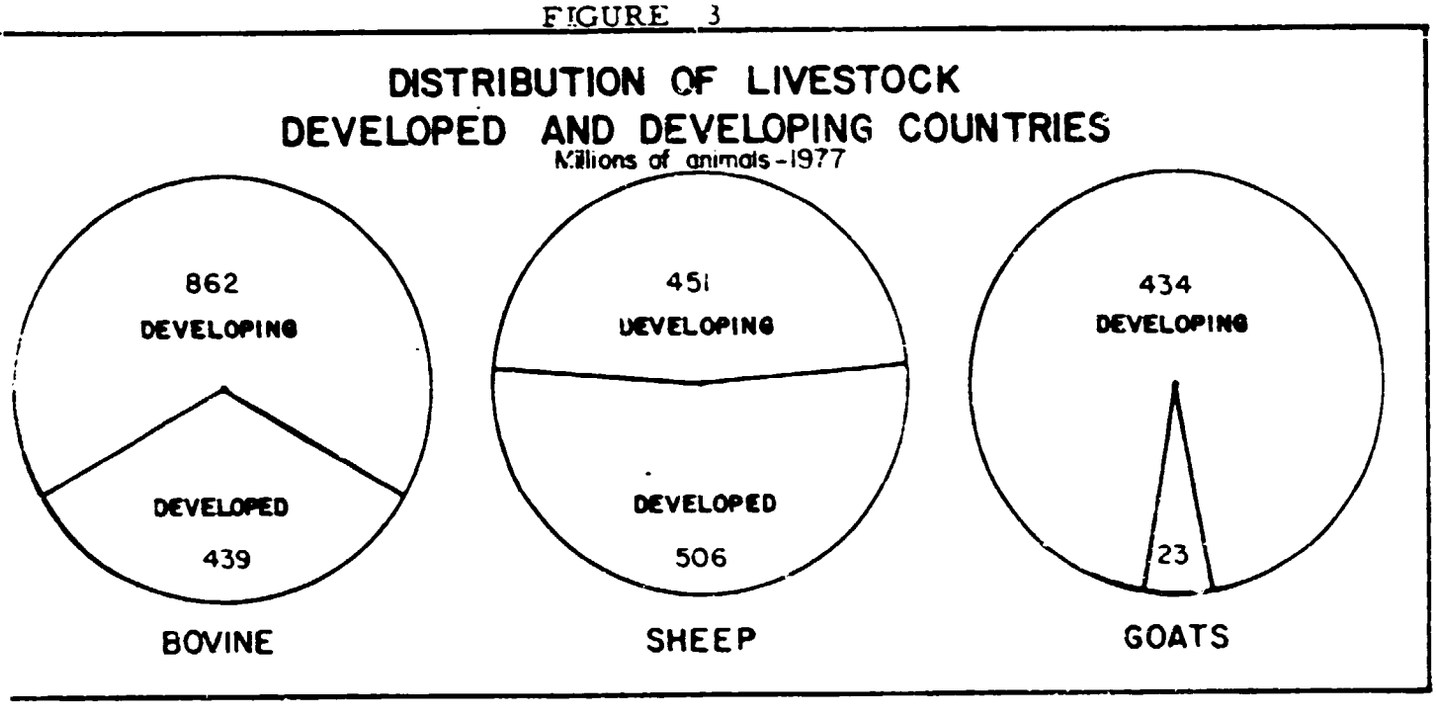
WORLD LIVESTOCK NUMBERS

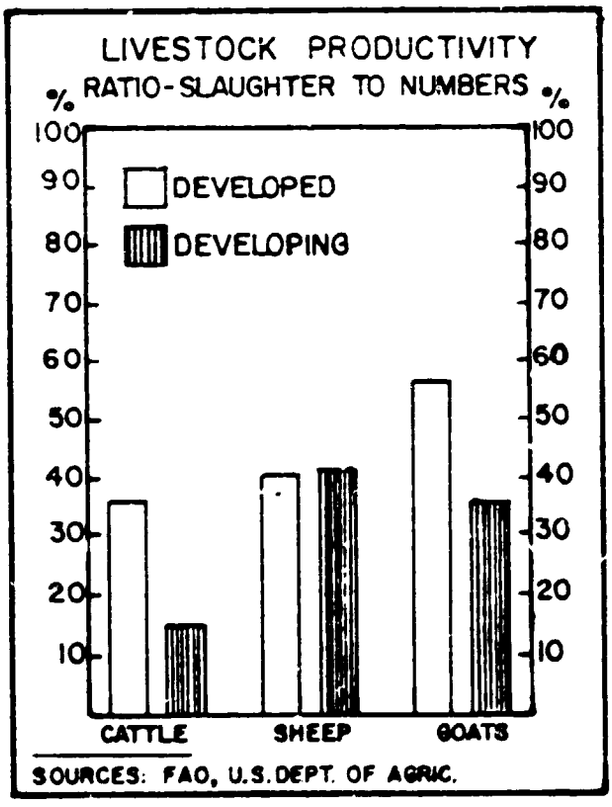
(Million Head)	C A T T L E			S H E E P		
	1961-65	1972-74	1977	1961-65	1972-74	1977
Developing Countries	757	856	862	455	441	451
Latin America	197	243	258	133	125	120
Africa	114	124	124	76	74	78
Near East	36	46	45	85	115	118
Far East	320	340	335	79	79	80
Asia, C.P.E.	90	103	100	82	48	55
Developed Countries	343	426	439	557	524	506
North America	114	135	136	29	18	13
Western Europe	84	100	98	73	93	94
Eastern Europe & USSR	107	137	148	178	174	175
Oceania	25	38	41	233	207	192
Other Developed Countries	13	16	16	44	32	32
World	1,100	1,282	1,301	1,012	965	957

	G O A T S			P I G S		
	1961-65	1972-74	1977	1961-65	1972-74	1977
Developing Countries	395	430	434	275	276	295
Latin America	43	35	36	71	69	73
Africa	122	129	131	9	9	14
Near East	53	76	77	3	3	3
Far East	87	89	89	17	20	20
Asia, C.P.E.	90	101	101	175	175	185
Developed Countries	26	23	23	270	305	319
North America	3	2	1	68	67	70
Western Europe	11	10	10	82	89	94
Eastern Europe & USSR	7	7	7	110	137	140
Oceania	-	-	-	3	3	3
Other Developed Countries	5	4	5	7	9	12
World	421	453	457	545	581	614

Sources: FAO, U. S. Foreign Agriculture Service, UNIDO Consultants.

FIGURE 3


DISTRIBUTION OF LIVESTOCK
DEVELOPED AND DEVELOPING COUNTRIES
Millions of animals - 1977
862
DEVELOPING
DEVELOPED
439
BOVINE
451
DEVELOPING
DEVELOPED
506
SHEEP
434
DEVELOPING
23
GOATS


LIVESTOCK PRODUCTIVITY
% RATIO - SLAUGHTER TO NUMBERS %
100
90
80
70
60
50
40
30
20
10
DEVELOPED
DEVELOPING
CATTLE
SHEEP
GOATS
SOURCES: FAO, U.S. DEPT. OF AGRIC.

Several aspects of Table 2 as a summary of the world's livestock resources require clarification. Numbers, per se, it must be noted, cannot be equated with hide or skin production. The most glaring example, of course, are the cattle of India which are not bred or raised for meat but are uniquely a socio-religious institution. Bovine hides or skins in that country are almost entirely obtained from fallen animals with mortality due to natural causes (age), disease and starvation. Consequently, in India the ratio of bovine hides and skins produced to animal numbers is approximately 10 per cent compared with off-take rates of 35 to 40 per cent from beef herds in developed countries. Similarly total cattle numbers include buffalo and water buffalo, related bovine species, and which are raised primarily for farm motive power. "Of the world's population of 150 million buffaloes, 95 per cent are in Asia and 76 per cent in S. E. Asia...it is considered that buffaloes are better suited to providing cultivation power for small farmers than mechanization in the near future."[6/] Since buffaloes are typically retained as long as they provide energy for plow or cart, the off-take rate is extremely low. Identical factors influence both the composition and slaughter rate of the bovine herd in China.

If the foregoing circumstances are taken into account, the conventional data on cattle numbers in Table 2 require pragmatic revision. From the standpoint of the hide and skin economy, the cattle resources of the developing countries in terms of hide productivity are considerably less than the conventional tally in Table 2. The following table illustrates the productive equivalent in hide terms:

Table 3. **Productive Equivalent in Hides**

Million Head	Estimated Actual	Adjusted for Hide Productivity*
Developing Countries	862	620
Developed Countries	439	439
World	1,301	1,059

* Based on calculated differential hide or skin yield, in pieces, from live cattle in India and China and from buffaloes in Asia equal to developed country average. Comparative size and quality of hides are ignored in this context.

The computation of productive cattle numbers in Table 3 draws a more accurate perspective on the present and foreseeable dimensions of the world's most important raw material resource for leather. In the first place, the proportion of "hide producing" cattle in the developing countries is smaller than indicated by cursory statistical enumeration. Second, barring massive sociological change and economic development, the limits on growth in the leather sector of major developing regions are severe.

Appraisal of the world sheep and goat stock does not involve problems of the same order as the cattle population. Major economic features of sheep and goat production include:

1. Wide dispersion of existing numbers among small producers, farmers and family units. With respect to sheep, the only exceptions are the large-scale production system in Oceania and to a lesser extent the commercial flocks in Argentina, Brazil, Spain, U. S., Iran and Turkey. Large flocks, however, are very rare in capriculture, although A. V. Parpia notes a possible trend toward commercial breeding and production in India.

2. Sheep are raised for meat and wool and suitability for one or the other major product varies with the breed. Production trends are affected in major degree by the demand for and prices of meat and wool. Production of goats is far less dependent on market meat prices since most goats are raised for family subsistence.

3. Sheep are efficient converters of grass to animal protein and are not crop destructive. However, they require more care and attention than any other livestock species. Goats, per contra, are born with a survival instinct. Unfortunately they are inimical to virtually all planting or foliage and, in that sense, characterize the lowest levels of agricultural development. Government policy in India, for example, has sought to discourage goat breeding because these animals, unless confined, denude land and forests.

Pigs are not at present a major source of world raw material supply. However, they are considered in this study because the raw material potential of 650 million

pigs cannot be ignored. In many ways, pigs present minimal production problems in comparison with other livestock species. They can be raised by farm households or on a large and intensive scale by specialized pig "factories". Diet for growth and fattening ranges from grain to vegetable waste. In most regions pigs can be bred semi-annually; multiple births permit swift growth in numbers in response to demand.

Livestock Production - Major Economic Aspects

It is not intended at this juncture to examine the minutia of livestock production, practices and results by regions and countries. The following analysis is concerned only with major economic facts and forces which are essential to understanding existing conditions in the hide and skin economy and to realistic projection of future hide and skin availability.

Grass

Grass is the point of departure for livestock culture because when grass is available ruminants convert solar energy into human food at exceedingly low cost. Grass, and its cultivated genetic variants, remains the primary economic factor in raising cattle and sheep. Vegetation of almost any kind is deemed edible by goats. Pigs have few dietary restrictions: they can be raised on household waste in small farm holdings or on planned grain regimens in factory type enterprises dedicated to uniformity of pork products.

In brief, production of cattle and sheep basically rests on grassland for grazing and for production of winter fodder. Quality and consistency of product, as well as speed of production (rate of weight gain) are greatly enhanced by grain feeding but grass is the fundamental prerequisite for maintenance of cattle herds and sheep flocks.

Suitable or available areas of grassland are more limited than is generally supposed. A glance at the world map discloses that prime pasture land is typically located in the temperate zones and is marked by year-round precipitation in contrast

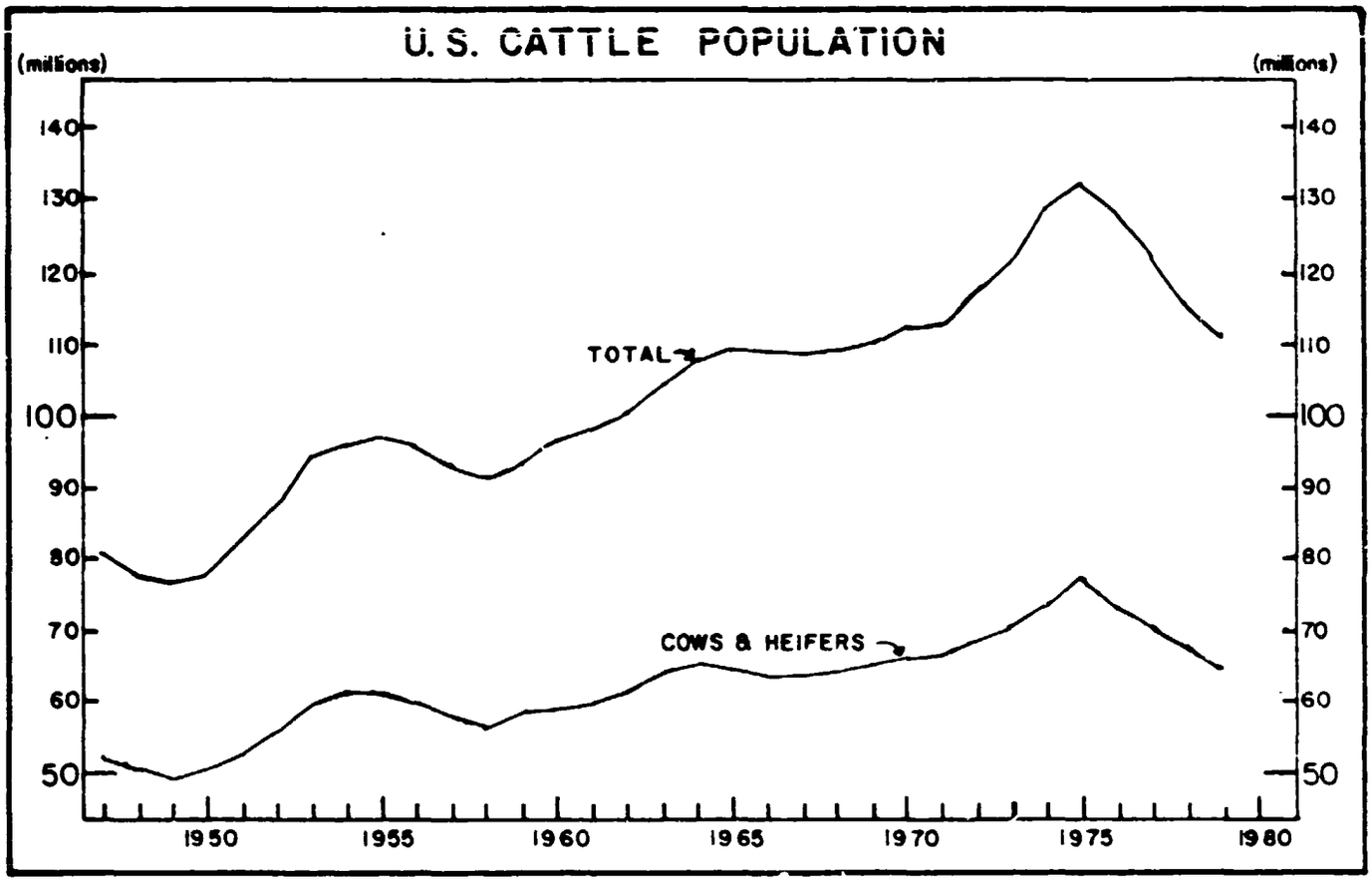
to seasonal deluge. Such areas are found in North America (Southern Canada, U.S., Northern Mexico), Argentina, Paraguay, Uruguay, Southern Brazil, Europe (below the 44th Parallel), temporate or pleateau Africa, Australia, New Zealand, Western China, Mongolia. It is not surprising, therefore, that the most productive herds and flocks and the maximum output of meat, milk, wool and hides and skins per capita are identified with the foregoing regions.

To what extent harsh determinants of geography and climate can be modified is a moot question involving many factors. These include the cost of the needed technology and requisite energy, water supplies and, above all, the conflicting claim for arable land due to population pressure. The latter aspect is obviously instanced by China where practically all arable land is cultivated intensively to produce food directly for human consumption. Even in the developed countries a debate has emerged in recent years on the economic merits and morality of vegetable versus animal protein.

Production Cycles

In the developed and market-oriented countries the past long-term upward trend in cattle numbers has, on occasions, been interrupted by temporary declines. These intervals are loosely described as "cycles", especially in the U. S., although the evidence with respect to cause and periodicity is far from exact. However, the mechanics of the so-called cycle are quite clear: A major drop in profit margin induces cattlemen to liquidate breeding stock, that is, cows and heifers. When profit margins increase, breeding stock is expanded through retention of heifer calves. For biological reasons seven years or more may elapse before herds again reach pre-liquidation numbers.[7/] Since the U. S. is presumed to be the statistical paradigm of bovine production cycles, Figure 3 merits examination. This indicates that in the thirty years prior to 1976, there were interruptions of only moderate amplitude in the long-term growth of cattle population.

FIGURE 4



In 1976 U. S. cattle numbers attained a record peak of 131.8 million head. By the spring of 1979 the estimated number had fallen to 110.6 million, the most severe drop in the history of the modern industry. Decline of such magnitude provokes serious questions. Is the downturn merely a pause in the secular trend or does it reflect more fundamental change?

TABLE 4

CATTLE NUMBERS IN CERTAIN COUNTRIES

Millions

	Average 1968-72	1973	1974	1975	1976	Pre. 1977
Western Europe	92.9	96.0	100.6	100.9	98.9	98.4
Argentina	50.1	54.7	58.3	59.5	59.0	58.3
Oceania	31.3	38.1	40.2	42.4	43.2	41.5

In each of the countries cited in Table 4, as well as in the U. S., seemingly different factors were responsible for the coincidental halt in long-sustained growth of cattle herds. Yet, on close examination a similar economic background appears to be pervasive, namely, excess market supply of beef, limited meat export opportunity, and inadequate realization prices compared with mounting production costs. In the EEC, for example, burdensome stocks of beef and butterfat led to reduction of price support levels. Argentina's traditional market in Europe was affected by heavy production in the EEC as well as beef import restrictions by the U. S. Depressed world beef prices, in addition to drought, afflicted cattle producers in Australia.[8/]

The Feedlot

No aspect of modern beef production is more important than the emergence of the feedlot in the U. S. during the early 1950's. Its consequences were by no means confined to the U. S.; they were worldwide and directly within the province of this study. Understanding the role of the feedlot is essential to informed appraisal of hide supply, past and future.

First, the facts: Grain finishing of cattle had been practiced in the U. S. on a small commercial scale for many years. In 1950 several feedlots were established contiguous to the source of range cattle, accessible to feed supply and capable of holding several thousand head at one time. The resulting advantages were quickly and widely recognized: Economies in transport and mechanized operation, marketing benefits in selling beef of more uniform and consistent quality. Cattle feeding rapidly became a major branch of the livestock industry.

In 1950 U. S. cattle slaughter totaled 13,104,000 head. By 1970 slaughter reached 35,740,000. Concurrently, cattle population increased from 77,963,000 to 112,303,000 head. This phenomenal growth has no precedent or parallel in agricultural history. The feedlot, as the analogue of a factory system, was

responsible. Obviously, a supporting base of fodder and feed grain output was an indispensable adjunct.

Second: The consequences - Cattlehide supply in the U. S. outstripped population growth and leather consumption. By 1953 the U. S. moved from the hide import to the export side of the foreign trade ledger; in following years, the U. S. became the major supplier of hides to the international market. This enormous addition to world supply kept hide prices exceedingly cheap, in relation to commodity price indices until 1972 when Argentina embargoed the export of cattlehides. In effect, the world leather economy was given a huge stimulus. Low cost hides promoted consumption and facilitated establishment of new tanning capacity in a number of countries.

It is now apparent that the great supply gain engendered by the feedlot in the U. S. was a non-recurrent development. By 1979 feedlot expansion stopped and, indeed, there were indications of redundancy in the cattle feeding industry.

Livestock Production Methods and Systems

An enormous spectrum of practices and methods is encompassed by the blanket term "Animal Husbandry". A majority of the world's livestock is bred and raised under conditions which would be familiar to farmers and producers of past centuries. That fact is vital in assessing future growth and projecting numbers in specified years, such as 1985. To enumerate the distinguishing characteristics of advanced livestock culture is tantamount to cataloguing a wide range of modern science and technology. For example, advanced management systems lean heavily on artificial insemination for control and improvement of breed, inoculation and disinfection against disease, feed supplements for weight gain, strength and to prevent aborting, forage crop rotation and fertilizers, formula silage and feed components, etc.[9/] A review of findings in various countries by UNIDO consultants suggests that only transfer of technology on a massive scale can accelerate the rate of livestock population growth in most developing and under-developed regions.[10/] Whether such transfer be accomplished rapidly enough to influence livestock numbers materially by 1985 is very doubtful.

POTENTIAL AND ACTUAL HIDE AND SKIN SUPPLY

Livestock numbers measure the capital resources which yield the potential supply of hides and skins. Three major factors then determine, everywhere and at all times, the actual yield available for leather output:

1. Productivity, or the ratio of slaughter to animal numbers.

2. Proper flaying and preservation of hides and skins for economic use in leather production.

3. Degree of recovery of hides and skins from fallen animals.

There is enormous variation in the operation and practical thrust of the above factors by country and by region. Per capita consumption of red meat, for example, ranges from well over 100 pounds annually in developed areas to less than 10 pounds in many countries and regions. With few exceptions, consumption of red meat correlates directly with per capita income; the exceptions are mostly due to social and religious inhibitions or to dietary preference. Livestock productivity, expressed as the ratio of annual slaughter to herd or flock numbers, also rises sharply with the per capita income gradient. In developed and industrialized regions, such as Western Europe and North America, yearly cattle and calf slaughter averages 36 per cent of cattle population; the comparable ratio in less developed areas can be as low as 10 per cent.

The range of raw material yield from slaughter correlates with the capital intensity of slaughtering facilities. In the U. S., at one end of the scale, the variance between hide and skin production and livestock slaughter is below one per cent. In less developed areas the gap is estimated to be as much as 20 or 30 per cent of slaughter and represents a serious loss in the availability of raw material. Reasons for the loss are described and documented by consultants' reports to UNIDO. 11/

Inadequate slaughter and flaying facilities are one of the main reasons for the discrepancy between total slaughter and actual hide or skin supply. In Africa, Asia and parts of Latin America, large packing houses with modern equipment and skills

TABLE 5

RATIO OF SLAUGHTER TO LIVESTOCK NUMBERS

BY REGION, 1977

(Million Head)	CATTLE			SHEEP		
	Numbers	Slaughter	%	Numbers	Slaughter	%
Developing Countries	862	129.6	15.0	451	183.2	40.6
Latin America	258	42.0	16.3	120	21.0	17.5
Africa	124	14.4	11.6	78	34.3	43.9
Near East	45	7.9	17.5	118	66.9	56.7
Far East	335	50.4	15.0	80	33.3	41.6
Asia, CPE	100	14.9	14.9	55	27.7	50.4
Developed Countries	439	156.1	35.5	506	200.5	39.6
North America	136	53.0	38.9	13	6.9	53.0
Western Europe	98	34.9	35.6	94	55.3	58.8
Eastern Europe & USSR	148	49.9	33.7	175	66.2	37.8
Oceania	41	14.7	35.9	192	64.0	33.3
Other Developed	16	3.6	22.5	32	8.1	25.3
World	1301	285.7	21.9	957	383.7	40.1

	GOATS			PIGS		
Developing Countries	434	153.5	35.4	294	191.4	65.1
Latin America	36	9.7	26.9	73	29.4	65.1
Africa	131	35.3	26.9	14	12.0	85.7
Near East	77	26.0	33.7	2	2.0	100.0
Far East	89	62.4	70.1	20	28.0	140.0
Asia, CPE	101	20.1	19.9	185	120.0	64.9
Developed Countries	23	13.5	58.7	319	410.1	128.6
North America	1	0.7	70.0	70	103.1	147.3
Western Europe	10	6.9	69.0	94	124.0	131.9
Eastern Europe & USSR	7	4.0	57.1	140	162.0	115.7
Oceania	-	-	-	3	4.0	133.3
Other Developed	5	1.9	38.0	12	17.0	141.7
World	457	167.0		613	601.5	

Source: FAO, U. S. Department of Agriculture.

are lonely exceptions to the prevailing practice of slaughter by household or farm, by local butchers and small abattoirs, or on village flaying grounds.

Loss of hides and skins at point of slaughter is compounded by their consumption as human food, a not uncommon practice in areas of Africa and Asia where immediate utility may outweight problematic returns for careful flaying, curing, storage and transport. It should be noted that the practice is not anomalous; in the developed countries far more pigskin is sold and consumed as food than is preserved for tanning.

Other conditions contributing to loss of hides and skins after slaughter are poor cure, inadequate transport, and lack of structured systems for the collection, grading, storage and marketing of the goods to assure optimum use and value. Proper curing after flaying is exceedingly important because fresh hides and skins are highly putrescible, especially in hot climates. Bacterial decay must be arrested promptly after flaying to avoid irremediable damage. (See Annex 1 for description of curing methods.)

Finally, the degree of recovery of hides and skins from fallen animals can and does represent a ponderable loss in availability. In the developed countries commercial rendering plants, strategically located, assure minimum loss of raw material to the leather economy as well as salvage of other by-products. The problem is of much greater magnitude in less developed countries and areas where the level of animal husbandry cannot as yet prevent high death losses. A. D. Parpia comments that in India, "Since the largest part of the raw material, namely bovine and buffaloes, are ex-fallen animals, it would be extremely important to institute steps for better carcass recovery.... the problem has to be tackled at the grass roots and the size of the problem is stupendous."[12/]

Hide and Skin Production, Past and Present

For more than two decades preceding 1977, global hide and skin production increased markedly, reflecting both greater livestock numbers, as well as improved

TABLE 6

PRODUCTION OF HIDES AND SKINS

1961 and 1977

B O V I N E

	Million Pieces			Wet Salted-000 Tons		
	1961	1977	% Increase Decrease	1961	1977	% Increase Decrease
Developing Countries	91.8	129.6	41.2	1487.4	2101.0	41.3
Latin America	27.8	42.0	51.1	635.3	949.3	49.4
Africa	11.2	14.4	28.6	168.1	217.6	29.4
Near East	5.5	7.9	43.6	66.3	99.9	46.3
Far East	34.6	50.4	45.7	364.0	540.9	48.6
Asia, CPE	12.8	14.9	16.4	251.7	293.3	16.5
Developed Countries	117.1	156.1	33.3	1943.7	3106.4	59.8
North America	38.2	53.0	38.7	720.4	1178.3	63.6
Western Europe	33.3	34.9	4.8	625.8	796.2	27.2
Eastern Europe & USSR	35.8	49.9	39.4	451.4	782.8	73.4
Oceania	7.3	14.7	101.4	100.4	287.6	186.5
Other Developed	2.5	3.6	44.0	45.6	61.5	34.9
World	208.9	285.7	36.8	3431.1	5207.4	51.8

S H E E P A N D L A M B

	Million Pieces			Dry Weight-000 Tons		
Developing Countries	138.2	183.2	32.6	89.8	115.8	29.0
Latin America	23.9	21.0	-12.2	20.1	17.1	-15.0
Africa	27.7	34.3	23.8	20.5	25.5	24.4
Near East	44.0	66.9	52.0	25.7	39.6	54.1
Far East	21.3	33.3	56.3	12.6	19.8	57.1
Asia, CPE	21.3	27.7	29.4	10.7	13.8	29.0
Developed Countries	219.0	200.5	- 8.4	200.8	192.7	- 4.1
North America	18.3	6.9	-62.3	16.4	6.2	-62.2
Western Europe	50.8	55.3	8.9	47.8	51.0	6.7
Eastern Europe & USSR	81.2	66.2	-18.5	58.1	51.7	-11.0
Oceania	59.9	64.0	6.8	69.7	75.7	8.6
Other Developed	8.7	8.1	- 6.9	8.7	8.1	- 6.9
World	357.2	383.7	7.4	290.6	308.5	6.2

TABLE 6 (Continued)

PRODUCTION OF HIDES AND SKINS

1961 and 1977

GOAT AND KIDSKINS

	Million Pieces			Dry Weights-000 Tons		
	1961	1977	% Increase Decrease	1961	1977	% Increase Decrease
Developing Countries	117.7	153.5	30.2	88.5	116.5	31.6
Latin America	8.7	9.7	11.5	7.0	7.8	11.4
Africa	32.1	35.3	10.0	19.7	22.2	12.7
Near East	18.0	26.0	44.4	13.3	19.6	47.4
Far East	42.1	62.4	48.2	38.4	54.9	43.0
Asia, CPE	16.8	20.1	19.6	10.1	12.0	18.8
Developed Countries	16.1	13.5	-16.1	12.6	10.6	-15.8
North America	1.7	0.7	-58.8	1.7	0.7	-58.8
Western Europe	7.2	6.9	- 4.2	3.9	3.7	- 5.1
Eastern Europe & USSR	5.6	4.0	-28.6	5.0	3.6	-28.0
Oceania	0.1	-	-	-	-	-
Other Developed	1.5	1.9	26.7	2.0	2.6	30.0
World	133.8	167.0	24.6	101.2	127.1	25.6

Source: FAO-CCP: 78/2, Part II August, 1978. Reports by UNIDO Consultants November-December, 1978, coincide with FAO data and estimates for Developed Countries but are significantly lower for various Developing Countries. However, the broad pattern of change between 1961 and 1977 is fairly represented by the FAO compilation.

TABLE 7

AVAILABLE WORLD SUPPLY

1977

	BOVINE HIDES AND SKINS					
	Million Pieces	% World Total	000 Tons	% World Total	Million Sq. Ft.	% World Total
Developing Countries	**129.6**	**45.4**	**2101.0**	**40.3**	**3369.3**	**37.9**
Latin America	42.0	14.7	949.3	18.2	1344.4	15.1
Argentina**	14.3	5.0	386.9	7.4	486.5	5.5
Brazil**	11.6	4.1	232.0	4.5	371.4	4.2
Africa	14.4	5.0	217.6	4.2	388.6	4.4
Near East	7.9	2.9	99.9	1.9	204.5	2.3
Far East	50.4	17.6	540.9	10.4	1104.0	12.4
India**	34.4	12.0	343.8	6.6	694.0	7.8
Asia, CPE	14.9	5.2	293.3	5.6	327.8	3.7
Developed Countries	**156.1**	**54.6**	**3106.4**	**59.7**	**5526.2**	**62.1**
North America	53.0	18.5	1178.3	22.6	2017.2	22.7
Western Europe	34.9	12.2	796.2	15.3	1256.2	14.1
Eastern Europe & USSR	49.9	17.5	782.8	15.0	1645.8	18.5
Oceania	14.7	5.1	287.6	5.5	485.5	5.5
Other Developed	3.6	1.3	61.5	1.2	121.6	1.4
World	285.7	100.0	5207.4	100.0	8895.5	100.0

** Included in Regional Total

	SHEEP AND LAMBSKINS					
Developing Countries	**183.2**	**47.7**	**115.8**	**37.5**	**1284.5**	**46.9**
Latin America	21.0	5.5	17.1	5.5	142.1	5.2
Africa	34.3	8.9	25.5	8.3	239.0	8.7
Near East	66.9	17.4	39.6	12.8	505.1	18.5
Far East	33.3	8.7	19.8	6.4	199.2	7.3
Asia, CPE	27.7	7.2	13.8	4.5	199.1	7.3
Developed Countries	**200.5**	**52.3**	**192.7**	**62.5**	**1453.1**	**53.1**
North America	6.9	1.8	6.2	2.0	40.9	1.5
Western Europe	55.3	14.4	51.0	16.5	387.5	14.2
Eastern Europe & USSR	66.2	17.3	51.7	16.8	483.3	17.7
Oceania	64.0	16.7	75.7	24.5	493.0	18.0
Other Developed	8.1	2.1	8.1	2.6	48.4	1.8
World	383.7	100.0	308.5	100.0	2737.6	100.0

TABLE 7 (Continued)

AVAILABLE WORLD SUPPLY

1977

	GOAT AND KIDSKINS					
	Million Pieces	% World Total	000 Tons	% World Total	Million Sq. Ft.	% World Total
Developing Countries	**153.5**	**91.9**	**116.5**	**91.7**	**770.7**	**92.4**
Latin America	9.7	5.8	7.8	6.1	49.5	5.9
Africa	35.3	21.1	22.2	17.5	190.5	22.8
Near East	26.0	15.6	19.6	15.4	135.6	16.3
Far East	62.4	37.4	54.9	43.2	293.8	35.2
Asia, CPE	20.1	12.0	12.0	9.4	102.2	12.3
Developed Countries	**13.5**	**8.1**	**10.6**	**8.3**	**63.5**	**7.6**
North America	0.7	0.4	0.7	0.6	3.2	0.4
Western Europe	6.9	4.1	3.7	2.9	31.2	3.7
Eastern Europe & USSR	4.0	2.4	3.6	2.8	20.5	2.5
Oceania	-	-	-	-	-	-
Other Developed	1.9	1.1	2.6	2.0	8.6	1.0
World	167.0	100.0	127.1	100.0	834.2	100.0

productivity in certain regions. The major gain was in bovine hides and skins; growth in output of sheep and lambskins and of goat and kidskins was significantly lower. In calculated weight, a more accurate measure of leather yield than pieces, the gain in bovine output reflects declining calf slaughter and heavier beef animals in developed countries.

In assessing world resources in available hides and skins, stress must be given to the facts detailed previously in this chapter on the tremendous variation in physical characteristics of hides and skins derived from the same species. These variations have been and are presently identifiable, to a very large extent, by region of production and size is a vital regional variation.

Cattlehides produced in Western Europe or North America will yield 40 sq. ft.; in India the corresponding figure is barely 19 sq. ft. African hides average less than 26 sq. ft., Australian hides 34 sq. ft., etc. Regional differences in size of sheepskins and goatskins are much smaller except for the great difference between skins from mature and from young animals.

True available hide and skin supply cannot, therefore, be accurately measured or compared in the primary units of production. Such tabulation and comparison alone can lead to gross distortion in appraisal of available supply, both globally and by region. Two conversions can be employed to approximate comparative quantities in equivalent units, weight and area yield of hides and skins. Table 7 compiles world available supply by region in original units, weights and surface area. Since the unit of sale for at least 92 per cent of all leather is now the square foot (or square meter), area is the most meaningful basis of comparison. Units of area are, of course, subject to the same caveat of quality variation that applies to a count by pieces or gross weight.

In concise form, the global distribution of the available major raw material supply in 1977 was as follows:

TABLE 8

1977 WORLD DISTRIBUTION OF AVAILABLE

MAJOR HIDES AND SKINS

Million Sq. Ft.	Bovine	Sheep	Goats	Composite Totals	%
Developing Regions	3369	1284	771	5424	435
Developed Regions	5526	1454	63	7043	565
Total	8895	2738	834	12,467	1000

Regional Variations

Variations other than size cannot be expressed statistically, although their qualitative bearing on available supply should not be disregarded. Grain surface, fiber structure, flaying defects and cure determine both the value of hides or skins and the type of leather and end-product for which they can be used. For example, hides from aged animals are typically coarse grained and marred by cumulative surface damage. Cattle or buffalo hides recovered in India cannot, therefore, generally be converted to full grain leather for top grade products. Skins from mature, wool-bearing sheep tend to be ribby and unsuitable for leather garments; hence, the superior quality status of New Zealand lambskins compared with Australian or Argentine sheepskins.

Detailed description and commercial evaluation of every type of raw stock by all regions and countries is beyond the scope of this study and the only comprehensive survey ever made is unfortunately outdated.[13/] Such evaluation of national or regional hides and skins in qualitative terms is a critical prerequisite to any consideration of viable alternatives for the optimum utilization of indigenous supply. Reports by UNIDO consultants in 1978 have greatly enlarged general information on the major characteristics of hides and skins in various regions. Their findings are incorporated in the following descriptive summary.

Latin America

In this area, ranging from Mexico to Argentina, there is substantial variation in methods of livestock raising and in character of hides and skins. Argentina, Brazil, Uruguay and Paraguay are the major cattle producers and with the largest proportion of slaughter in "Frigorificos" or modern packing establishments. In these countries, where cattle production and slaughter methods compare with standards in developed countries, hides are of excellent to good quality, although many of the Brazilian hides are ticky. Hides from Central America are generally inferior in quality, takeoff and cure. It is estimated that in 1977 the entire region's hides averaged 32.5 sq. ft. and output totaled 42 million pieces.

Sheepskin production, which has been declining, is mainly from wool breeds. Quality of skins from commercial packers is good; collectors' skins are inferior; loss from non-recovery is believed to average 15 per cent. Skins are approximately 6.8 sq. ft. in area.

Goatskin supply has been relatively stable with very modest growth predicted for the near term. Kidskins from the region are a desirable raw material; goatskin quality is inferior.

Africa

In general, the conditions governing livestock raising, slaughter, flaying and curing are serious constraints on quantity and quality of output. The catalog of problems includes: Nomadic or semi-nomadic stock raising; periodic and recurrent drought in areas such as the Sahiel; family or butcher slaughter and flaying; lack of abattoirs or their non-utilization; disease and insect damage; dry-curing; consumption of hides or skins as food; non-recovery from fallen animals, etc., etc. There are several countries where UN assistance and government-sponsored programs have resulted in improvement. However, the bright spots are rare; tremendous effort must be applied to improve available quantity and quality of hides and skins.

Variations within and among the sub-regions of the continent are pronounced. The estimated average size of all African cattlehides is 26 sq. ft. but this covers 34 sq. ft. hides from North Africa and 18-30 sq. ft. pieces from Central and Southern Africa. Heterogeneity also afflicts the sheep and goatskin supply. North African countries such as Morocco and Algeria produce skins of reasonable uniformity. Ethiopian skins, when available, are fairly consistent in character, especially in the Addis Abbaba area. African sheepskins run large, averaging more than 7 sq. ft., reflecting proportionately large slaughter of sheep. Goatskins vary in size from 4.5 to 6.6 sq. ft. and are extremely diverse in grain and fiber from country to country.

Commercial observers long familiar with Africa, cite two reasons for the reduced uniformity of available national supply: First, the movement of livestock as well as hides and skins across borders causes intermingling of supply; second, commercial systems for large-scale collecting, sorting and grading of hides and skins have diminished.

Near East, Africa

A perceptible improvement in the quality of Egyptian hides and skins is related to operation of government abattoirs and salt curing. However, many of the cattle slaughtered are draft animals with hides in poor condition and include a large proportion of buffaloes. Measurements range from 10 to 34 sq. ft. Sheepskins are small, 6 sq. ft., and goatskins of less than 4.0 sq. ft. are very much below the world average. In the Sudan, the characteristic problems of slaughter, flaying and cure depreciate the value of hide and sheepskin output which compares with Egypt in available quantity.

Near East, Asia

Turkey and Iran possess the major livestock numbers in the region. Hides in Turkey are small, poor in quality due to bad grain scratches, insect damage and

inferior cure. Goats are inferior and declining in numbers, but the sheepskins are surprisingly good in quality. Growth in domestic leather garment output has provided an incentive for improvement of sheepskin quality. Average sizes are - cattlehides 24.7 sq. ft., sheepskins 6 sq. ft. and goatskins 4.1 sq. ft.

Iran's sheep flock is third largest in the world and is largely composed of hair sheep. Skins from this crossbreed are more finely textured than wooled sheepskins and are highly valued for garment leather. Average size of Iran sheepskins approaches 8 sq. ft., a very desirable feature for garment leather. The ratio of acceptable to reject grades of Iranian skins is considerably higher than in the rest of the region or, for that matter, in other developing regions. Apart from Turkey and Iran, the available hide and skin supply of the region is marked by the endemic problems of less developed countries.

Far East

The outstanding and unique variation in hide and skin supply of the Far East is familiar. Since most of the cattle and buffaloes in the region are not raised for beef, the hides are taken from superannuated or fallen animals. Productivity of herds is low; hide quality is notably poor; area yield of hides is the lowest in the world. Conditions adverse to hide and skin output and quality are exemplified in India which represents 73.0 per cent of total regional supply in equivalent surface area.

Hide and skin productivity and quality suffer from the repeated litany of farm and village slaughter, bad flaying, poor cure, inadequate transport, animal disease, insect damage, lack of grain and feed, etc. A provocative observation by R. D. Higham illustrates the economic cost of quality deficiency in the region: "Despite the high cost of imported leather which includes a substantial import duty, some products manufacturers have found it worthwhile to import finished leather in order to get more consistent quality and better cutting value."[14/]

Surface yields differ only moderately in the Far East countries; estimated averages for all countries are - bovine hides 18 sq. ft., sheepskins 6 sq. ft., goat and kidskins, 4.7 sq. ft.

China

The extraordinary subject of hide and skin supply in China is reviewed in a following paragraph. Regional variation is almost an irrelevant consideration. Nevertheless - cattlehides in China are small, about 20 sq. ft. or half the size of hides in Western Europe or North America. Quality is deplorable and testifies to the age and long service of beasts of burden which have outlived their usefulness. Sheep and goatskin quality is superior to hide condition in commercial characteristics; takeoff appears to be acceptable and traditional trading practices are still respected. The same comment is not applicable to China's pigskins; grain damage and butcher defects are omnipresent.

North America

North American cattlehides are the largest and perhaps the only supply in the world meeting all of these criteria:

1. Basic homogeneity of animal breed (Angus, Hereford, Longhorn).
2. Standardized methods of raising and marketing cattle.
3. High quality of hides with respect to substance, grain, flaying, cure.

Brands are an economic rather than quality issue since only area is affected and this is recognized in price differentials for branded selections.

4. Recognized and respected trade standards for grade and selection.
5. Consistency of quality from year to year and by comparable season.

Area yield varies with weight of specified hide selections. Light hides produce 36-38 sq. ft., heavy hides 40-46 sq. ft.

The quality of calfskin and kips is uniformly high. Calfskins average 10 sq. ft., and kip yield 22 sq. ft.

Sheep and lambskins vary with geographic origin but flaying, cure, pickling, etc., meet top standards. An increasing proportion of skins are marketed as shearlings, wooled skins, to meet world demand for double face garment leather. (Skins with wool on and sueded leather surface.) Average footage of sheep and lambskins is 7.2 sq. ft.

Western Europe

Comparable or superior in quality to North American cattlehides. Points of difference are the absence of large herds in Europe and grain feeding is either carried out by the original producers or in small feedlots with little resemblance to the American system. Considerable local butcher or farm slaughter exists in Spain and Italy, but the bulk of animals are slaughtered in modern commercial establishments. Cattlehides in Western Europe are the largest in the world and average about 42 sq. ft. Europe is also the largest remaining source of calfskins which average 10 sq. ft. per piece and are unexcelled for quality. Sheep and lambskins, primarily from wool breeds, approximate 6.8 sq. ft. and meet top standards for flaying, cure and pickling.

Eastern Europe and USSR

Geography and climate pose unusual problems for the region, and particularly for a large proportion of the USSR land mass. Extensive programs have been undertaken in the USSR to improve livestock breeds and expand grass, forage and feed resources. Existing diversity of cattle breeds impairs the homogeneity of cattlehide supply. This appears to be less pronounced in several countries of Eastern Europe than in the USSR. Flaying and cure vary considerably but on the whole fall short of the most desirable standards. In the USSR cattlehides are estimated to average 33 sq. ft. and in Eastern Europe about 35 sq. ft.

Sheep and lamb numbers in the region are second only to total flocks in Oceania. Wooled skins or shearlings averaging 7.5 sq. ft., are widely used for garment purposes. Available supply for light leather purposes is thereby limited.

Oceania

Livestock raising is one of the principal industries of Australia and New Zealand which have the highest ratio of animal numbers to human population of any area in the world. Sheep production in particular is outstanding in systematic technique and organization; flock productivity is unexcelled. Land and water conditions are

more favorable in New Zealand than Australia, where drought is a recurrent problem in the marginal production areas of the interior. High quality lambskins are the unique New Zealand specialty; these average 6.0 to 6.4 sq. ft. and are deemed suitable worldwide for smooth and suede garment leather. Most of the Australian output is in sheepskins, which are coarser grained and ribby. Cattlehides in both countries yield less footage than North American and European hides, approximately 33-34 sq. ft., and Australian hides from the country's interior are frecuently insect damaged. Takeoff and cure meet modern standards.

CONCLUSIONS

Statistical approximations of global and regional hide and skin availability, whether measured in pieces, weight or equivalent area, are the essential first step in analysis of the hide and skin, leather and leather products economy. They define the potential for leather production globally and are a guide to the indigenous resources available for tanning by region and by country.

It is apparent that the distribution of hide and skin supply is extraordinarily uneven among the nations. Whatever the causes, a major share of world supply is concentrated in relatively few regions and countries.

Moreover, it is not necessary to engage in demographic or per capita exercise to demonstrate that population and raw material concentrations do not coincide. It should be noted, too, that uneven availability of supply cannot be identified solely with the juxtaposition of developed and developing nations. It also applies within the developing group. For example three countries, conventionally described as developing, accounted in 1977 for 35 per cent of the total supply in the entire developing country group. Available supply in Argentina, Brazil and India totaled 1,903 million sq. ft. in the three principal raw materials, compared with 5,424 million for all the developing countries.

Table 9. Supply Comparison: Argentina, Brazil, India and All Developing Countries - 1977

Million Sq. Ft.	Bovine	Sheep	Goat	Total
Argentina	486	56	10	552
Brazil	373	26	14	413
India	618	134	186	938
Total	1477	216	210	1903
All Developing Countries	3369	1284	771	5424

Cattlehides are the base and bastion of the leather industry. They represent 71.3 per cent of all leather production and can serve virtually every leather product need. Goatskins and sheepskins have much more limited end product utility.

Problems suggested by quantitative description of available supply are intensified and multiplied by regional and national variations in character and quality of hides and skins. Too much stress cannot be given to the fact that an economic tanning operation requires adequate supply of reasonably uniform raw material. (Economic is defined here as output value exceeding input costs.) The development of the modern tanning and leather products industries depended to a great extent on a trading structure which channeled hides and skins into reasonably uniform and comparable assortments for their economic utilization.

Unusual and sustained growth in world hide and skin supply occurred for some twenty years prior to 1977. In large measure this growth was attributable to the coincidence of expansionary forces in Europe, North America, Argentina and Oceania. Projection of future supply by extrapolation from the preceding period of growth would give misleading results. Methods of forecasting or projecting hide and skin supply must be revised.

SUPPLY, DEMAND AND TRADE PROJECTIONS

Introduction

It has been pointed out previously in this chapter that projection of future livestock numbers must weigh distinct anomalies of development during the last twenty years. Equally unique problems are involved in forecasting future available hide and skin supply, future demand and future patterns of international trade in hides and skins. The problems are apparent in reviewing major trends discernible currently and in the very recent past.

Major Current and Supply Trends

Accessibility of Supply

Forecasting is complicated in the hide and skin area by the abridgement of the market process in the international allocation of available supply. This takes two forms: On the supply side, major producing countries embargo or severely restrict the export of raw material and, on the demand side, certain importing nations provide subsidies or various other incentives to finance imports of hides and skins which might otherwise be economically unjustified. Examples of the first are Argentina, Brazil, India, Colombia and Pakistan, producers of 25 per cent of the world's cattlehides, who embargo or otherwise restrict access to their own raw material. The Republic of Korea, Taiwan, Mexico and Japan are instances of raw material deficient countries where large imports are sustained through direct government aid or restrictive foreign trade controls. Centrally planned economies are a case unto themselves since exports and imports may be guided by national economic policy rather than subject to the arbitrament of market value.

Several implications of this trend are treated elsewhere in this study. It is immediately relevant to analysis of trade flow and patterns of demand for hides and skins. Hide and skin supply, it will be recalled, is virtually inelastic in response to demand. Moreover, with one historic exception, potential demand has always

exceeded actual supply in modern times. The exception occurred in 1934-36 as a result of the great drought in the western U. S. when eight million starving cattle were acquired by the government. After slaughter the hides from these animals were marketed gradually over a three-year period, by a government corporation, to avoid market disruption. At all other times in the past, consumption and supply were in a continually shifting but de facto state of equilibrium. Market price determined who would be the users and what would be the usage of available hides and skins.[15/]

Whatever its social virtues or demerits, the market process allocated the distribution of available supply among and within the countries of the world. Abridgement of the market process has developed against a background of rapidly growing supply during the last two decades. If that period is succeeded, for even several years, by reduced growth or static supply, what will be the consequences in price and accessibility of hides and skins to various regions and nations?

Hide and Skin Prices

Violent price eruption in the first quarter of 1979 continued the steady advance of the preceding year. But, what had previously been interpreted as an element of the general inflation syndrome was increasingly viewed by Spring 1979 as indicative of adverse hide and skin supply prospects. This was most apparent in the U. S. where commercial cattle slaughter declined 15.3 per cent from 1978 during the first six months. An immediate consequence of high-priced raw material for tanners and product manufacturers was a huge increase in working capital requirements. Raw material importers, more particularly in developing countries lacking domestic hides and skins, curtailed purchase operations in the first five months of 1979.

Processing At Source

Shortened U. S. supply of cattlehides in 1979 has stimulated further interest in the economics of processing fresh hides (not cured) at or contiguous to supply

sources. Initial operations at a new plant designed to produce blue leather from fresh hides confirm estimated savings of .03¢ to .04¢ per foot.[16/] Elimination of salt from tannery effluent is also reported of major importance. The trend toward adoption of the fresh hide tanning concept will have a wide impact on the structure of trade between importing and exporting nations. Formidable cost advantages will favor the export of processed hides, i.e., wet blue or crust leather over raw hides.

Capacity

Whether the facts should be described as condition or trend is irrelevant: Capacity in tanning and in leather products manufacture was widely reported as under-utilized in May, 1979. This trend had previously been apparent in a number of developed nations, notably the U. K., France, West Germany and the U. S. More recently there is evidence of a similar development in certain developing countries. For example, tanning capacity in Argentina now exceeds current available hide supply in that country.[17/] Reports of UNIDO consultants cite examples of comparatively new leather plants operating at a fraction of rated capacity in India, Thailand, Tanzania, Egypt, Turkey, Iran, the Sudan, Nigeria, etc.[18/] The Republic of Korea, Japan and Taiwan, almost completely lacking domestic raw material, the sharp rise in hide prices has forced curtailment of leather production.

Energy

The all too familiar curve of energy costs since 1974 need not be described. Tanning and the manufacture of leather products are not energy intensive industries[19/] and, therefore, will not be seriously or disproportionately affected by the rise in energy costs, provided that energy supplies are available to existing or prospective plants. However, energy is a major factor in transport and in developed agriculture. Shipping costs, for example, have become a more significant item in ocean carriage of wet-salted hides. For agriculture the implications are wider since they involve the feasibility of mechanization, irrigation and the cost of

fertilizers based on petrochemicals. These are, in turn, factors of considerable weight in the broad objectives of increasing and improving available hide and skin resources.

Demography

Finally, a trend has emerged, to the surprise of most demographers, with long-range and unpredictable consequences for the hides, skins, leather and leather products sector. Birth rates are declining in almost all developed and a number of developing countries. In Europe, West and East, zero population growth is imminent, if not already a fact in several countries. Similarly, forecasts of biological increase in the U. S. have been revised downward in light of a persistent low birth rate. Declining population growth is accompanied by shifts in the age group distribution of national societies, thereby influencing production and consumption levels.

It is unlikely that tangible consequences of the new population trend will be evident by 1985. Over the longer term, however, it could well assume major importance in the development of the hides, skins and leather economies.

PRODUCTION PROJECTIONS, 1985

Livestock Numbers

Future livestock numbers cannot be projected by the statistical techniques applicable to certain kinds of time series. For example, the data for the major parameters of cattle population are more precise and reliable in the U. S. than in any other country. Nevertheless, statistical extrapolation from a 25-year baseline, 1950-1975, would yield grossly inaccurate results on the size of the U. S. cattle herd in 1979 or 1985. Why? Because there are too many economic variables which must be factored into forecasts of livestock population and which cannot be quantified. These include demographic factors, energy costs, social customs, competition for arable land use (grain vs. grass!), water supplies, feedlot waste disposal, dietary trends, competitive meat supplies, existing technology and the rate of technological change, capital resources, etc. Informed knowledge of the foregoing

factors, and many others, as well as familiarity with available statistics is essential in estimating future livestock numbers. The reports of UNIDO consultants on various regions and countries in 1978 provided a great amount of down-to-earth information needed to evaluate livestock trends and hide and skin availability.

The forecasts given in Table 10 are grounded both on available data and evaluation, by region and country, of relevant and specific factors in prospective development.

Regional Variations

Regionally and by key countries the 1985 livestock projections take account of the following specific considerations.

Cattle

In Western Europe stability in numbers is likely following the induced expansion which culminated in 1976. Both beef and dairy product demand will reflect the somewhat unexpected and pronounced trend toward human zero population growth. Traditionally, cattle raising in Europe has been intensive, due to limited grassland, in contrast with the extensive nature of production made possible by the prairies or pampas of the U. S. and Argentina. Hence, in the absence of stimuli such as beef or butter-fat support prices, there has been a notable correlation between cattle numbers and regional consumption.

Eastern Europe and the USSR pose questions of analysis and projections on which prior experience is inadequate. A two-fold program has been initiated in recent years to expand cattle numbers and improve meat yield per animal. In both instances the coefficients of success are pasture-land and sufficient supply of grain or suitable fodder. Geography defines the extent of feasible grassland and the length of growing seasons for grain and fodder crops. Variables such as annual precipitation and feed grain import requirements are, of course, unpredictable. It is estimated that cattle population in the USSR and Eastern Europe will increase to 156 million head by 1985.

TABLE 10

LIVESTOCK NUMBERS

ACTUAL AND PROJECTED

(Million Head)	CATTLE Average 1972-74	CATTLE Pre. 1977	CATTLE Projected 1985	SHEEP Average 1972-74	SHEEP Pre. 1977	SHEEP Projected 1985
Developing Countries	856	862	925	441	451	468
Latin America	243	258	290	125	120	125
Africa	124	124	130	74	78	80
Near East	46	45	50	115	118	123
Far East	340	335	350	79	80	80
Asia, C.P.E.	103	100	105	48	55	60
Developed Countries	426	439	450	524	506	525
North America	135	136	138	18	13	10
Western Europe	100	98	100	93	94	95
Eastern Europe & USSR	137	148	156	174	175	175
Oceania	38	41	40	207	192	215
Other Developed Countries	16	16	16	32	32	30
World	1,282	1,301	1,375	965	957	993

	GOATS Average 1972-74	GOATS Pre. 1977	GOATS Projected 1985	PIGS Average 1972-74	PIGS Pre. 1977	PIGS Projected 1985
Developing Countries	430	434	427	276	295	318
Latin America	35	36	30	69	73	75
Africa	129	131	136	9	14	20
Near East	76	77	77	3	3	3
Far East	89	89	84	20	20	20
Asia, C.P.E.	101	101	100	175	185	200
Developed Countries	23	23	23	305	319	340
North America	2	1	1	67	70	75
Western Europe	10	10	10	89	94	96
Eastern Europe & USSR	7	7	7	137	140	150
Oceania	-	-	-	3	3	4
Other Developed Countries	4	5	5	9	12	15
World	453	457	450	581	614	658

Sources: FAO, U. S. Foreign Agriculture Service, UNIDO Consultants.

In North America cattle numbers are projected to reach 138 million head in 1985. That would be lower than the peak population of 146 million attained in 1975. It is noteworthy that the downturn in the U. S. cattle herd, commencing in 1976, is the most severe in magnitude and percentage yet recorded in that country. Preliminary estimates place the 1979 mid-year tally in the U. S. at 110 million cattle and calves compared with 132 million in 1976, a decrease of 16.7 per cent. A number of economic factors will dictate a longer period for rebuilding herds, whenever that process begins, than in their liquidation. These include: An historically low number of dairy cows thereby limiting the number of calves suitable for diversion to beef output; the ratio of feed and beef prices, highly probable at least through 1979, which will stimulate marketing for consumption rather than retention of young stock; the capital requirements for maintaining a herd at the record high animal prices in the Spring of 1979 and forecast into 1980 by the Chicago cattle futures markets.

Only modest growth is anticipated in the Far East. It has been noted that a major proportion of Far Eastern bovines consists of cattle in India and buffaloes, largely concentrated in Southeast Asia. Reports of UNIDO Far East consultants in 1978 emphatically support the finding of little growth potential in these resources. As for the balance of the Asian cattle population, the ubiquitous constraints of arable land, farm systems, national income, climate and so forth, impose limits on growth. In 1985 cattle numbers in the Far East will do well to aggregate 350 million.

Africa poses the most complex problem of analysis with respect to cattle numbers as well as other types of livestock. Varying stages of economic development on the continent hinder the collection of data and obscure their interpretation. Projections cannot be derived from any common or dominant matrix; they must be based on painstaking country-by-country assessment. A total of 134 million cattle are projected for Africa in 1985.

A unique set of conditions marks the Asian Centrally Planned economies and particularly the major nation of the group, the People's Republic of China. In the latter country, land utilization is not a conjectural problem; it is a harsh reality. Production of grain and vegetables for a growing population have absolute priority in the use of tillable soil.[20/] Projected cattle numbers for the centrally planned nations of Asia will not exceed 104 million by 1985.

Latin America will sustain the largest relative and absolute growth of the continental regions. There is still grassland to exploit in South America. In several countries the supporting infra-structure of industry, distribution and trade may even qualify their economies as "developed". Argentina, Brazil, Uruguay, and Paraguay are the countries where greatest expansion in cattle numbers is expected. The 1985 projection for Latin America is 290 million head, a gain of 12.4 per cent from 1977.

Sheep

During the past decade world sheep numbers decreased due to sharp reduction in Australia and the U. S. and were merely stable in other regions. Marketing conditions for sheep and lamb meat and wool were adversely affected by the competition, respectively, of rising beef output and synthetic fibers. The slight increase anticipated by 1985 is predicated on several factors: A better price/cost ratio for lamb and mutton; renewed consumer interest in wool as a "natural" product; greater import demand for sheep meat from the affluent Middle East areas.

A moderate increase in world sheep and lamb numbers is projected by 1985 to a total of 964 million from 930 million in 1977. This gain would reverse the downward trend of the past decade. Moreover, the bulk of the increase will occur in developed nations, specifically New Zealand and Australia, where land capacity will permit production to benefit from propitious meat and wool price trends. Almost everywhere else the maintenance of existing pasture capacity or the cost of additional grazing land set serious limits to flock expansion.

Goats

A small decline is projected in 1985 world goat population. Indications of this prospect have been observed and discussed in recent years, and the rationale is familiar.

With very minor exceptions goats are not bred or raised commercially. They remain, essentially, the livestock resource of small farmers and low income rural households in under-developed areas. Under typical conditions goats forage for their sustenance and their production cost, thereby, approaches zero. It has been noted that the wide-ranging appetite of goats encompasses nearly all forms of vegetation, foliage and even tree bark. For that reason the comment is aptly made: "...the nature of goat husbandry creates serious ecological problems especially in Africa and Asia."[21/] In short, capriculture is not consistent with the development of productive agriculture. Government authorities concerned with improvement of farm output discourage breeding of goats.[22/]

In the long term beyond 1985, it is likely that progressive improvement in the agricultural methods of developing regions will correlate with decline of world goat population.

Pigs and Hogs

At present, pigs furnish only a minute faction of the world supply of leather-making raw material. However, the potential of this source is enormous and could be increasingly utilized in the future with the conjunction of skin price incentives and appropriate flaying techniques. World pig numbers in1985 are projected at 658 million, a continuation of long-term growth.

Availability of Hides and Skins

Projected livestock numbers in 1985 are expected to yield the available hide and skin supply shown in Table 11. The gain from 1977 in total equivalent area would be 4.2 per cent.

TABLE 11

AVAILABLE HIDE AND SKIN SUPPLY

MILLION PIECES AND SQUARE FEET

	BOVINE			
	Est. 1977		Projected 1985	
	Pieces	Square Feet	Pieces	Square Feet
Developing Countries	**129.6**	**3369.8**	**140.1**	**3628.0**
Latin America	42.0	1344.4	48.0	1509.0
Africa	14.4	388.6	15.2	408.8
Near East	7.9	204.5	8.8	226.3
Far East	50.4	1104.0	52.5	1140.7
Asia, CPE	14.9	327.8	15.6	343.2
Developed Countries	**156.1**	**5526.2**	**159.7**	**5621.4**
North America	53.0	2017.2	53.7	2040.6
Western Europe	34.9	1256.2	35.3	1264.8
Eastern Europe & USSR	49.9	1645.8	52.7	1721.3
Oceania	14.7	485.5	14.4	473.0
Other Developed	3.6	121.6	3.6	121.7
World	285.7	8895.6	299.8	9249.4
	SHEEP AND LAMBSKINS			
Developing Countries	**183.2**	**1284.1**	**192.3**	**1346.2**
Latin America	21.0	142.1	22.0	147.4
Africa	34.3	238.0	37.0	255.3
Near East	66.9	506.1	68.0	516.8
Far East	33.3	199.8	36.0	216.0
Asia, CPE	27.7	199.1	29.3	210.7
Developed Countries	**200.5**	**1453.1**	**209.3**	**1525.1**
North America	6.9	40.9	5.3	33.4
Western Europe	55.3	387.5	56.8	398.5
Eastern Europe & USSR	66.2	483.3	68.0	499.7
Oceania	64.0	493.0	71.6	547.8
Other Developed	8.1	48.4	7.6	45.7
World	383.7	2737.2	401.6	2871.3

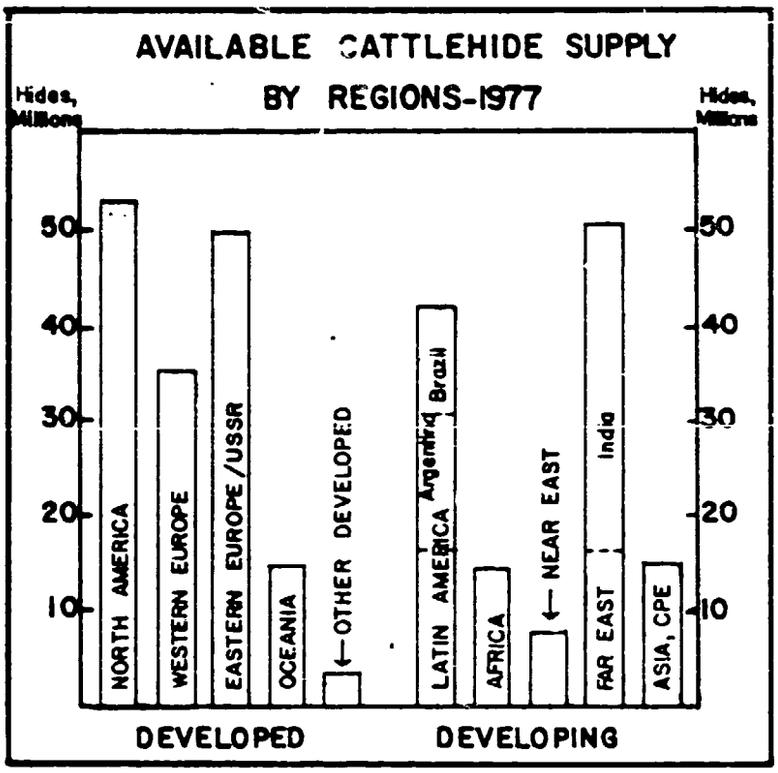
TABLE 11 (Continued)

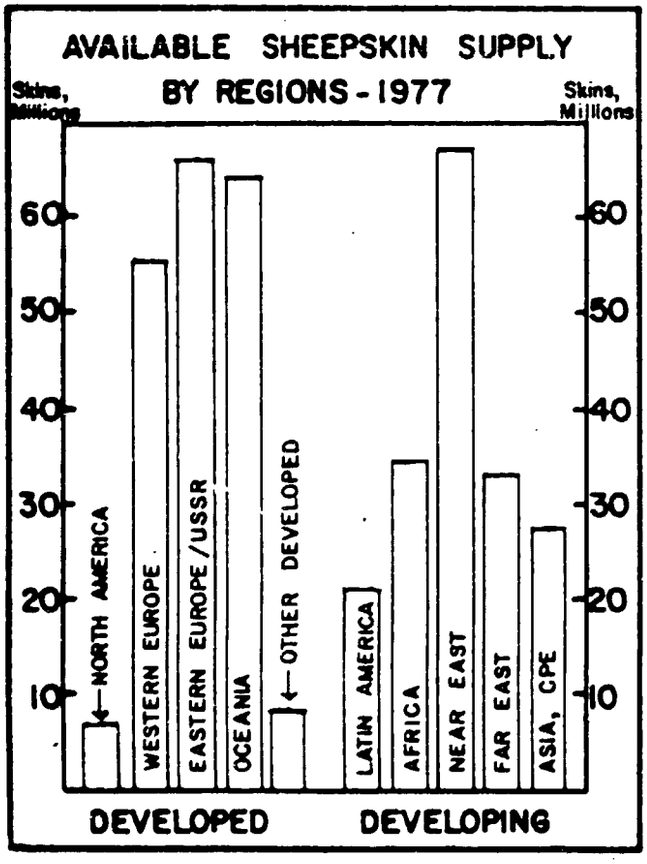
AVAILABLE HIDE AND SKIN SUPPLY

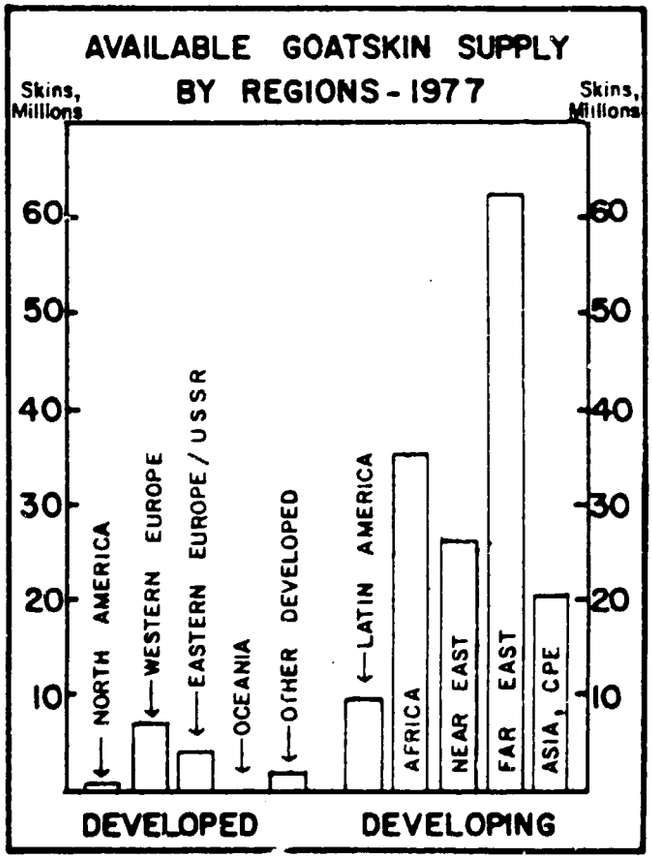
MILLION PIECES AND SQUARE FEET

	GOAT AND KIDSKINS			
	Est. 1977		Projected 1985	
	Pieces	Square Feet	Pieces	Square Feet
Developing Countries	**153.5**	**770.7**	**162.0**	**810.3**
Latin America	9.7	49.5	8.0	41.7
Africa	35.3	190.5	40.0	214.1
Near East	26.0	135.6	29.0	147.7
Far East	62.4	292.8	62.0	290.5
Asia, CPE	20.1	102.2	23.0	116.3
Developed Countries	**13.5**	**63.5**	**13.4**	**62.1**
North America	0.7	3.2	0.5	1.3
Western Europe	6.9	31.2	6.9	31.2
Eastern Europe & USSR	4.0	20.5	4.0	20.5
Oceania	-	-	-	-
Other Developed	1.9	8.6	2.0	9.1
World	167.0	834.2	175.4	872.4

Figure 5


AVAILABLE CATTLEHIDE SUPPLY
BY REGIONS-1977
Hides, Millions
Hides, Millions
50
40
30
20
10
NORTH AMERICA
WESTERN EUROPE
EASTERN EUROPE/USSR
OCEANIA
← OTHER DEVELOPED
LATIN AMERICA
Argentina, Brazil
AFRICA
← NEAR EAST
India
FAR EAST
ASIA, CPE
DEVELOPED
DEVELOPING


AVAILABLE SHEEPSKIN SUPPLY
BY REGIONS - 1977
Skins, Millions
Skins, Millions
60
50
40
30
20
10
← NORTH AMERICA
WESTERN EUROPE
EASTERN EUROPE/USSR
OCEANIA
← OTHER DEVELOPED
LATIN AMERICA
AFRICA
NEAR EAST
FAR EAST
ASIA, CPE
DEVELOPED
DEVELOPING


AVAILABLE GOATSKIN SUPPLY
BY REGIONS - 1977
Skins, Millions
Skins, Millions
60
50
40
30
20
10
← NORTH AMERICA
← WESTERN EUROPE
← EASTERN EUROPE / USSR
← OCEANIA
← OTHER DEVELOPED
← LATIN AMERICA
AFRICA
NEAR EAST
FAR EAST
ASIA, CPE
DEVELOPED
DEVELOPING

DEMAND PROJECTIONS, 1985

Consumption and Projected Demand

In almost all other commodities the concept of demand and the analysis of demand trends rests on two postulates:

1. Demand varies with price;
2. Supply is elastic in response to variations in demand.

Only the first of these premises applies to hides and skins. The second does not since available hide and skin supply is basically indifferent to price-demand factors. No more hides and skins can be consumed than are available. That hard fact chains tanners, as well as manufacturers and retailers of leather products in market economies, to a condition they are powerless to control. In planned or controlled economies, available supply can be adjusted through directed imports or exports.

For the purpose of the projections given in Table 12, hide and skin demand is treated as the quantities consumed or put into process by tanners. In that sense aggregate consumption must be the mirror image of total available world supply. This procedure has flaws since tannery input of hides and skins does not correspond with output of finished leather ready for fabrication into shoes or other leather manufactures. In various countries production may be carried no further than a semi-processed stage such as wet blue or crust leathers which are often exported rather than consumed domestically. Nevertheless, it appears essential to compare projected available supply and tannery input as a guide to policy and planning for the most effective exploitation of raw material in countries of origin. To avoid any confusion, it is emphasized that available supply refers explicitly to hides and skins produced within a country or region and not adjusted for exports or imports. On the other hand "tannery input" is assumed to be net supply after foreign trade adjustment.

It is obvious that the foregoing projections entail, of necessity, forecasts of future trade flows and regional trade balances in hides and skins. A detailed

TABLE 12

AVAILABLE HIDE AND SKIN SUPPLY
AND
TANNERY INPUT*

Million Hides and Skins

	BOVINE			
	1977		Projected 1985	
	Available Supply	Tanning Input	Available Supply	Tanning Input
Developing Countries	129.6	128.3	140.1	143.5
Latin America	42.0	43.2	48.0	49.0
Africa	14.4	6.8	15.2	13.0
Near East	7.9	8.5	8.8	9.5
Far East	50.4	54.3	52.5	52.0
Asia, CPE	14.9	15.6	15.6	20.0
Developed Countries	156.1	157.4	159.7	156.3
North America	53.0	24.6	53.7	29.0
Western Europe	34.9	55.1	35.3	53.0
Eastern Europe & USSR	49.9	59.6	52.7	60.0
Oceania	14.7	3.4	14.4	4.5
Other Developed	3.6	14.7	3.6	9.8
World	285.7	285.7	299.8	299.8
	SHEEP AND LAMBSKINS			
Developing Countries	183.2	124.3	192.3	142.3
Latin America	21.0	16.3	22.0	18.0
Africa	34.3	12.0	37.0	15.0
Near East	66.9	34.3	68.0	44.0
Far East	33.3	34.0	36.0	36.0
Asia, CPE	27.7	27.7	29.3	29.3
Developed Countries	200.5	259.4	209.3	259.3
North America	6.9	15.8	5.3	16.0
Western Europe	55.3	170.3	56.8	164.8
Eastern Europe & USSR	66.2	67.0	68.0	69.0
Oceania	64.0	3.9	71.6	5.0
Other Developed	8.1	2.4	7.6	4.5
World	383.7	383.7	401.6	401.6

*Quantities put into tanning process whether carried to rough tanned or finished stage. Includes pickled sheep or goatskins.

TABLE 12 (Continued)

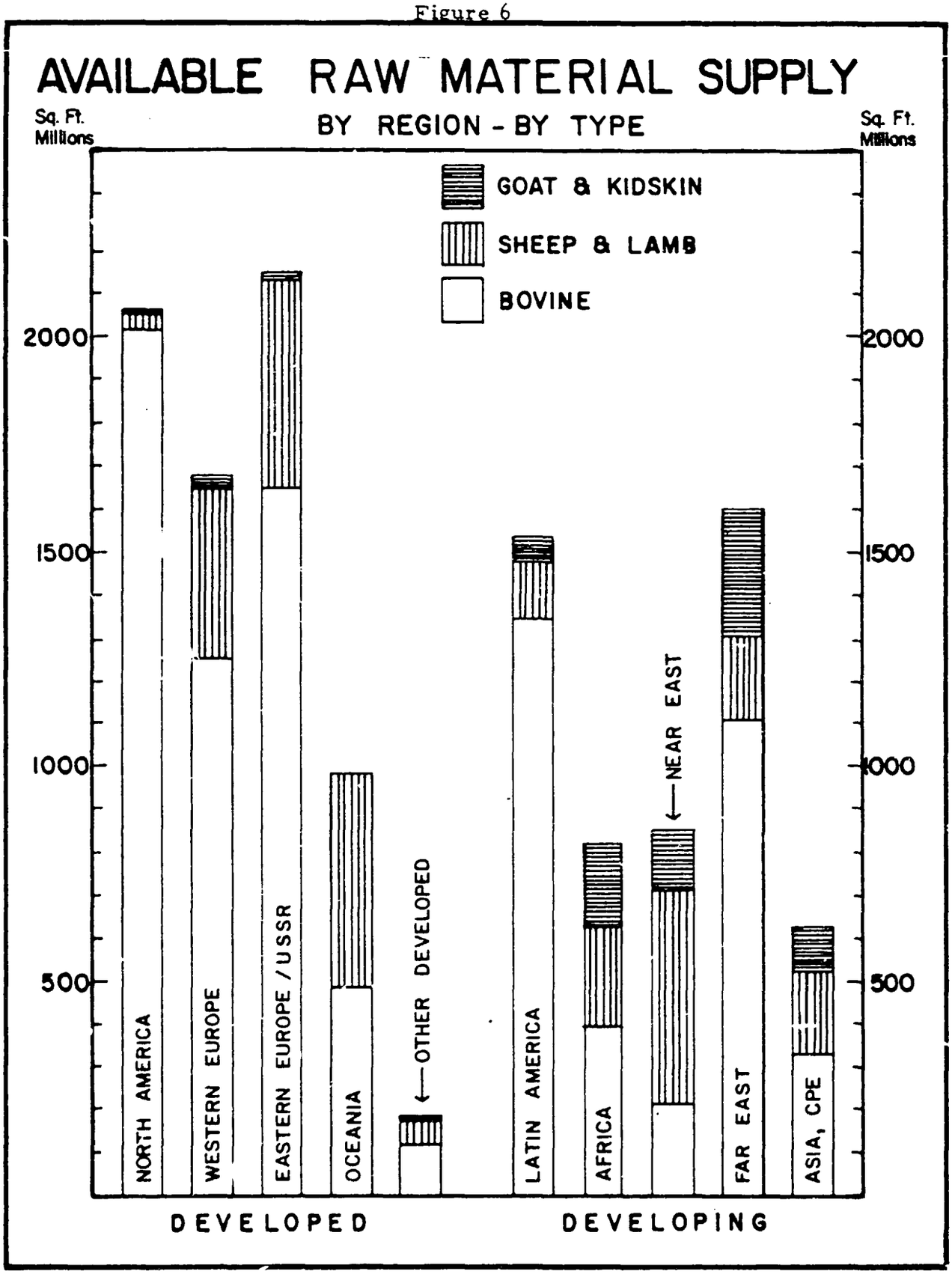
AVAILABLE HIDE AND SKIN SUPPLY
AND
TANNERY INPUT*

Million Hides and Skins

	GOAT AND KIDSKINS			
	1977		Projected 1985	
	Available Supply	Tanning Input	Available Supply	Tanning Input
Developing Countries	153.5	117.5	162.0	132.0
Latin America	9.7	6.5	8.0	7.0
Africa	35.3	15.0	40.0	18.0
Near East	26.0	19.0	29.0	22.0
Far East	62.4	61.0	62.0	62.0
Asia, CPE	20.1	16.0	23.0	23.0
Developed Countries	13.5	49.5	13.4	43.4
North America	0.7	0.7	0.5	0.4
Western Europe	6.9	42.8	6.9	37.0
Eastern Europe & USSR	4.0	4.0	4.0	4.0
Oceania	-	-	-	-
Other Developed	1.9	2.0	2.0	2.0
World	167.0	167.0	175.4	175.4

* Quantities put into tanning process whether carried to rough tanned or finished stage. Includes pickled sheep or goatskins.

Figure 6


AVAILABLE RAW MATERIAL SUPPLY
BY REGION - BY TYPE
Sq. Ft. Millions
Sq. Ft. Millions
GOAT & KIDSKIN
SHEEP & LAMB
BOVINE
2000
1500
1000
500
NORTH AMERICA
WESTERN EUROPE
EASTERN EUROPE / USSR
OCEANIA
← OTHER DEVELOPED
LATIN AMERICA
AFRICA
← NEAR EAST
FAR EAST
ASIA, CPE
DEVELOPED
DEVELOPING

discussion of the basis for these forecasts is given in succeeding paragraphs concerned with trade projections. In addition, factors have been weighed which are not indicated in the statistical record of the last fifteen or twenty years. The most important of these is price, or more accurately, the value of hides and skins in relation to the general commodity price level.

There have been intimations since 1975 of a change in the relative value of hides and skins. In retrospect it is apparent that the persistent upward trend in world hide and skin markets foreshadowed more limited supply in relation to potential demand. For almost 25 years, beginning in 1952, the spectacular rise in U. S. hide production had invited complacency and wishful thinking.[23/] As late as October, 1975 the Tanners' Council of America projected continued increase through 1985 in the per capita availability of cattlehide leather for the world population.

Projected supply of hides and skins in 1985 points to a decline in global per capita availability of leather expressed in equivalent area.

TABLE 13

WORLD LEATHER AVAILABILITY: PER CAPITA

	Million Sq. Ft.*	Million Population	Sq. Ft. Per Capita
1972-74	10,725	3,860	2.9
1977	12,467	4,190	3.0
1985	12,992	4,860	2.7

*Composite of Bovine, Sheep and Goat leather area equivalent of tannery hide and skin input. Sources: FAO, UNIDO Consultants, OECD Reports, Population Reference Bureau.

While the global per capita ratios given above are significant, a similar comparison by regions would not be meaningful. Tannery input by countries and regions is not synonymous with the quantities of leather available for domestic

consumption. Exports and imports of leather and its products determine the true balance of supply available for final consumption in each country. That subject is considered below.

NET CONSUMPTION, INCLUDING LEATHER MANUFACTURES

Final consumption of hides and skins in finished products, by country or region, can be approximated only by adjustment of base supply for exports and imports of raw material, leather and finished leather products. Repetition notwithstanding, it is again stressed that final world consumption of leather, in whatever form of fabricated product, cannot exceed available hide and skin supply. Neither price nor constraints on trade can alter basic supply; they can only affect its geographic distribution or end product usage.

Although aware of deficiencies in national data, FAO has suggested and undertaken a statistical procedure to determine the ultimate consumption of leather regionally. In this effort production at three stages, that is, hides and skins, leather and leather manufactures, are converted to equivalent units of hide and skin weight and adjusted at each level by addition of imports and subtraction of exports similarly stated in raw material weight units.[24/]

In Table 14 an effort is made to apply the model schematic proposed by FAO with these qualifications: First, it is assumed that consumption will equal total leather output; second, area units rather than equivalent weights are employed; third, trade balances in all leather manufactures are included. FAO is entirely correct in observing that trade balances in leather manufactures other than footwear are normally given only in terms of value.[25/] Nevertheless, the great increase during recent years in the relative use of leather for products other than footwear justifies the effort; the margin of probable statistical error in Table 14 falls within tolerable limits.

Comparative consumption of leather, in manufactured products, is the resultant of various factors of which none has been more important in the past than

TABLE 14

NET LEATHER CONSUMPTION*

Million Square Feet

	Estimated 1977	Projected 1985
BOVINE		
Developing Countries	2,740	2,928
Latin America	1,030	1,114
Africa	210	220
Near East	220	230
Far East	930	974
Asia, CPE	350	390
Developed Countries	6,156	6,321
North America	1,800	1,856
Western Europe	1,666	1,720
Eastern Europe & USSR	2,060	2,095
Oceania	140	150
Other Developed	490	500
World	8,896	9,249
SHEEP AND LAMBSKINS		
Developing Countries	689	777
Latin America	96	105
Africa	133	169
Near East	159	180
Far East	112	120
Asia, CPE	189	203
Developed Countries	2,049	2,094
North America	344	324
Western Europe	1,038	1,057
Eastern Europe & USSR	525	550
Oceania	78	85
Other Developed	64	78
World	2,738	2,871

*Hide and skin availability adjusted for exports and imports of raw material, leather and leather products.

TABLE 14 (Continued)

NET LEATHER CONSUMPTION*

Million Square Feet

	GOAT AND KIDSKINS	
	Estimated 1977	Projected 1985
Developing Countries	301	335
Latin America	23	29
Africa	36	45
Near East	58	63
Far East	91	94
Asia, CPE	93	104
Developing Countries	533	537
North America	178	187
Western Europe	237	237
Eastern Europe & USSR	60	53
Oceania	17	18
Other Developed	41	42
World	834	872

* Hide and Skin availability adjusted for exports and imports of raw material, leather and leather products.

disposable income. Consumers throughout the world have and continue to prefer leather for footwear and other goods traditionally associated with leather as a basic component. Whether utility, prestige or aesthetic considerations are responsible is irrelevant to the germane fact that potential consumer demand, or the wish to acquire leather, exceeds the available supply. Consequently, leather consumption is a coefficient of disposable income or purchasing power with one exception: Planned economies may and do undertake to modify the market process through allocation of resources, price control or rationing.

It is redundant to point out that consumption of leather is elastic. With the possible exception of industrial leathers, such as textile machine leathers or transmission belting, demand for leather goods is directly responsive to price.

Disposable income is the underlying factor in the diversification of leather usage; it is the economic base for fashion, prestige or aesthetic appeal. Modal lifestyles have emerged, patterns of consumer wants, which must be realistically acknowledged in projecting future leather consumption. "It may be answered that the slowdown in the growth of per capita consumption of footwear in these developed countries which have very high incomes will be more than compensated by the rising demand in non-footwear leather manufactures."[26/]

TRADE PROJECTION, 1985

Current and Historic Trends

Data on international trade in hides and skins suffers many of the defects characteristic of the information base of the entire sector. Customs classifications and descriptions vary; physical units are not uniform, including pieces, wet salted weight, dry weight, bales and area. In some cases exports or imports are denominated by value alone. Nevertheless, the information from major trading countries is sufficient to permit reasonably accurate approximation of world trade volume.

In the conventional perception of foreign trade in hides and skins there is still the implicit assumption that developing or under-developed nations are the source of huge quantities of raw material shipped for processing and consumption by the developed or industrialized countries. That was the case in the past; it is no longer a primary characteristic of world trade in hides and skins. In cattlehides, the developed countries are now net exporters to the developing group; in raw sheep and goatskins, the net exports of developing countries are reduced. A number of trends have contributed to the results summarized below. Consumers have preferred leather in the past to a degree assuring the consumption of available hide and skin supply and leaving unsatisfied demand. It is a premise of the analysis that the preference for leather will remain operative through 1985.

Appraisal of future hide and skin consumption globally and by regions entails close scrutiny of leather end uses. Footwear has been and will continue to be the largest end-use of aggregate leather supply. Although footwear consumption varies with income, the elasticity of demand is obviously greatest at low income levels where initial acquisition may be more compelling than mere replacement. Weight has been given, therefore, in projecting hide and skin consumption, to rising footwear demand trends engendered by development and urbanization. But, an offsetting factor of substantial magnitude also enters the 1985 projection, namely the rising proportion of leather consumed in products other than footwear.

Data on consumption of leather in products other than footwear is confined for the most part to the developed countries. In this group a remarkable change began in the mid-60's and has accelerated in the present decade. Leather consumption in products other than footwear has grown sharply in absolute volume and in ratio to total usage. Within the OECD area the calculated ratio of leather consumed in footwear declined from 81 per cent in 1965 to 66.7 per cent in 1978. In several countries footwear has become or is close to being a minority interest.

TABLE 15

NET TRADE BALANCES*

Million Pieces	1962 - 64		1977	
	Developed	Developing	Developed	Developing
Cattlehides and Calfskins	+15.2	-15.2	+ 1.3	- 1.3
Sheep and Lambskins	+69.2	-69.2	+58.9	-58.9
Goat and Kidskins	+77.5	-77.5	+36.0	-36.0

*Raw hides and skins; does not include semi-processed stock in blue, crust or vegetable tanned skins. Source: Derived from FAO and OECD data, Commonwealth Hides and Skins Quarterly, U. S. Department of Commerce Trade Reports.

The above tabulation is intended only to measure and reflect the changed flow in hide and skin trade between the developing and developed countries. Within these groups equally significant trends have emerged. For example, Italy and Spain have become the major tanning countries of the OECD, Japan imports more cattlehides than any other nation, Latin America, once the largest source of hides for the world market was a net importer in 1977. Such intra-regional changes are reviewed in a following section. The immediate question, against the background of the Lima Declaration, is the future trend in the distribution of global available supply between the developing and developed regions.

Table 12 compared 1985 projections of available supply and tanning input of raw hides and skins. Changes forecast implied a slower rate of tanning expansion in the developing regions than has been witnessed in the last decade.

Correlative changes in hide and skin trade, between developed and developing countries, will also be moderate and are projected as follows:

TABLE 16

PROJECTED NET TRADE BALANCE

Million Pieces	1985	
	Developed	Developing
Cattlehides & Calfskins	- 3.4	+ 3.4
Sheep and Lambskins	+50.0	-50.0
Goat and Kidskins	+30.0	-30.0

Three aspects of the above projections are noteworthy. First, the apparent volume of hide and skin trade between the developed and developing areas is a small fraction of world trade volume in hides and skins. According to a report prepared by UNCTAD for UNIDO[27/] the value of hide and skin exports and imports between 21 Developed Market Economy Countries and the developing countries compared as follows in 1977:

	$Millions
Total Exports 21 DMEC	1,826
To Developing Countries	268
Total Imports 21 DMEC	1,720
From Developing Countries	235

It is apparent that the great bulk of trade in hides and skins is confined within the developed countries. Moreover, U. S. cattlehide and calfskin exports - $686 million - were more than one-third of aggregate world trade value. The main supplier to the developing countries was the U. S., with $176 million in cattlehide shipments.

Second, the modest exports of raw hides and skins by the developing group (and greater value of imports!) testifies to the extent of their domestic utilization of domestically produced hide and skin supply.

Third, it is clear that the regions of the world once described as major surplus producing and exporting areas have completed the transition to internal utilization of hides and skins. That is true without any qualification of South America, South and Southeast Asia and China. In other words, in hides and skins the historic issue of raw material utilization and exploitation has been largely exhausted. Trade projections in Table 16 assume that residual exports by developing countries,

mainly in Africa, will continue to be economically advantageous to them. Furthermore, unless there are revolutionary changes in animal husbandry and swift expansion of available supply, or a major transfer of raw material from developed to developing areas, the growth of tanning activity in the developing zone can only expand in sheep and goatskins.

PIGSKIN SUPPLY POTENTIAL

In a period when high prices for all descriptions of hides and skins are a barometer of limited supply, attention is again focussed on pig and hog skins. According to leather industry annals, consideration of the pigskin potential rises in intensity with the hide price curve. New price records in 1979 and concern with future supply trends in cattlehides, the primary raw material of the world leather industry, amply justify renewed examination of pigskins as a supply relief valve.

The arithmetic is certainly appealing: 614 million pigs in the world; biologically prolific, this number could support a slaughter ratio of 100 per cent, actually 150 per cent in certain developed countries; a yield of 10 sq. ft. per skin would enlarge world leather resources by 6 to 10 billion sq. ft. and without impairing swine numbers. One billion sq. ft. is the equivalent of 25 million cattlehides, as much as the U. S. exported in 1978. Ten billion sq. ft. would provide a pair of shoes for every inhabitant of the planet with a dividend of a few million handbags and wallets. In contrast to this possible boom in raw material supply, the current reality is disconcertingly minute. With the exception of China, pigskins have a negligible role in leather production and consumption.

Estimated production of pigskins in 1977 was:

Western Europe (Including Yugoslavia)	3,900,000
Eastern Europe (Poland & USSR)	17,000,000
North America	1,900,000
Latin America	4,000,000
China	23,000,000

The quantities of skins actually flayed and available for tanning are less than 10 per cent of the number of pigs slaughtered worldwide in 1977. What are the reasons for the great gap between pig slaughter and skin takeoff as raw material suitable for tanning:

In the first place, pigskins are not typically produced as by-products with the low value ratio to meat which has been characteristic of almost all hides and skins. Pigskins can be and are sold at meat values; it has been far more profitable to market pigskins attached to the various cuts of pork. In effect, the ultimate consumer pays the price of bacon or ham for pigskin. This applies equally to a modern packing plant in Chicago or to the sale of pigskin strips as food in an African village. The economic incentive and result are identical. Leather-making substance would have to be at least as valuable per pound as the average pound of meat carcass to inspire the incentive for commercial flaying of pigs.

However, more than a temporary price incentive or stimulus would be required to change prevailing packing house or butcher practice. Economic removal of pigskins entails new technology and capital equipment as well as radical changes in meat marketing. Investment to achieve the basic changes enabling recovery of pigskins in volume would be large by industrial standards in developed countries and beyond the means of small abattoirs or local butchers. There is no feasible alternative to such large scale costs if pigskin availability is to be more than a small fraction of pig slaughter.

Hand skinning of pigs is costly and time-consuming because surgical dexterity is needed to cope with the fatty layer under the skin and avoid carcass damage. Several machines have been developed for the purpose but there is no unanimity of their effectiveness. Installations to date in the U. S. have not been notably successful and were abandoned in two instances.[28/]

In almost all developed countries the large pig slaughtering and processing establishments scald the carcass prior to butchering as a sanitary requirement.

Packers claim that proper control of temperature and water change enable them to meet hygienic standards. Scalding also is a low cost means of bristle removal. Alternative methods of preventing meat contamination would have to be utilized if skins were removed prior to carcass processing.

Quality variation in pigskins is as extreme as the difference between North German packer cattlehides and hides from the interior of China. Pigs raised in pens or the enclosures of U. S. pig factories and slaughtered at approximately six months yield the finest quality skins. Under ordinary farm conditions grain damage tends to be extensive, especially on skins from older animals. Inferior pigskins can only be used for limited purposes by tanners and their marketability, therefore, is restricted. Finally, the fiber structure of pigskins is not uniform through the entire area of the skin. This variation causes much greater technical difficulty in producing uniform leather than in tanning hides or skins of other species.

Low relative value in return to producer is the core of every reason cited for the limited production and leather tanning of pigskins in the past. Given adequate incentive, through market operation or plan, every one of the constraints noted, whether technical, financial or gustatory, could be lifted. A parallel may be recalled in the prompt development of cattlehide garment leather, when the incentive appeared, although it had previously been gospel that cattlehides could not be used for that purpose. In the light of price trends in hides and skins during the past two years and supply projections, the compelling reason may be emerging for growth in pigskin supply.

Hide and skin prices tend to move in unison in spite of the moderate extent to which cattlehides, sheepskins and goatskins can be substituted for each other in end products. There is, however, sufficient overlapping in end usage to cause similarity of price trend. Pigskin prices have already been drawn into the orbit of the

higher price level of hides and skins because pigskin leather can be used for apparel, shoe uppers, small leather goods and travel ware.

Stable production of pigskins in volume will not be engendered by a brief flurry of high prices for raw material. Only the persistence of a price level high enough to offer an attractive alternative to selling pigskins as "food" will accomplish the changeover. There should be no illusions harbored on that score. Studies which skirt or ignore the central fact of meat price versus skin price and merely extrapolate potential billions in sq. ft. of leather are a disservice to sound analysis of available hide and skin supply.

Price prediction is notoriously fallible; whether and when pigskin values will reach the level required to divert skins to leather production is not certain. However, two factors will aid the likelihood of a favorable trend. First, beef output is declining and several years must elapse before herds and slaughter, notably in the U. S., can expand. But, pork supplies can increase rapidly, within six months. In fact, that prospect was discounted by future markets in June 1979. Consequently, price trends of pork and of pigskins will probably diverge for an appreciable time span and thereby enhance the incentive for removal and marketing of pigskins.

It is pointless to count future litters or speculate on the leather product niches which amplified pigskin supply might fill. At best, the process of transferring the pig slaughter industry to a more productive system, from the tanners' standpoint, will be slow. Accretion to available skin supplies will not flood markets by 1985.

Tanners seeking additional raw material supply frequently pose the question - Are any measures feasible to expedite expansion of pigskin supply and thereby aid the world tanning industry in meeting serious supply problems anticipated during the next few years? It is difficult to conceive any effective organized action under any auspices - short of governmental intervention on a multi-national scale. One may assume that, barring grave exigency, such action would be exceedingly remote

in the market-oriented economies. In planned or controlled economies, the effectiveness of regulations or mandated prices might correlate with the proportion of slaughter in large-scale establishments.

In brief, until and unless comparative prices give greater value to pigskins over pork, the supply of these skins will remain a potential rather than actual raw material resource.

REGIONAL VARIATION IN TRADE

From the data and projections in Tables 15 and 16, it is apparent that no profound change is expected in the total trade balances between the developed and developing countries. However, a number of important changes are anticipated in hide and skin trade among and within several regions. These are identified below, in Table 17.

TABLE 17

PROJECTED REGIONAL TRADE BALANCES IN HIDES AND SKINS

(Million Pieces)

	BOVINE		SHEEP		GOAT	
	1977	1985	1977	1985	1977	1985
Developing Countries	- 1.3	+ 3.4	-53.8	-50.0	-44.0	-37.0
Latin America	+ 1.2	+ 1.0	- 4.7	- 4.0	- 4.2	- 3.0
Africa	- 7.7	- 2.2	-22.3	-22.0	-23.3	-22.0
Near East	+ .6	+ .7	-27.5	-24.0	- 7.0	- 9.0
Far East	+ 3.9	- .5	+ .7	0	- 1.4	0
Asia, CPE	+ .7	+ 4.4	0	0	- 8.1	- 3.0
Developed Countries	+ 1.3	- 3.4	+53.8	+50.0	+44.0	+37.0
North America	-28.4	-24.7	+ 7.2	+10.7	0	- .1
Western Europe	+20.2	+17.7	+112.5	+108.0	+43.9	+37.1
Eastern Europe & USSR	+ 9.7	+ 7.3	+ .8	+ 1.0	0	0
Oceania	-11.3	- 9.9	-60.3	-66.6	0	0
Other Developed	+11.1	+ 6.2	- 6.4	- 3.1	+ .1	0

In cattlehide trade the important changes projected for 1985 include: Reduced imports by Japan, the Republic of Korea and Taiwan; emergence of China as a substantial importer of raw hides; decline in U. S. cattlehide exports. Latin America will remain a moderate net importer in spite of significantly increased production in Argentina, Brazil and Paraguay. The rationale for these changes is elaborated in a subsequent section dealing with trade flows in hides and skins.

Trade patterns in sheepskins and goatskins will conform in the main to current movement of raw material. Increased output of sheepskins in Oceania will offset greater utilization in developing countries. Goatskins from the Far East, including China, will be foreclosed to the developed countries where supply will be drawn from Africa and the Near East.

THE HIDE AND SKIN ECONOMY: PROBLEMS AND POSSIBLE SOLUTIONS

At the time of the Lima Declaration there was broad consensus on the major problem or issue with respect to hides and skins. It was widely assumed and urged that development goals would be furthered by the utilization of these raw materials in the countries of origin rather than being exported to developed and industrialized regions. But, the problem then defined has shrunk tremendously. Within the past 15 years massive expansion of tanning in developing regions has completely recast the trade ledger; developed countries have become, in the aggregate, the net exporters of cattlehides and greatly reduced net importers of sheep and goatskins.

For the sake of clarity and perspective notice should be taken of the anatomy of world hide and skin trade, past and present. Prior to the striking change in the geography of tanning activity, Latin America and the Far East accounted for the greatest proportion of exports from the developing countries because the two regions were and remain the largest producers. Since Latin America and the Far East now consume all their domestic supply, plus imports, the scope for further expansion

of tanning in developing areas, based on utilization of domestic supply, is clearly quite limited.

Establishment of new tanning facilities was not confined to developing countries endowed with raw material. Reference has been made previously to Japan, the Republic of Korea and Taiwan, practically devoid of raw material, and net importers in 1978 of approximately 14 million cattlehides. Equally striking change has occurred during the last 12 years within the developed regions. Leather production in Italy and Spain has expanded enormously while volume in the U. S., the F.R.G., the U.K. and France has declined.

PROBLEMS AND ISSUES AFFECTING THE HIDE AND SKIN ECONOMY

From the preceding analysis of available supply, consumption and trade flows, it would seem that the great problem of the sector as perceived in the past has been supplanted by two cardinal issues:

1. Increasing the available supply of hides and skins, and

2. Promoting through international cooperation and agreement, the most economic and efficient utilization of available supply.

New vision and new perspectives are essential to initiate self-generating momentum for the growth and improvement of raw material supply and to ameliorate self-defeating conflict in the supply arena.

Reasons and Implications of Changing Trade Flows in Hides and Skins and Derived Products

A massive change has taken place in the historic pattern of international trade in hides and skins. It began in the Sixties and proceeded at an accelerated rate during the last decade. Changes in raw material trade flows were accompanied by striking shifts in the location of tanning and leather product manufacturing facilities. Trade in leather and derived products also departed sharply from traditional channels.

It would be simplistic to ascribe trade and production trends of recent years to a single course or set of conditions. There have been, in fact, five distinct series of cause and effect circumstances responsible for changed trade flows in hides and skins and derived products. These must be distinguished for logical grasp of the existing situation and its serious implications and problems.

First, and most important with respect to total volume of raw material, the major hide and skin producers and exporters in the developing world determined in the '60's to assume the prerogative and economic benefits of tanning their domestic raw material. To these countries hides and skins had "The same priority, importance and political implications as oil, uranium or copper have for other areas."[29/] India, Argentina and Brazil were the paradigm of policy and action for other developing nations in the effort to foster employment, gain value added through export of leather, and lay the base for manufacture of leather products to meet domestic needs and for export.

Initially, the objective was pursued through hide and skin export quotas, differential exchange rates favoring the export of semi-processed or finished leather and subventions to encourage import of capital equipment and processing chemicals. In 1972 Argentina banned the export of raw cattlehides and comparable measures were instituted by Brazil and by Indian authorities for goat and sheepskins as well as bovine hides. Production of leather and leather products has expanded dramatically in these countries and availability of suitable raw material is now a constraining factor to further growth. Broadly similar policies have been pursued by other developing countries which previously exported the bulk of their hide and skin output. The roster includes Mexico, Uruguay, Colombia, Paraguay, Pakistan, Bangladesh, Thailand, Indonesia, Turkey, Iran, Nigeria, Kenya and Ethiopia.

In cattlehide trade the position of the developing sector has been completely reversed. It is now a net importer. Changes in sheep and goatskin trade have followed the same trend but to lesser degree.

Lastly, the obverse side of the trade flow between developed and developing countries is also highly concentrated. Only two countries can be identified as significant exporters to developing areas - the U. S. and Australia. In 1978, U. S. exports of cattlehides and calfskins amounted to 27.3 million pieces, with approximately 7.1 million consigned to developing countries. Excluding intra-regional transactions in Western Europe, North American exports accounted for more than 70 per cent of world cattlehide and calfskin trade. In retrospect, the unprecedented upswing in U. S. cattlehide production, described in a previous section, appears to have been a major factor in the expansion of leather and leather products manufacture in the developing regions.

Second, a different set of causes and conditions with significant effects on trade flows operated in the case of the Republic of Korea, Taiwan and, to a lesser extent, Hong Kong, the Dominican Republic, Singapore and the Philippines. The Republic of Korea and Taiwan are, for all practical purposes, devoid of indigenous hides and skins so that their tanning and leather product manufacturing depend entirely on imported raw material. In 1978, for example, the Republic of Korea consumed more than 4 million cattlehides of which 3.7 million were imported from the U. S. In these countries the underlying motivation was not the utilization of domestic raw material resources. It was rather the utilization of low-cost labor in tanning and in the ensuing production of derived products for export. This interest coincided during the last ten years with the quest of multi-national entities for lower production costs and was assisted by government financing and control of imports and exports.

Total volume attained by the Republic of Korea and Taiwan has had a considerable impact on trade flow in footwear, leather garments and handbags as well as hides and skins. Both countries are now parties to Orderly Marketing Agreements with the U. S. which restrict their footwear exports to the latter.

Third, Japan is a developed country, lacking a ponderable base in domestic hides and skins, but which ranks first among the cattlehide importing nations of the world. With imports rising to more than 10 million hides in 1978, Japan has unquestionably affected trade flows during the past 15 years. There is no modern parallel or precedent for the measures used to establish and to assure growth of the Japanese tanning industry. Imports of leather and leather products have been and remain prohibited, except for token quantities. It is reported by U. S. sources that in 1978, faced by retaliatory action under the GATT Convention, Japan agreed to consider modification of its rigid import ban.

Developed and developing countries alike are properly concerned by the enigma of Japan's leather industries and the literal absence of any reciprocal terms of trade in leather and leather products with a highly developed economy.

Fourth, within the developed regions the trade flow of hides and skins has gravitated toward Italy and Spain. Leather output in the two countries exceeds 50 per cent of total production in Western Europe. Dynamic growth of tanning in Italy and Spain during the past decade is associated with equally vital expansion of footwear and leather goods manufacture. Growth of the Italian and Spanish leather and associated industries was not the result of factors which stimulated expansion in developing regions or in the other situations cited above. The explanation is twofold: First, the market for the quality grades of footwear and leather products has grown relatively faster in developed countries than for the volume or mass grades. Second, both Italy and Spain possessed the physical and the intangible infra-structure to identify their leather products with a quality trend in production and in marketing of leather products.

Leather Production Million Sq. Ft.	Western Europe	Italy and Spain	Per Cent
1961	2,560	533	20.8
1977	3,718	1,812	48.7
Leather Shoe Produc. Million Pairs			
1961	554	113	20.4
1977	732	384	52.5

Fifth, the role of the centrally planned economies of Eastern Europe and the Far East in hide and skin trade is unique. Other countries may and do control their exports or imports, Japan or Argentina for example. But, permissible trade is consummated by agents of the market, that is, buyers or sellers with economic interests linked to price. In the centrally planned economies foreign trade is an instrument of national policy and, presumably, that involves the allocation of resources by industry and by product. When consumption of leather is planned, the external observer has no means of gauging the possible breadth of demand for foreign hide and skin supply. Since hide and skin supply is defined as inelastic with respect to demand, even minor changes in planned export or import policy can exercise considerable leverage on world hide and skin markets.

A case in point, with current and prospective implications, may be noted. In 1978 the People's Republic of China announced economic policies aimed at accelerating industrial developing and expanding trade relations with other countries. Will hides and skins, leather or leather products be involved? All available data and information clearly indicate that hide and skin supply in China is exceedingly low relative to population. A fraction of a pair of leather shoes per capita would project to massive raw material requirements in a country with population approaching one billion. And, any plans directed toward such objective could have extraordinary impact on the structure of the world hide and skin and leather economy. China and

all its potential trading partners would benefit tremendously from exchange of information to mimize price instability and disruption in the international flow of hide and skin supply.

In brief, the problems of the milieu in which the hide and skin, leather and derivative industries function in 1979 can no longer be addressed to the simple dichotomy of developed and developing. Countries in both groups must be concerned with the consequences of the trade factors and conditions described above.

New patterns in trade flows derive in part from the changing dimensions of available hide and skin supply globally and by regions and countries. Supply growth in the last two decades has not been uniform and has centered mainly in cattlehides. Production of sheepskins has, in fact, declined from the peak of 1971-1972, while the trend of goatskin production appears to be slowly levelling off. It is not remarkable, therefore, that the expansion of tanning in the developing countries has been concentrated in cattlehides where the supply surge offered opportunity and encouragement.

The complexity of the reasons and implications of changing trade flows in raw material, leather and its products emphasize the need for a summary picture of the broad current since the early '60's. Hide and skin utilization is the clearest indicator of the redistribution of tanning in relation to hide and skin supply. With the reservations expressed in preceding paragraphs, the format of "Developed and Developing" nations appears to be the most feasible means of statistical summary. Table 18, computed and prepared by FAO, encompasses domestic supply and trade balances in deriving the apparent utilization of hides and skins. Although stated in weight, the data shown are congruent with the distribution of tannery input given by pieces in Table 12.

Several facts should not be overlooked in construing the implications of the trends demonstrated in Table 18. Increased share of raw material utilized by the developing group was highly concentrated within a few countries, especially in

TABLE 18

Trends in apparent availability of raw hides and skins for tanning in developing and developed countries

	1962-64		1967-69		1974-76		Growth in availability	
	Availability '000 tons 1/	Share of total percent	Availability '000 tons 1/	Share of total percent	Availability '000 tons 1/	Share of total percent	1962-64 - 1967-69	1962-64 - 1974-76
							percent per annum	
Raw Hides, wet salted weight								
Developed countries	2471	65.2	2797	63.7	2865	57.8	2.5	1.2
Developing countries	1318	34.8	1592	36.3	2088	42.2	3.8	3.9
World	3789	100.0	4389	100.0	4953	100.0	3.0	2.2
Raw Sheepskins, dry weight								
Developed countries	281	84.2	302	82.3	246	75.0	1.5	-1.1
Developing countries	53	15.8	65	17.7	82	25.0	4.2	3.7
World	334	100.0	367	100.0	328	100.0	1.9	-0.2
Raw Goatskins, dry weight								
Developed countries	49	49.0	43	41.7	32	27.1	-2.5	-3.5
Developing countries	51	51.0	60	58.3	86	72.9	2.9	4.4
World	100	100.0	103	100.0	118	100.0	0.6	1.4

1/ expressed as production + imports - exports

cattlehides. Argentina, Brazil and India accounted for 45.1 per cent of the apparent increase in hide utilization by the developing countries. South Korea and Taiwan were responsible for 13.6 per cent of the hide gain; five countries thereby represented 58.7 per cent of the overall change and the balance was dispersed among 38 other developing nations. In goatskin usage, one country - India, represented 52.7 per cent of the processing shift to developing areas. Comparative utilization of sheepskins reflects minor changes in trade flow; the change was primarily due to greater production of raw skins in developing regions and a declining trend among the developed countries.

Another pertinent fact is the extent of tannery processing following the input stage and the disposition of leather not brought to completion. Initial efforts in leading developing countries were aimed at producing semi-tanned leather, wet-blue or rough vegetable tanned, to replace the export of raw hides and skins as staple articles of commerce. With the growth of confidence in the products and recognition of the economies of processing hides and skins at source, more leather was progressively taken to the crust state; ready for finishing, or completely finished and ready for manufacturers' use. The incentives obviously were greater value added as well as providing the material for domestic production of footwear and other products.

Nevertheless, a substantial volume of semi-tanned leather continues to be exported by developing countries of Asia and Africa. Importing countries, therefore, participate in the processing of such leather, controlling its completion to types and finishes dictated by marketing opportunity. Shortcomings of official classifications make it difficult to compile the quantity of semi-tanned leather in the trade flow; it is estimated that in 1978 the plysical volume was between 10 and 12 per cent of aggregate leather exports from developing countries.

Export of unfinished or crust leather is a very appreciable item to the more advanced, with respect to tanning, of the developing countries. Most of Argentina's

leather exports, which totaled $280 million in 1978, are crust leather. J.A. Villa reports that in 1977 production of crust leather in Latin America was 34,100,000 sq. m. and was all exported.[30/]

Reporting on India, A. D. Parpia states that: "It is generally believed that 50 to 60 percent of the finished leathers that are being exported can at best be described as 'ready to finish' leather and requires further processing before it can qualify as properly finished leather."[31/] The implied problem of classification arises from "The effect of restriction and export duties on East India tanned and wet blue tanned, the injection of handsome cash subsidies to finished leather..."[32/]

Concentration of hide and skin utilization within the developing country group or export of semi-tanned and unfinished leather by these countries does not alter the fact that a great change in raw material trade flow has taken place. It suggests further implications of the change to date. These are: Correlative expansion in leather products; viability of tanning in countries void of indigenous raw material; the differential effect of a short-fall in world supply in view of existing tanning capacity; choice of guidelines and criteria in framing plans for efficient utilization of resources in economic development.

Impact of Changing Trade Patterns on Government Trade Policy

Several events in the early months of 1979 illustrate the growing stresses on government trade policy engendered by the changing patterns of trade in hides, skins and derivative products. In May, for example, the governing body of the EEC accepted for consideration and possible action the demand that export of hides and skins from the Common Market be barred to countries which did not permit reciprocal access to their own raw material. In the same month a broad coalition was formed in the U. S. to achieve a single purpose - restriction of U. S. cattle exports. Groups included in the coalition were manufacturers and retailers of shoes and all other leather products, tanners, hide dealers, and labor unions from every one of the industry segments. It was asserted to the U. S. Congress and President that

more than a million jobs were affected by the export drain of hides to countries which did not reciprocate in trade policy.

It is an ironic coincidence that also in May 1979 the Multilateral Trade Conferences were concluded in Geneva and a new trade treaty was remanded to 90 governments for their formal appraisal.

Concrete steps had previously been taken by several countries to restrain imports of footwear and other leather products Australia, Canada and Sweden imposed shoe import quotas; the U. S. sought the same end through Orderly Marketing Agreements with several developing countries. Under these Agreements, the exporting nations bound themselves to hold annual exports to the U. S. within stated limits. Inevitably, other countries had to be affected because the exporters intensified marketing to unrestricted outlets. Not surprisingly, therefore, import quotas and Orderly Marketing Agreements are on the policy agenda of nearly all developed market economy states.

It would be completely inaccurate to describe the actions noted above and the ferment of discussion on import and export control as a renewed confrontation of protectionism and free trade. Those classic terms were meaningful only when international trade was the province of entrepreneurs and was governed almost exclusively by the dicta of the market. With the emergence of controlled economies, that is, nations where political and economic interests are fused, "protectionism" and "free trade" have become archaic language. Realism demands acknowledgment of the fact that two-thirds of world population lives within economies wholly or partially controlled and dissociated from the market mechanism as a central economic factor. It is vital to face the facts so that accommodation be achieved between differing economic structures in their mutual interest.

In the hide and skin and related leather industries, the trade trends of the past fifteen years are subsiding. Countries with available domestice raw material supply will continue to utilize their own raw material. Expansion based on raw

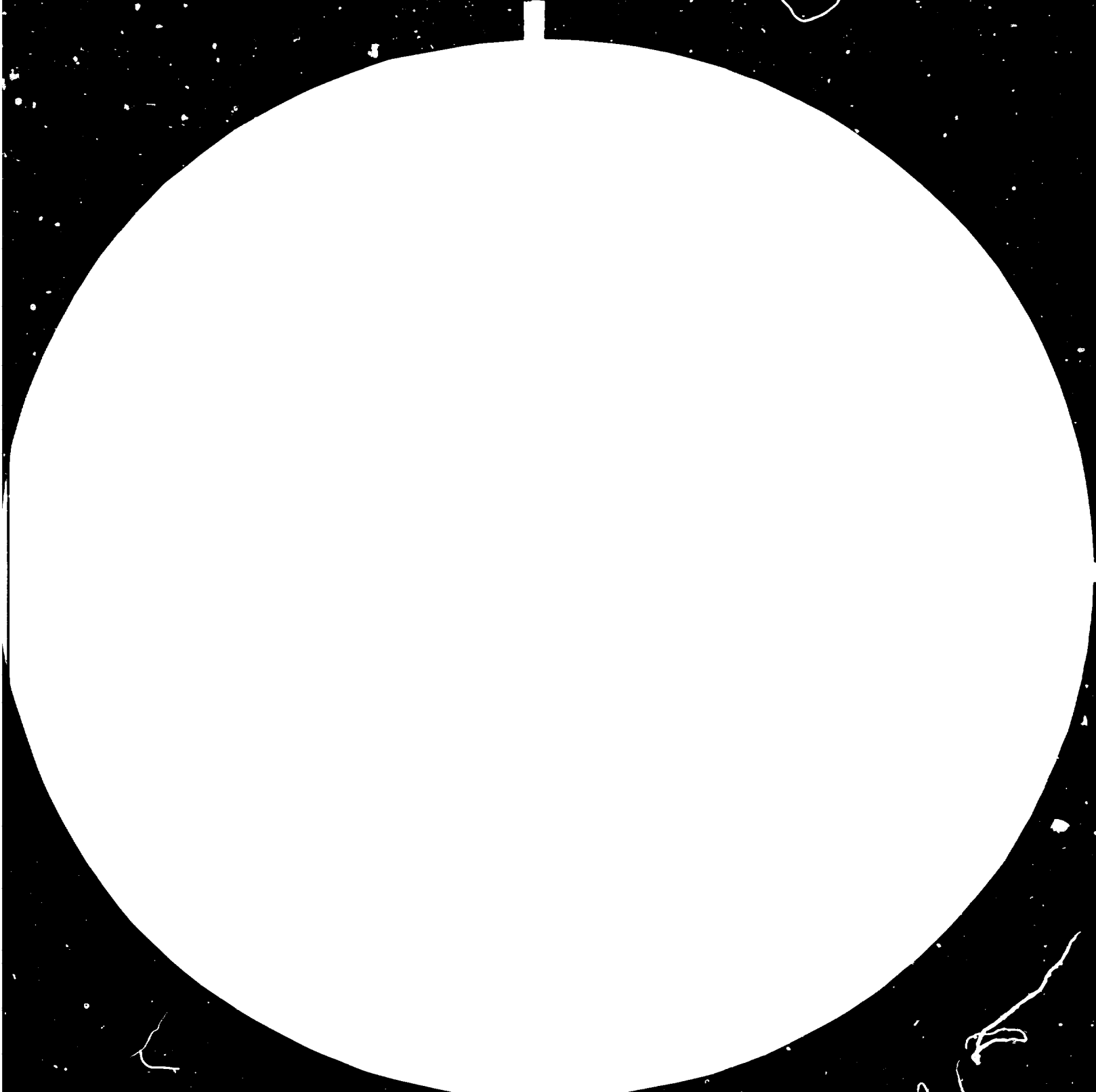
material imports from the developed countries will become more difficult. Those countries lacking domestic raw material, and which have become major importers of hides and skins, may be compelled to reduce the scale of leather and leather product output. Hardened trade policy by developed countries will be partly responsible for the foregoing changes in trend.

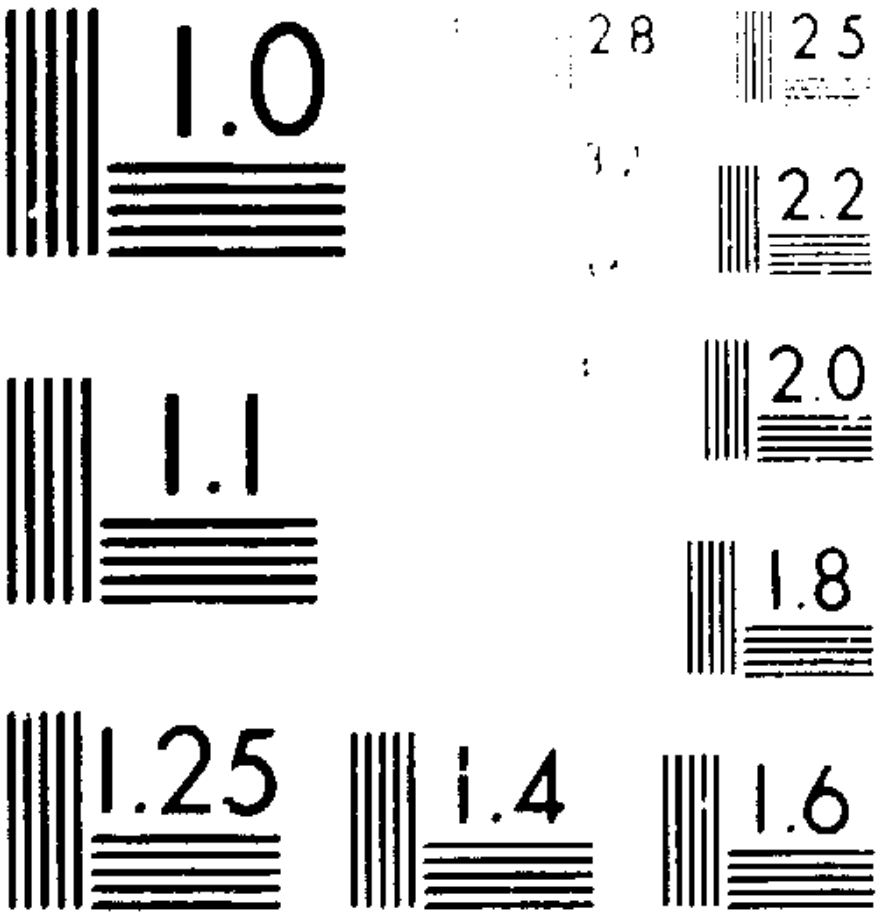
Several factors contribute to the appearance of a new and harder policy by developed countries. In a climate of reduced economic growth and threatened unemployment the view has grown that the leather and related industries are no longer expendable. Arguments have been adduced to demonstrate that the cost of sustaining unemployment at home through welfare payment is far greater than any conceivable benefit from import of lower cost products. It has been found that labor needs in technological and service industries cannot absorb a substantial fraction of the total potential work force. Furthermore, several developed countries with adequate raw material resources have found that the export of raw goods and the subsequent import of the manufactured counterparts is seriously adverse to their balance of payments.

However valid or invalid the cited reasons may be, the fact remains that they have surfaced in developed countries and will influence trade policy in hides and skins, leather and leather manufactures.

Trade Limitations Due to Heterogenous Hides and Skins

At every stage in the sector's economy there is a premium value attached to uniformity and consistency of hides and skins of every description and quality. Tanners, manufacturers and retailers share the identical need for maximum homogeneity of product as a precondition of volume production and distribution. Consequently, the hides and skins first absorbed in world trade meet this condition within the practical limits dictated by experience. Cattlehides from North America, Western Europe and Argentina are marketed by standard classifications and these




2.8
2.5
1.0
2.2
2.0
1.1
1.8
1.25
1.4
1.6

are the end result of standardized breeds, slaughter systems and curing methods. Similarly, sheep and lambskins from Australia and New Zealand are virtually produced to specification. Buyers can rely on such hides and skins for consistency in the leathers they produce.

Wherever production, from livestock forward, is not standardized and hides and skins are collected from small abattoirs, village butchers and individual farmers over a large area, heterogeneity becomes an acute problem. It can be solved in some degree by collection systems to aggregate hides and skins in quantity for central sorting and grading, by quality, size and thickness. The object of such collection systems is the establishment of practicable standards so that buyers can rely on the consistency of lots offered from time to time.

Non-uniformity is the major problem with the available hide and skin supply of less developed areas. It depreciates the value of the supply for trade purposes. Equally important, it is a serious and almost insuperable obstacle to domestic utilization of supply beyond the handicraft stage. A modern tannery cannot earn its capital keep by processing a melange of raw material.

The Impact of Technical Factors on Hide and Skin Markets

From primary markets through every subsequent stage of distribution and production, technical factors govern the functioning of the hide and skin and leather economies. Their impact is omnipresent, either positively as the framework in creating economic value or, negatively, as the cardinal reason for loss of such value by technical default.

Although every pertinent technical factor has been mentioned in other sections, a summary is useful at this point to emphasize their key role in the structure of hide and skin markets.

In livestock raising technical factors as well as natural resources determine productivity and quality of meat and of hides and skins. Control of breed, disease

prevention, effective land use, planned feed reserves are the indicia of successful animal husbandry and the initial technical base for desirable hides and skins. Wider application of known livestock technology could generate massive capital accumulation, in less developed areas, from hides and skins alone.

Slaughter methods and flaying techniques are responsible for a major part of the range in market value of hides and skins. Machine pulled hides in modern packing plants are a far cry from hides skinned by hand and damaged by butcher cuts. It is estimated that poor flaying represents a loss of 10 to 15 per cent in the marketable value of hides and skins. Incentives to prevent such loss would yield a tremendous dividend.

Inadequate cure ranks with bad flaying as a cause of depreciated value. Both the purpose and techniques of proper curing are widely known. When the right methods are practiced hides and skins can retain their value for extended periods. Improper cure is a certain invitation to bacterial decay, grain damage, or even total loss of value. Hide and skin markets are sensible to the risks in raw material from certain origins and prices are discounted commensurately.

Recovery of hides and skins from fallen animals is conducted with minimal loss by rendering plants in most developed countries. Flaying and curing methods are comparable to practice in slaughter houses. In developing countries a large proportion of hides and skins from fallen animals are either not recovered or grossly damaged through unskilled flaying.

Beyond the major technical factors reviewed above, transportation and storage facilities enter the market appraisal of relative value. In developed areas these costs are readily determinable so that calculation of comparative value is certain and prompt. In less developed countries a degree of uncertainty may attach to both cost of transport and quality consequences of available storage facilities. Here, again, markets are prone to anticipate risk by discounting value.

Appreciation in hide and skin prices of the magnitude experienced in 1978 and 1979 directs attention to technical factors usually ignored or taken for granted. One of these is deterioration of raw material on long ocean transport and under abnormal conditions of heat and humidity. Container vessels minimize a problem formerly observed even with well cured hides and skins conveyed in cargo holds and subjected to excessive heat. However, delays in carriage or in unloading and processing at destination continue to be hazardous and costly in yield of quality leather.

Techniques of producing quality hides and skins, curing them effectively, storing and shipping to maintain inherent quality, are known and practiced in developing areas. Preferential demand for the hides and skins from such origins reflects the assurance of quality to the tanner and his customers. In a very real sense that assurance is the keystone of large-scale production and leather products. Transmitting codified knowledge to countries or areas which need it is a minor task. The real problem is training personnel at every level of the hide and skin economy, from management forward, to respect and practice the techniques which optimize quality and avoid waste.

The Impact of Price Fluctuations on Various Processing Sectors

Hide and skin prices fluctuate, with greater frequency and amplitude than most other commodities.[33/] By every measure of price variability, hides and skins have distinguished themselves for generations as the epitome of volatility, uncertainty and risk. The basic reason has been indicated at several points in this study: Supply of hides and skins does not and cannot respond to variations in demand. Hence, variations in demand exert disproportionate leverage on price whenever the desires to buy or to sell are not fully satisfied. Either the demand or the supply side of the equation can provide the imbalance. For example, a vogue for knee-high boots might increase potential demand for upper leather, the principal product of the leather industry, by 15 or 20 per cent. Obviously, supply cannot rise to the occasion; price intervenes to frustrate an appropriate percentage of would-be consumers.

If, on the other hand, a shortage of feed grain forces the untimely sacrifice of many cattle, hide prices will fall. In either case equilibrium is always restored by the contraction or expansion of consumption induced by price.*

Historically, the vast number of relatively small enterprises engaged in competitively producing, selling and buying hides and skins has contributed to the universality of price oscillations. There have not been factors large enough to administer prices or to hold large enough inventory and periodically release supply to control prices.

Since cattlehides represent two-thirds of the world's leather-making raw material, their price almost invariably determines the price behavior of calfskins, sheepskins and goatskins. There is sufficient overlapping in end-uses of hides and skins so that imbalance of supply and demand in cattlehides is quickly communicated to the markets for the other raw materials and causes parallel price adjustments. High prices for cattlehide leather, for example, will lead shoe manufacturers to use more goatskin leather. But, the supply of the latter is inelastic and therefore the price will follow suit. Minor exceptions to the general role do occur, by virtue of special circumstances, and usually for limited periods. Thus calfskins in short supply and used for the finest grades of footwear or handbags have on occasion stayed aloof from the mainstream of hide and skin prices. Wooled sheepskins are in a class by themselves since there is no replacement either for the better goods (shearlings) used in garments or for the lower grades bought by pullers for the wool content.

Although the causes and broad effects of hide and skin price fluctuations are readily explicable in classic economic terms, their impact is extremely varied and complex. Tanners and manufacturing sectors are primarily exposed and subject to the resulting problems.

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* This description of the market mechanism and the role of price in balancing supply and demand in hides and skins is applicable to market economies.

To packing and slaughter houses in developed countries, the incidence of even wide price swings in hides and skins does not have grave economic moment. What matters in this sector is obtaining a return from the sale of meat and by-products at least equal to the gains of competitors. Such equivalence enables the packing house operator to remain competitive in the purchase of livestock on the hoof. Typically, packers sell their hide and skin products as produced with very little speculation on possible price change.

To tanners and manufacturers of leather products, however, price fluctuation is a constant, absorbing and dangerous fact of life. They must sell their goods weeks and months ahead to assure continuity of output and retail sales whereas raw material supply becomes available only day by day. Hence, coverage of raw material requirements may spell the difference between profit and loss for the tanner and to a smaller extent for the manufacturers. Speculative risk cannot always be avoided; availability of certain hides and skins is conditioned by seasonality or by geographic factors. Tanners who require such hides and skins must speculate involuntarily. Similarly, the manufacturer who commits himself to underwriting prices of shoes for extended delivery, to a catalog retailer for example, may invite considerable risk if he has not fixed the cost of commensurate supply of leather.

These exposures to uncertainty follow from the high proportion of raw material to total cost of leather and the lower but still substantial ratio of leather to final product costs.

To the tanner, raw material is the major cost of production varying in ratio to total cost with hide and skin prices because other costs - labor, chemicals, power, interest, etc. - may change but are not volatile. Hides and skins can represent 35 to 75 per cent of leather cost depending on product made and on the price level. Within a ten-month period, July 1978 - April 1979, the ratio of hide cost in cattlehide upper leather moved from 47 to 71 per cent as hide prices doubled.

In footwear the cost of leather over a twenty-year period has averaged between 20 and 30 per cent of total cost. Again, however, the impact of sharp price change in hides and skins first communicated to leather becomes apparent on the shoe manufacturer's cost sheet. By June, 1979 a producer of a medium grade shoe who had budgeted 24 per cent of cost to leather a year ago wrestled with a 37 per cent ratio. In products such as leather garments, handbags or upholstery, the leather component is normally a higher ratio of total cost than in footwear and ranges from 20 to 50 per cent.

Retail prices in the developed countries are based upon manufacturers' selling prices plus a "mark-up" of at least 100 per cent. Hence, the change in hide and skin costs transmitted by the processing sectors is inflated even though the retail price curve is statistically flatter.

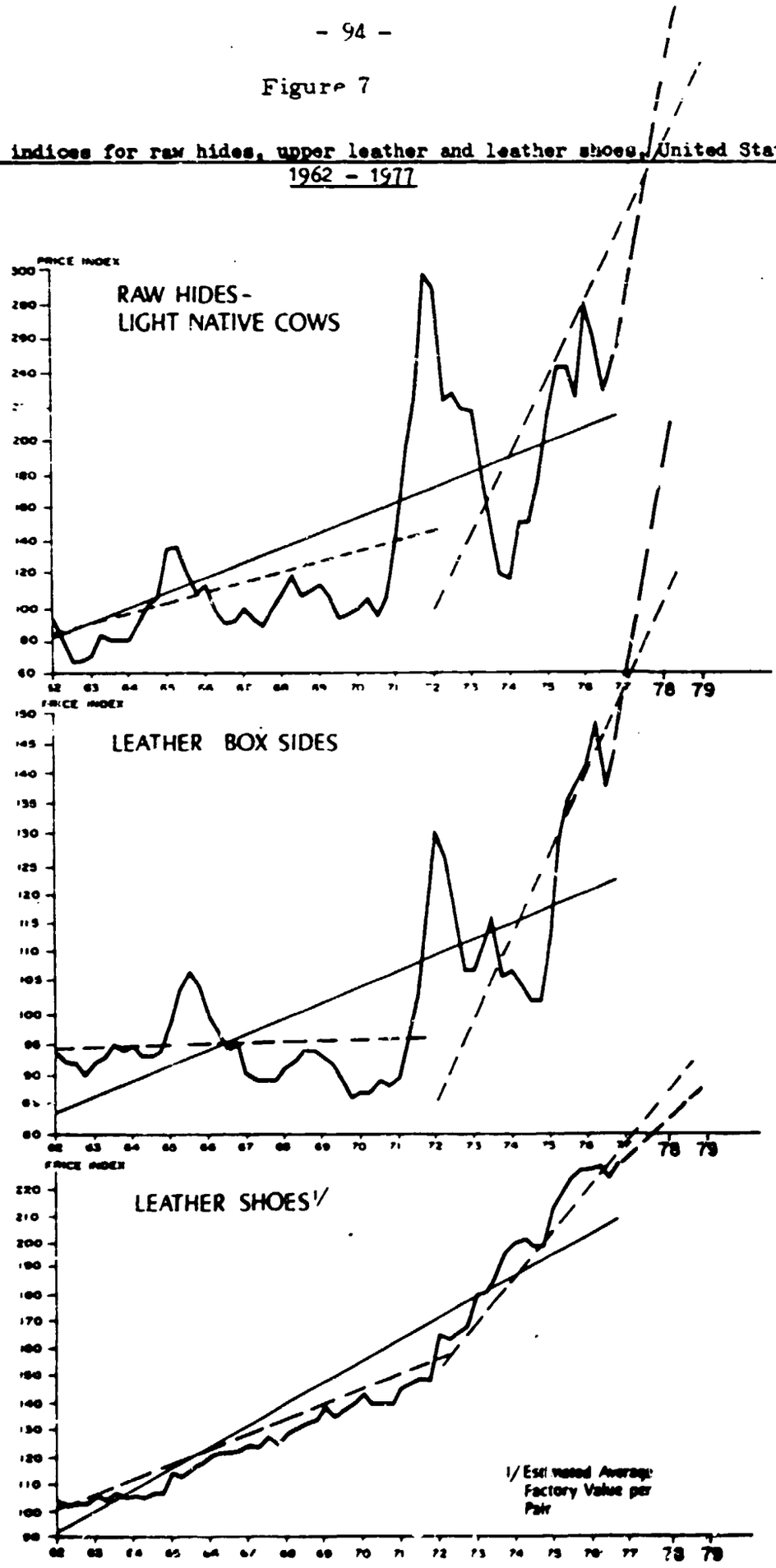
Price indices shown graphically in Figure 7 illustrate the similarity of trend as well as the compressed effect of hide and skin price changes as additional costs are incurred at the tanning and manufacturing levels. As FAO (source of Figure 6) notes, "between 1962 and 1967, the average deviation of quarterly prices for raw hides, leather and leather shoes from their respective linear trend lines was 22.0 per cent, 9.5 per cent and 6.9 per cent."

Increasingly, tanners in developed countries and in several developing areas have endeavored to cope with hide and skin price fluctuations by preaching and practicing "replacement pricing". Leather, it is contended, must be sold at prices based on the latest cost of hides and skins to permit replacement of raw material used. Competitive pressures, mainly due to excess capacity, make it difficult to achieve consistent achievement of replacement in actual selling practice. Hence, severe price changes in hides and skins continue to be attended by great risk to tanners.

Tanners and many of their customers feel the impact of price change directly and promptly in working capital requirements. A prolonged rise in raw material

Figure 7

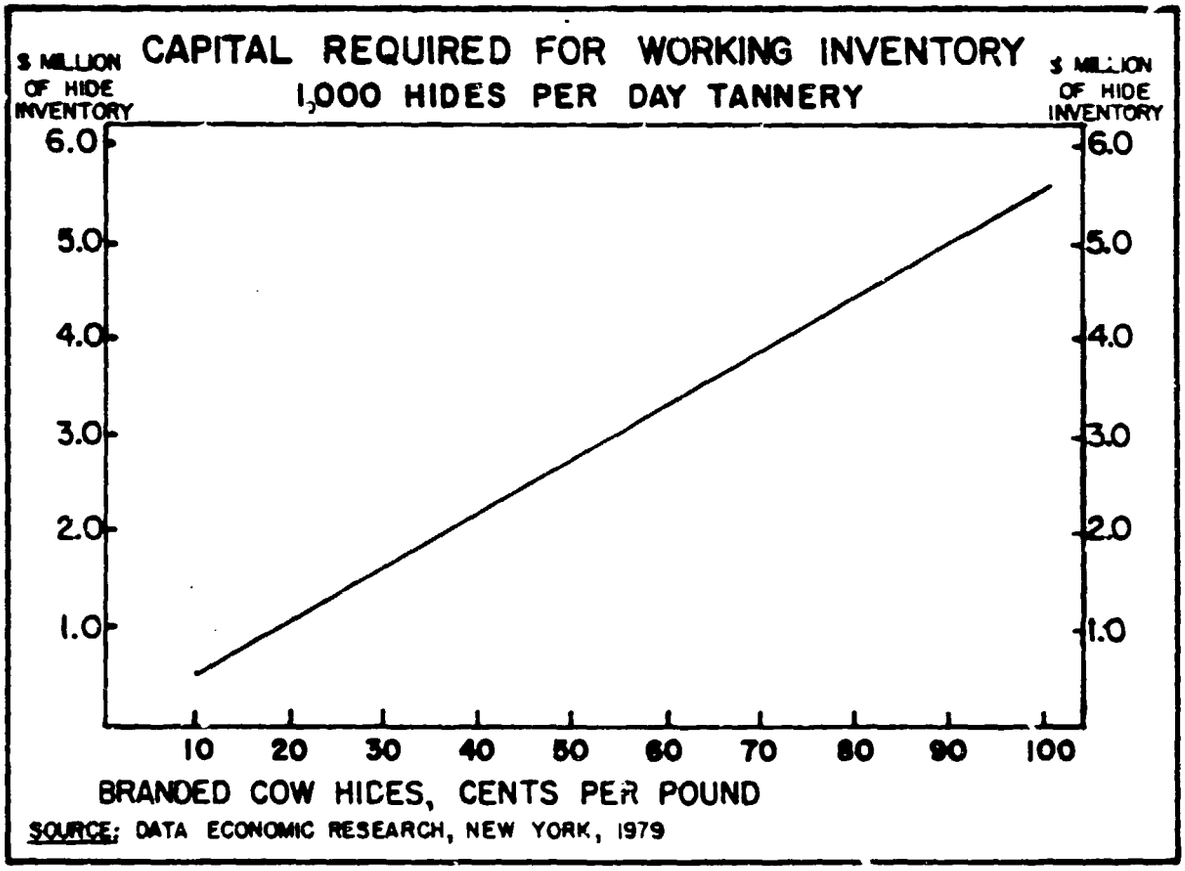
Price indices for raw hides, upper leather and leather shoes, United States, 1962 - 1977



Adapted from FAO, CCP:HS 78/5, Figure 2, to indicate subsequent price change and change in price trend since 1972, date of Argentine hide export embargo.

markets can have extraordinary consequences. These may be illustrated by the investment in hide inventory essential to operation of a tannery processing only 1,000 hides per day and with a typical cycle of 16 weeks from purchase of raw material to receipt of payment for sales.

Figure 8



When markets decline, a consistent sequel to price advances in the past, the eased burden of capital needs is not assuaged by inventory loss.

Finally, both advance and decline in hide and skin prices are accompanied by a shift in the distribution of leather usage. Higher prices, symptoms of supply inadequacy, open the gate to substitution, mainly synthetics in recent years. Reduced leather prices, marking relative gain in supply, stimulate greater leather

consumption in markets previously lost or in new products. The process of restoring supply/demand equilibrium never ends and, in the event of acute disruption as in 1972-1974 or 1977-...?, is costly and characterized by casualties among leather producers and manufacturers.

It is not remarkable that the subject of hide and skin price fluctuation is foremost on the agenda of conferences, conventions and meetings, national and international, of the leather and leather products industries of market oriented economies. Notwithstanding many decades of appeal to reason, restraint, common sense and material interest, no solution has been found.

IMPACT OF COMPETITION FROM SYNTHETIC SUBSTITUTES ON DEMAND FOR HIDES AND SKINS

Substitute Materials

There have been substitutes for leather since ancients tanned the first hides and skins.

Historically, demand for leather has always exceeded supply, with rare and transitory exceptions. Supply of leather, tantamount to supply of hides and skins, is inelastic vis-a-vis demand. Hence, price adjudicates the distribution and consumption of available supply. Severe price fluctuation in hides and skins, paralleled by the price of leather, is the reflection of the continuous movement toward equilbrium of supply and demand. The point of balance always leaves unsatisfied demand and that is the area of substitution.

A few illustrations will define the role of substitutes in the hide and skin economy. For example, in 1948 sole leather was the major cattlehide product in the U. S. and in Western Europe. Tanners consumed 8,000,000 hides in the U. S. to provide the soles, insoles, etc., for 88 per cent of the country's shoe production. Synthetic rubber, perfected during World War II, entered the market and progressively captured the volume shoe trade. At present sole leather is used only

on top grade footwear and less than 3 million hides are processed for that purpose in the U. S. Hides not tanned for sole leather were used for shoe uppers, garments, handbags, upholstery and so forth; consumption made possible only in part, by raw material sole leather tanners were compelled to relinquish.

Upholstery leather for cars is another case in point. If the same proportion of cars manufactured in 1978 were upholstered in leather as in 1928, there would be scarcely any leather remaining for footwear! Fabrics, vinyl and other materials were the substitutes and instrumentality for price rationing of leather. Needless to say, a car equipped with leather seats commands a premium price of several hundred dollars.

The process of substitution is endless and the battle line constantly changing. When fortuitous circumstances enlarge the supply of hides or skins, lower prices enable leather to percolate down to lower product grades. Some types of leather benefit more than others, but the sum total of consumption expands to balance with new supply. If, on the other hand, adverse conditions reduce raw material supply, price will mediate a greater share of the market to substitutes in some products.

From the economist's standpoint the term "substitutes" is a misnomer. Such products are more accurately described as alternative materials, and, as long as leather supply falls short of potential consumption the alternatives are essential to help fill consumer needs in footwear and other products.

Until now, and most probably until 1985 at least, leather has enjoyed commanding preference in footwear and many other essentials or luxuries. Its unique physical properties have not been emulated by other material or synthetic material. Those properties in brief are: A complex fibrous structure with extraordinary strength to weight ratio; water vapor permeability; lack of spatial memory (leather shoes adapt to corns and bunions; plastics have memory and return to original shape!) Attempts have been made to duplicate these characteristics. Dupont in the U. S. expended $30 million in the effort and eventually conceded failure.

Vinyl and urethane coated fabrics are simulations of appearance, attractive invitation of surface but not of physical properties. It may be surprising in the age of space technology, but the characteristics on which the appeal of leather is grounded have not yet been replicated in any synthetics.

Synthetics are merely another case in point. They do not displace leather; it is their function, as with all other substitutes, to fill consumer wants and needs for which leather is not available in terms of supply and feasible price.

Of course the ebb and flow of competition by synthetics, and other substitutes, is vastly more complex than indicated by the summary given above. Not all markets and outlets for leather are concurrently or equally affected. The lowest and lower price brackets of consumer goods are first to experience the inroads of synthetics when the equivalent products in leather become too expensive. In certain products where the unique properties and appeal of leather are not vital, the loss of market can be irrevocable. Heels and seats in shoes, partitions and linings in wallets and briefcases, machine drives, the outer shell of ski boots are examples of such loss. But, the aggregate supply of leather, when price denotes increased availability, recaptures traditional markets or expands in new outlets to the fullest extent of available supply.

No synthetic product has thus far succeeded in emulating the unique properties of leather and thereby competing with leather as an equivalent material. Corfam, developed by Duport, and more or less similar materials generically known as poromerics, are the most sophisticated effort to duplicate the water vapor permeability of leather and its weight/strength ratio. The manufacturing process is costly and complex, relies on petrochemical feed stocks and is not adaptable to meeting demand from shoe manufacturers for relatively small lots of different weights, colors and textures. Above all, consumers' experience with poromerics, a high-cost material, was unsatisfactory. Production has been abandoned in the U. S. and Western Europe; Corfam process rights and equipment were sold to Poland; limited poromeric output is reported in Japan.

Unless chemical companies attempt and succeed in producing more satisfactory and less costly poromerics, this class of synthetic will not have significant impact on potential demand for hides and skins. Substitution in years of diminished hide and skin supply will come from another quarter, namely, the fabric-backed polyurethanes and vinyls. These are by far the most important synthetics in current use and the only materials to which manufacturers of footwear and leather goods can look to supplant leather on a volume scale in the lower price ranges of their products.

Vinyl-coated fabrics have been in production for more than twenty years but were not highly regarded as an alternative for leather except in the very cheapest products or in novelty items. However, introduction of urethanes gave a great stimulus to the plastic coated product group. Urethane is superior to vinyl in abrasion resistance, in texture embossing and in color matching to customer specification. Even prior to the upsurge in hide and skin prices during 1972-74, urethane-coated fabrics were the mainstay of substitution in footwear uppers, handbags, and small leather goods. Peak use developed during the 1972-74 price cycle and began to decline shortly thereafter when hide and skin prices fell precipitously.

There are no data on the overall use of synthetics during the 1972-74 episode of leather supply stringency. An indication is given by the percentage of shoes produced in the U. S. with non-leather or part-leather uppers because the largest part of the substitution consisted of backed urethanes and vinyls. It is estimated that peak usage in footwear exceeded 40 per cent of total shoe production. Comparable information is not available for other countries where resort to synthetics was also extensive.

Queries were directed in June, 1979 to manufacturers of six developed countries regarding projected use of leather and synthetics in footwear and handbags. Indications from Western Europe do not point to a marked increase in synthetics. However, in the U. S. several leading producers of volume grade footwear and

handbags are apparently committed to greater use of the backed synthetics as a consequence of the leather price outlook.

Plastics used in sheet form or by injection moulding and extrusion for very low-priced sandals, slippers, handbags or purse accessories are not substitutes for leather. The wants filled by such plastics are, in effect, a new market in which leather could not be competitive under almost any circumstances.

It is assumed in this study that in the foreseeable future potential demand for leather will exceed available supply; alternative materials (substitutes) will determine, in part, where and how leather is used and who consumes it. In planned economies, the function of price will be discharged by mandate or plan.

Problems Arising From Cultural And Social Factors

Problems attributable to traditional social and cultural institutions and practices are limited although the economic impact in at least one instance is highly significant. That situation, of course, is the prohibition of cow slaughter in India. With the exception of a few localities, Kerala, West Bengal and Assam, where restricted slaughter is allowed of aged and dry animals, slaughter is not officially permitted in the rest of the country. Almost all cattlehides are obtained from fallen animals and, as previously noted, the quality of such hides reflects the cumulative marks of age, disease and inferior village flaying. In a few Asian countries any vocations involving livestock slaughter and the processing of hides, skins and leather are restricted to specific castes or social classes. This may handicap technological development and thereby restrain improvement of supply.[34/] Only one dietary restriction is of any consequence: The Moslem and Judaic proscription of pork, which does not seem to be a problem for hide and skin supply or demand. Consumption of hides and skins as human food in Africa and parts of Asia inhibits raw material supply for leather, but points to a vastly greater social problem.

Traditional social and cultural factors identified as problems for the hide and skin economy are usually associated with curtailment of possible supply. A social factor of more recent vintage in developed countries stimulates demand for leather. A growing predilection for "natural" products, appearing in recent years, has perceptibly affected demand for food, cotton, wool and leather. Deprecated at first as cultist, the demand for the natural has become a market force of considerable dimensions. It has been clearly apparent, within the industrialized nations, in consumer choice of footwear, apparel, and accessories such as handbags and belts, and upholstery.

PROBLEMS AND POSSIBLE SOLUTIONS

Increase in Quality and Quantity of Hide and Skin Supply

The core of the problem must be stated without equivocation: Greater global production of leather and, more particularly, an increased share of global production by the developing countries, cannot be attained without increased available supply of improved quality within the developing countries. Furthermore, the problem is far more narrowly focused geographically now than ten or twenty years ago. The reasons are: First, Latin America and Asia currently process all their indigenous raw material and have become net importers. Available supply in these two regions represents 58 per cent of total hide and skin supply in the developing countries. Second, a period of spectacular cattlehide supply growth in the developed countries came to an end in 1977. Over the near term cattlehide supply in North America, Western Europe and Oceania will decline. Whether, when and at what rate supply growth will resume is problematical, but in no event are future trends likely to duplicate the unprecedented expansion of the last 25 years.

It follows that developing countries must rely to a greater extent on domestic hide and skin resources for fruitful and viable progress in tanning and the manufacture of derived products. Those resources can be increased and improved at every stage of their production.

Livestock

Raising livestock efficiently and productively in terms of yield - meat, milk, wool and hide or skin by-products - is both the base and the limiting factor to progress in the leather sector. Economic history also records that productive herds and flocks are a source of capital accumulation indispensable to economic growth. A comprehensive program should be framed under the aegis of the U. N. and drawing upon expertise from all possible quarters such as departments of Agriculture in developed countries, ranchers from the U. S. and Argentina, breeding specialists, experts in forage crops, entomologists and veterinarians. It would be presented to developing nations as a platform for action, beginning with initial on-the-spot investigation and then detailing progressive stages of breed improvement, disease and insect control, pasture management, feed or forage crops and their storage. Explicit recommendations should be made on means of implementing the program and on incentives for its acceptance by farmers or herdsmen. In that regard, seemingly far-fetched suggestions should not be overlooked - blue ribbon awards, local competition, financial inducements or exchange visits with livestock producers in other countries.

In brief, a quantum jump is needed from the present level of animal husbandry in many developing countries. Unless that is attempted, much of the following will remain pious rhetoric.

Slaughter Facilities

The absence of central abattoirs or slaughtering facilities is a principal cause of non-recovery of hides and skins. All the obstacles and difficulties are familiar: Lack of roads and transport facilities, absence of communication, shortage or total lack of trained management or working personnel. Urban centers of some description are a prerequisite to provide markets for abattoir meat products and thereby encourage consistent livestock marketing to a commercial or an organized channel.

All too often the problem is characterized in broad terms such as the "absence of an infra-structure" with the connotation that the latter means supplies, equipment, mechanics, plumbers and electricians on call. Obviously, these are the indicia which distinguish developed from under-developed economies. An "infra-structure" cannot be imported or imposed full blown. It must be developed from fertile take-off points; organized livestock slaughter can be one of the most fertile and productive. It would contribute to protein supply[35/] and the hide and skin by-products would unquestionably aid broad capital growth and industrial development. There is ample evidence of favorable results wherever private or government effort has led to the establishment of modern slaughtering facilities.[36/]

Flaying and Curing

Until slaughter methods can be more effectively controlled and improved through abattoirs, the promotion of better takeoff by farmers and local butchers is essential. In this regard the lessons of the past should not be overlooked: Economic incentives have always been the most potent touchstone of improvement. Differentials in price to reward good knife work, proper trim and adequate cure are of the essence. Hide and skin improvement services should consider programs involving the distribution of good tools, skinning knives for example, and curing salt or toggles for air drying. Cost of such activity would be minor compared with the resulting increase in economic value of hides and skins produced.

Collection

In some developing areas loss of hide and skin supply is due to nothing more than the absence of effective collection systems. Here again, the past as mentor is not to be ignored: Hides and skins move into "sight" when the incentives are known, reliable and practiced. Collection systems based on incentives to garner the products of farm, herdsman or village build their own communications network. How to give full play and scope to incentives is obviously conditioned by the economics or social structure of a country.

Ways to Improve Research and Development Programs

Fundamental research in hide and skin chemistry, tanning processes and materials is conducted by a number of long-established institutes as well as by commercial organizations in the developed countries. Their findings are published and widely disseminated through technical journals. Such research keeps current the vast body of existing knowledge and technology concerning hides, skins and leather which is universally available. Lack of information is not an obstacle to producing better raw material or tanning leather to achieve maximum added value. Any needed information can be obtained, literally, for the asking!

Consequently, research in developing countries should not be addressed to abstract and theoretical problems with no immediate and practical benefits. It should be directed toward the application, the best utilization of the existing body of knowledge and information on hide, skin and leather technology. Such change in emphasis may require reconsideration of existing programs in the research organizations of several developing countries. Field operations to spread information would take precedence over research, however creditable, in the laboratories. The latter should become centers for testing and control, for solving practical problems as they arise, for developing standard procedures for tanneries without their own laboratories. It is in no sense devaluing the status or role of "research" to suggest the priority of such practical, grass-root activity. In fact, fundamental research in the developed countries always flowed from initial dedication to solving practical day-by-day problems.

FAO has framed a clear summary of practical research objectives: "Research and development centres in the developing world may have to concentrate their activities on the following basic areas:

- Measures to increase the availability of hides and skins and upgrade their quality;

- Improvement of flaying procedures;
- Measures to adapt modern tanning technology to their respective needs;
- Development of standard processes and controls, acceptable to international markets, for wet blue, crust and finished leather;
- Development of quality control standards, and means of enforcing such standards so as to ensure that all finished and traded leather products can maintain the high premium which such products now enjoy in major developed country markets."[37/]

In this context FAO noted the financial problems of national research organizations and suggests consideration of multi-country institutes, similar to regional research and training centers established by UNIDO, and an international entity to coordinate and avoid duplication of effort at the country level.

WAYS TO IMPROVE MARKETING PRACTICES

Marketing begins with the product and in the hide, skin and leather field, Emerson's dictum is infallible (Make a better mousetrap and...). Marketing problems in hides, skins and leather are inversely related to quality of product and that is measured by all the criteria discussed in preceding sections: Fiber, grain, weight, butcher cuts surface damage, tannage, finish and, above all, uniformity or consistency of supply or output.

In the markets of the developed world descriptive trade standards have evolved, codified in many cases and sufficiently respected in trade practice, to facilitate matching sellers' offers and buyers' needs. A similar condition prevails in certain developing countries and governs trade in certain products - Frigorifico hides, Madras vegetable-tanned skins, Thailand buffalo semi-tans, Iranian hair sheep, etc. However, where heterogeneity is the rule rather than exception, as in many developing countries, value diminishes and price suffers.

The marketing solution, therefore, is twofold: Improvement of quality through better takeoff, cure, storage, and so forth; sorting or grading of hides and skins

to achieve consistency in lots offered to tanners or for export. Quality has been discussed at length in previous sections. Sorting or grading as functions of better marketing require further comment.

Large abattoirs in developing countries can and do sort hide and skin output in the same manner as packers in the developed regions. But, when the bulk of supply originates with small farmers, local butchers or herdsmen, the collection system or network must assume the function of grading, sorting and assembling merchantable lots of hides and skins. More frequently than not, success in this endeavor is directly related to the size of the collecting agency and the amount of territory covered. Economic motivation, profit incentive or participation in greater gain, is equally important.

Generalizing about possible improvement in marketing or collections systems is hazardous. In market-oriented economies value is communicated by competition for supply; the number of intermediaries between primary producer and the final buyer is dictated by necessity not by largesse or custom. However, when price incentives are absent, the advantages of improving quality or grading and sorting hides and skins are not fully appreciated.

Under all circumstances it would appear that economic incentives must be harnessed to improve the marketing structure and that greater knowledge of market value would aid the bargaining position of the original sellers.

WAYS TO REDUCE PRICE FLUCTUATIONS

There are no feasible means of controlling or dampening fluctuations in hide and skin prices. Conceivably, a wide-ranging set of worldwide international agreements might achieve apparent and temporary results, but the agreements would entail:

Fixed maximum and minimum prices for every possible variety of hide and skin with suitable differentials for every grade.

Similar fixed pricing for every type of semi-tanned or rough-tanned leather and every grade of finished leather, footwear and all leather products.

Multilateral export and import quotas for hides and skins and all derived products.

Maintenance of stockpiles to absorb or release supply whenever the dykes were threatened anywhere in the world.

Rationing of footwear and all other leather products.

Obviously, the concept is chimerical and is suggested only to emphasize that hides and skins are not a homogenous commodity, e.g., copper or wheat; they are many commodities inter-related by the common markets in which they are consumed. Furthermore, leather is hide and skin substance and so too are leather products. Hence, control at one level is futile without parallel restraints or controls on the others. 38/

It can be surmised that no subject has ever been discussed and deplored more fervently by tanners than the price vagaries of their raw material. A recurrent thought is advanced in such discussion, namely, stockpiling under governmental auspices to restrict the range of price fluctuation. An ever normal granary of hides and skins is appealing at first blush until the technical problems are considered, not the least of which is how to acquire the initial stockpile without causing the very disruption it is hoped to avoid.

Another possibility advanced from time to time proposes that pooling of national information or estimates on probable supply and demand configuration for the ensuing year would lead, through greater understanding of the world market, to more price stability. This idea was actually implemented by the International Council of Tanners for several years with unfortunate results. Apparently, "A little knowledge is a dangerous thing" in the world of hides and skins because anticipation by certain participants of even moderate change proved self-fulfilling with a vengeance.

Only one plan has ever been proposed, and adopted by some tanners, which makes economic sense and might lead to greater price stability if it were universally practiced. This is the "Last-In, First-Out" method of inventory valuation, an accounting system which dispels the illusion of gain from market advances and thereby helps to curb speculative impulse.

WAYS TO APPROACH TRADE RESTRICTIONS

In spite of the conclusion in April 1979 of the Tokyo Round of multilateral trade negotiations, a serious if not critical phase is emerging in the trend of international trade relations. Imbalance on trade account, diminished growth rates, spiraling energy costs and inflation have exacerbated trade problems and grievances. Leather, its raw materials and products, are involved. It is important therefore to define the specific issues within this sector.

First, total or partial denial of access to their domestic raw material by a large number of developing countries and the centrally planned economies. In contrast, the developed and market-oriented economies have continued to allow the export of hides and skins without restriction. Prohibiting or blocking raw material export is motivated by the desire to promote and expand domestic utilization. Frequently, the rigid application of this policy has led to the absurdity of export prices for leather below the value which could have been realized for the equivalent raw material.

Apart from considerations of equity, there are two reasons why a one-way system of trade in raw material cannot be sustained indefinitely.

First, an industry fostered by exclusive right to domestic raw material is never exposed to the tests of efficiency implicit in a free market. Sooner or later, productivity and quality of produce deteriorate as the industry "becomes 'addicted' to subsidies."[39/] Raw material producers, aware of world market hide and skin values, demand equal prices at home, and at the least, quality standards are

jeopardized. Although no official account is available, it is believed that such a conflict of interest transpired in Argentina early in 1979 and was resolved by movement of hide and skin prices to or near the world market level.

Second, countries aggrieved by export restriction began to assert, to Argentina and Brazil, for example, that "developing" is not an indeterminate sentence; that at some point maturity is presumably attained and the obligations of trade reciprocity must be assumed. As noted in a preceding section, discussion along these lines began mounting in the EEC and the U. S. during May and June, 1979.

Approaching the issue of raw material export restriction on the level of rational economic discourse would be preferable and more productive than retaliatory measures by the freely exporting nations. Discussion among the concerned countries could well disclose that the dimensions of the underlying problems had shrunk radically. In several developing countries, for example, the primary objective of domestic utilization is now an accomplished fact. Blanket export embargoes may be doing more harm than good by preventing exchange in types or grades of hides and skins more useful in one country than another. In short, there are practical solutions to accommodate the transition to freer trade in hides and skins without impairing the basic objective of developing countries. Joint studies of possible solutions should be framed and recommended by international bodies including the appropriate elements of the U. N.

The other side of the trade coin, import restriction in the leather and leather products sector, poses more difficult problems. Although these have arisen primarily between developed and developing countries, they are also manifest in trade relations in the developed regions, e. g., import quotas by Japan.

In the developing world the export of leather and its fabricated products was the basic stimulus for creating the requisite productive capacity. Growth in capacity was encouraged by low tariffs in the developed nations, including the General

System of Preferences, and the absence in these countries of non-tariff barriers. Another spur of tremendous importance was, and remains, the interest of multinational business groups in exploiting low labor costs and participating in the subsidies or other forms of assistance by governments to infant industries in developing countries.

Within a relatively short period - 12 years - exports of footwear and other leather products to developed countries reached proportions which prompted deep concern and has in several instances culminated in restrictions on imports from developing countries. Such restrictions have typically been effected through measures extraordinarily reasonable by historic standards. Instead of reverting to blanket exclusionary tactics, to prohibitive tariffs, developed countries sought to achieve a balance of interest with the exporting nations. This was accomplished through an historic innovation in trade relations - bilateral Orderly Marketing Agreements.

Two premises underlie Orderly Marketing Agreements as instruments for bridging sharply divergent national interests and thereby avoiding uncompromising trade restrictions. In the first place, the developed partner to the agreement recognizes the value and importance of leather and leather products to the growth of the developing country. And, second, the developing country acknowledges that unlimited exports can bring serious disruptive consequences to the importing nation. Those consequences, reflected in popular sentiment or legislative action, could threaten existing patterns of trade and national development. Hence, it is mutually advantageous to acknowledge practical limits to the rate of export growth in specific industrial sectors of a developing country. In all OMA's negotiated thus far, provision has been made for continued participation by the developing country in the market growth of the importing nation. Such participation in the future is, in effect, a trade-off against precipitate capture of an unduly large share of the market within the importing country.

Satisfactory bilateral agreements can only allay acute problems between two countries at a time and, inevitably, create problems in other quarters. A limitation on exports to a given market provokes the effort to seek expanded outlets elsewhere. Unless OMA's are consistently employed in resolving such situations, the treat of arbitrary and severe retaliatory measures will be ever present.

Can the concept of the OMA be generalized internationally to the end that past progress be safeguarded and the avenue to future development not be blocked by draconian restrictions? The answer must be affirmative on two grounds.

First, there is precedent for the principle of market sharing without onerous restraints on development or dangerous disruption of national markets. The international agreements on textile trade dealt with problems as complex as in the leather sector. Negotiated in 1973, the textile and fibers agreement has averted dangerous trade conflict and given economic value to the concept of orderly marketing and shared growth. No agreement subscribed to by more than two score countries can anticipate problems certain to arise from year to year. However, the machinery for review and negotiation in the textile arrangement has prevented fissures from growing into irrevocable disagreement or trade conflict.

Second, the dimensions of the problem, in the entire sector based on hides and skins, should not be exaggerated. Emphasis has been given in this study to the concentration of available hide and skin supply by region and country. Countries producing hides and skins have the most vital long-range interest in the growth of orderly trade in leather and its products as a prerequisite to sound economic development. These countries have an economic stake in orderly marketing far greater than the few anomalies producing leather and its products from totally imported raw material. Consequently, a great majority of nations participating in leather and leather products trade share a basic common interest on which multinational orderly marketing agreements can be built.

A COMPREHENSIVE FRAMEWORK FOR OPTIMUM DEVELOPMENT OF THE HIDES, SKINS AND DERIVED PRODUCTS ECONOMY

The General Objective of International Cooperation

International cooperation, with very rare exceptions, is the result of consensus in national self-interest. What are the objectives of all countries, developed or developing, with respect to hides, skins and derived products, and which both define and justify international cooperation:

1. Increasing the available supply and improving the quality of hides and skins.

2. Realizing the maximum return from hides and skins, whether from domestic utilization or for export.

3. Maintaining trade in hides, skins and derived products with the best possible (or least adverse) impact on foreign trade account and on internal problems of employment or the economic stability of regions and communities linked to leather and its products.

4. Minimizing price fluctuation in hides and skins and the ensuing consequences in manufacturing and retailing.

With one addition, the foregoing describe the substantive objectives and areas of international cooperation. The addition is assistance or guidance to those developing countries which have not yet reached a self-sustaining takeoff point in utilizing or marketing their hide and skin resources. Every one of these objectives has been noted or discussed in preceding sections of this study. In summary, international cooperation should be organized and formed on:

Quantity and Quality

More problems would be solved (and more dialectic avoided) by increasing the supply of hides and skins in many developing countries and raising the quality. One can infer from Table 5, which compares regional livestock numbers with hide and

skin supply, the huge increase greater productivity would yield. Raising quality through reduction of defects would have almost equally significant results in gross income of producing countries. The benefits, moreover, would be perceptible in all nations because increased and better supply would be communicated to world markets and raise the universal level of leather consumption.

Existing programs of technical assistance and training spearheaded by UNIDO, FAO and other agencies of the U. N., should be expanded and intensified. Applied research, at a down-to-earth level, can be increased and coordinated internationally to avoid wasteful duplication and ensure "hot-line" distribution of useful information.

It is suggested that international cooperation and support could be facilitated by exposition of the economic benefits to financial institutions concerned with the balance sheets and credit standing of various countries. Prevailing information among such institutions on the economic leverage in expanded and improved hide and skin supply is strikingly absent.

Efficient Utilization of Supply

It has been too frequently assumed that the presence of livestock, and hides and skins of some description, automatically justifies building a tannery. The result of this stereotype in thinking has been costly excess processing capacity in a number of developing countries. A sounder approach would weigh the character and logistics of supply, measure the cost and profit benefits of marketing raw material or processing it and determining the point at which capital investment is justifiable. International agencies can approach the task without preconception or prejudice. It is urgent for two reasons: To correct errors of the last eight years and to restore confidence in tanning operations properly installed at the right time and the right place.

Price Stability

For reasons adumbrated previously, any recommendations on this score are of dubious value. There is no solution that can be reconciled with the existence of a market in which several million buyers and sellers participate and the market, it might be noted, is more pervasive than the avowedly market oriented economies.[40/] Exchange of information at the international level might help to moderate oscillations or reduce their most adverse consequences provided that:

A sufficient number of countries agreed to periodic consultation and evaluation of supply and demand trends indicated by their pooled data; and

Second, those countries undertook to avoid unilateral import or export action which would aggravate the factors leading to instability.

National Support Measures

Leadership and initiative by international agencies can delineate the objectives and benefits of cooperation among countries on the problems of the several industries grouped as the leather sector. However, the achievement of positive results requires positive action by individual nations or by regional groups facing common problems and issues. Endorsement of sonorous generalities leads nowhere; concrete problems must be tackled systematically at the national level.

Problems and issues to which national energy must be directed may vary with every country. There are three primary subjects to which every nation with an interest in hides, skins and leather should subscribe as deserving full support:

1. Collection and compilation of comparable data on livestock, hides and skins, leather and its products, in the format prescribed and approved internationally.

2. Increasing the available supply and quality of hides and skins by implementing appropriate measures and programs.

3. Determining the optimum utilization of raw material, not by pre-conception but through concrete analysis of feasibilities, markets and cost-benefit ratios.

STRATEGY FOR ACTION

It should be clear from all of the preceding review that there is still scope for economic progress in hides and skins and their derived products. Developed countries have charted the routes to efficient production of raw material and its most economic utilization. Several developing nations have demonstrated that indigenous hide and skin resources can be a major asset in national development when the available techniques are adopted and supported. In the latter countries the self-generating momentum of incentives has become a powerful element in attaining greater value for hides, skins and their processed derivatives. But, in the Near East, Africa and the Far East there are countries where potentials are considerably greater than current availability and efficient utilization of hide and skin supply. While these countries account for a small proportion of global livestock resources, their hide and skin productivity is extremely low. Hence, improvement in these regions would contribute to their economic progress as well as enhancing world supply in hides and skins or processed goods.

Strategy at the International Level

Two problem areas deserve and require international leadership and action. The first has been noted above - three regions where improvement in the scale and quality of hide and skin supply would exert positive economic leverage for the countries directly concerned and in some measure for the rest of the world. The second has been defined in a preceding section - the rise in trade restrictions and the inevitable counterpoint of retaliatory measures.

At the present stage of development in the hide and skin branch of the world economy, circumlocution is a waste of time in coping with the first problem area. All the generalities are familiar: inadequate slaughter facilities, bad flaying, poor curing, haphazard collecting... The time appears right for a pinpointed address to governments based upon first hand, on the spot appraisal by qualified observers. In essence, the message must detail the benefits of specific actions, diagram what

must be done, assign responsibility for performance, clearly define the scope of international assistance and offer to recruit foreign expertise on suitable terms.

A platform for action on the foregoing lines cannot be framed in the abstract by the most competent armchair theorists. It must begin with down-to-earth investigation by competent observers schooled in hides and skins and capable of smelling profit or loss in any economic milieu.

A moral for action by international agencies can be read from the reports of UNIDO consultants who visited various countries all too briefly in 1978. Their findings gave substance to surmise, dispelled generalities with hard facts and identified the most urgent tasks, country by country. Leadership and action at the international level should follow this precedent so that guidance and assistance can be offered to a country in concrete terms, directly and knowledgeably applicable to the country's problems.

Limited resources undoubtedly confront UNIDO and other U.N. agencies with the dilemma of either diffusing or concentrating effort. It is suggested that the time is propitious to adopt the latter course in hides and skins.

A departure from the generally hortatory position at the international level to a pragmatic stance would involve the following steps:

1. A statement should be addressed to all developing countries with potentially significant hide and skin supply to stress the economic gains of increasing and improving this raw material resource. Each recipient country should be given an outline of practical ways and means, tailored to the factual situation in that country. A substantial body of the necessary information in that respect is already available from reports by UNIDO consultants and FAO field observers. In framing the outline of ways and means for a country, every possible emphasis should be given to limited practicable, attainable goals. One reasonably efficient abattoir or collecting station or the adoption of better curing methods will do more good than far-reaching programs that cannot get off the ground.

2. Any government evincing interest in a program of economic self-improvement via hides and skins should be asked for positive commitment to the indicated targets and for manpower and management personnel to support project leadership and expertise from international agencies such as UNIDO and FAO.

3. Technical missions or advisors designated to organize a specific project should have practical knowledge of hides and skins and access to information they might lack. Following the initial phase of an undertaking, provision should be made for two-way communication to obtain progress reports and to furnish advice and instructions on problems as they arise.

4. As a project gets off the ground with ponderable results in more or better hides and skins, then consideration should be given to the next stage - better marketing or utilization to obtain greater economic returns. This should be based on thorough evaluation to avoid the costly mistakes and disillusionment of excessive and idle capacity in processing plants.

Obviously, the concept of international strategy and action in the foregoing is concerned with countries where hide and skin supply falls drastically short of national potential. It is not addressed to developed or those developing countries where hides and skins are efficiently produced, used or marketed with knowledge of their economic value. But, countries in the latter group would welcome any expansion in global supply, any reduction in the waste of possible resources in less developed regions, as essential to the leather wants and needs of growing world population.

The other major problem urgently requiring international consideration is the growing threat of escalating trade restriction and reprisal. This ominous possibility, of which the origins have been discussed in a preceding section, calls for outspoken international discussion and every possible effort to adjudicate or, at the least, to ameliorate the consequences of national differences. International

agencies and institutions concerned with the hide and leather sector must be objective in determining and presenting economic facts and their implications. Preconceptions must be shed and facile formulas abandoned if they do not square with the facts. Lack of objectivity can and has bred costly illusions; it has been, more often than not, a benign disservice to viable economic development. It is misleading, for example, to generalize on the benefits of exporting manufactured products rather than hides and skins without weighing the character and availability of the necessary raw material.

Any working conference convened to consider the question of access to raw material should include innocent bystanders, that is, hide and skin deficit nations. Countries in this group could exercise weight in mediation through their importance in trade flows other than hides and skins. A future UNIDO consultation meeting such as the Innsbruck session in 1977, would be a highly appropriate forum.

To cope with the retaliatory prospect engendered by massive exports of leather and its products from newly established capacity, no better instrument is at hand than Orderly Marketing Agreements. In spirit as well as substance, the OMA's are a remarkable forward step toward equitable and rational trade policy. However, it has become apparent that bilateral agreements will have to be generalized to preserve their purposes and effectiveness. In the footwear sector, for example, rapid expansion of capacity and the resulting quest for markets can be as dangerous to developing countries as it is deemed disruptive by developed nations.

Initiative at the international level is required and a first step in that direction would be the compilation of more accurate data than now available on existing and prospective capacity. UNIDO surveys in 1978 yielded considerable information[41/] but more important charted the research procedures to be followed.

Essentially, these are on-the-scene investigations as distinct from desk studies. More extensive information of the character developed by UNIDO would also be invaluable in gauging the economic merit of proposed new manufacturing facilities. Hindsight suggests that such information and appraisal in the past might have avoided serious errors in the utilization of national resources.

Country or Regional Strategy

In developing countries the major objective is: Increase and improvement of available hide and skin supply. Any programs, projects or plans to attain those ends must enlist positive support and cooperation from a multitude of producers who are the base of the supply pyramid. Economic incentives are an exceedingly effective system of communication in the hide and skin supply chain. Creating and promulgating the necessary incentives is, therefore, the key element of effective strategy to maximize potential hide and skin resources.

It would be futile to specify precise measures; national systems and broad economic policies differ widely. In some instances the expertise of foreign trading companies, through joint venture or other arrangement, may be desirable to establish better market channels. Other countries might find it possible to rely on existing resources for production improvement and trade management. But, the pervasive factor in any system must be the incentive of greater return for greater production and superior quality of hides and skins. There can be no equivocation on the underlying problem: In many developing countries the gap between potential resources and actual available supply must be closed as the prerequisite to development in the leather sector.

Geography and similarity in livestock breeds may dictate the strategy of regional cooperation and action. Information organized by UNIDO on this score would be useful to countries with contiguous borders and concerned by common problems of animal disease, insect control or marketing channels. A strategy of joint action in such cases could reduce costs and accelerate the growth of supply.

Reference has previously been made to the interest of developed countries in the global expansion of hide and skin resources. Such interest could provide information to nations seeking to enhance their hide and skin resources - information on markets, specifications, grading, trade practice, shipping methods and the like. Contacts of this kind are essential to development at every stage.

Beyond action directed at the most basic problem - hide and skin supply - national strategy should be guided by national needs. These include, in the hide, skin and leather industries, practical, down-to-earth research, training of management and personnel, market analysis,exchange of information with other countries either directly or through UNIDO and the other U. N. agencies.

Experience has demonstrated that economic development is not a pre-ordained, automatic and infallible sequence. Any decision on the optimum utilization of indigenous raw material should be preceded by exhaustive evaluation of quantity and quality of supply, alternative marketing results and capital and operating costs of the options under consideration. For example, present excess tanning capacity, coinciding with reduced world hide and skin supply, is prejudicial to success of new tanning enterprise. However, five or ten years hence the outlook could well be much more favorable.

Second, every country should be cognizant of the grave risks in the mounting threat of trade restriction and retaliation. National strategy, therefore, should include participation in and support of international efforts to achieve equitable compromise and the rule of reason in foreign trade.

CHAPTER III

LEATHER AND LEATHER PRODUCTS ECONOMY

CURRENT PRODUCTION OF LEATHER

Major Aspects

The Product

Raw hides and skins are organic materials subject to bacterial decay within hours after removal from slaughtered or fallen animals. Putrefaction can be arrested temporarily by curing (see Annex 1), freezing, dehydration, or the application of biocides. In their original state, fresh or cured, hides and skins have very limited utility; they must be converted to a semi-organic, stable form through a tanning process to gain the characteristic properties and values associated with leather for thousands of years.

The Process

Tanning can be effected by various methods and materials but the underlying principle is identical even in the most primitive systems, namely, the transformation of collagen to a stable form retaining the fiber structure of hide or skin substance. In modern tanning the known functions of chemical agents are coupled with various physical treatments for the precise and mass duplication of desirable characteristics in finished leather.

A typical leather production process flow is outlined in Annex 2. Although this is primarily descriptive of steps in the manufacture of the world's most important type of leather - cattle side upper - the operations noted apply to most commercial leathers. In essentials, all tanning processes entail four successive groups of operations: Preparation and depilation of the rawstock; basic tanning; retanning, splitting, lubrication, and coloring; drying and physical conditioning; surface finishing. Variation at different stages of production are legion, especially

in market oriented, competitive economies. However, a remarkable degree of basic process standardization prevails due to the rapid diffusion of technical information.

Characteristics tanners preserve and enhance in processing hides and skins distinguish leather from all other sheet materials, natural or artificial. The random fiber structure of hides and skins endows leather with: Water vapor permeability, high tensile strength and tear resistance, dimensional conformation (a vital factor in footwear comfort), flexibility over ambient temperatures, puncture resistance and durability. It has been previously noted that many have sought and none succeeded in duplicating these properties in synthetic materials.

Types of Leather

Analysis of the leather and leather products industries in succeeding sections will be facilitated by a brief summary of the principal types of leather produced and the broad categories of end-use in each instance.

TABLE 19

MAJOR TYPES OF LEATHER AND END USES

Bovine Leather	% of Total Leather Production in Area	
Light (Produced mainly in sides; upholstery and some garment leather in whole hides; includes splits.)	66.1	Shoe Uppers, garments, shoe linings, handbags, and personal leather goods, upholstery, luggage, sporting goods, waist belts, dress and work gloves, book bindings.
Heavy (Tanned in sides; sole leather cropped to bends, shoulders and bellies.)	4.9	Soles, transmission belting, other industrial and mechanical leather, harness and saddlery, heavy equipment cases, waist belts, welting and top grade insoles.

Sheep & Lamb Leather (Includes shearlings, or skins tanned with wool on for garments, slipper linings, rugs and bed pads.)	22.0	Grain and suede garments, slippers, shoe linings, dress gloves, hat sweats, book-bindings, chamois, small leather goods, promotional novelties.
Goat and Kid Leather	6.6	Shoe uppers, linings, dress gloves, garments.

The foregoing emphasizes again the great range of end products for which cattle-hide leather is employed and the very large proportion of total leather output represented by bovine rawstock.

Modern and Vintage Tanning

No industry of ancient, and respectable lineage, can compare with leather in the gulf between modern functioning technology and still existent vestigial practice. In certain areas leather is currently produced in backyard or rural workshops by methods as old as recorded history. Leather is also produced in plants where computer consoles monitor, time and control every stage of a completely mechanized system. And, between the two extremes there are small tanneries, partially mechanized, relying on low labor costs rather than investment in modern equipment and methods.

Reasons for the great variation in technique and mechanization are more complex than the simple division of developed and developing. Perhaps the most important is the relative availability in sufficient quantity of reasonably uniform raw material supply. In the absence of such supply a large and mechanized tannery would be an economic white elephant. It could not operate efficiently on a mixture of assorted hides and skins nor could the product be marketed to recoup production cost or amortize capital investment. Argentine tanneries, among the most rationalized in the world, exemplify the positive consequences of adequate,

consistent and quality raw material supply. Ancillary skills and trades have grown in Argentina in response to the proven ability of the tanneries to utilize domestic raw material and market the product successfully at home and abroad.

Leather production in India has developed on a dual track which copes to some extent with the endemic problems of deficient hide and skin supply. Much of the backyard or rural tanning output is semi-tanned leather which is funneled to mechanized plants for sorting, further processing and marketing to domestic manufacturers or foreign buyers. In a practical sense this system reaches the same goal as collection and centralization of raw material supply. It may have the additional effect of dispersing labor requirements over a wide area. It should be noted, however, that the Indian system rests on a very substantial raw material base in volume, if not in ideal quality. 42/

In strictly economic terms there is not the slightest doubt as to the enormous advantages of a tannery designed on modern, mechanized lines. Productivity in such plants is several times greater than in technologically backward units and an order of magnitude beyond the capability of "tanneries" relying mainly on labor rather than machines. The difference in unit costs offsets almost any conceivable saving in wages. Quality control, uniformity of product, flexibility in meeting customer requirements are further attributes of modern tannery superiority. But, the crucial precondition is raw material supply meeting the criteria identified above. If that condition cannot be met or foreseen, a mechanized tanning plant abreast of modern technology would be a costly liability.

In evaluating the role a tannery might have in a national economic complex, it is important to avoid the recurrent misconception that tanning is a labor intensive industry. The contrary is true: Modern tanning ranks low in labor intensity; it is a capital intensive industry. Productivity in processing and materials handling, made possible by new machines and methods, has significantly changed the character of the modern rationalized tannery.

Locational Determinants

Access to raw material takes precedence over all other factors in tannery site selection. Availability of water, power and fuel, labor, transport facilities for incoming supplies and outgoing shipments of product are all vital but secondary to the indispensable, primary factor of raw material availability.

Within the past five years attention has been drawn to the desirability of tanning fresh hides to obviate the cost of curing and to produce better quality leather.[43/] The value of this procedure has been proven. However, it is feasible economically and practically only if a tanning plant is contiguous to a slaughtering facility with adequate and consistent volume or can collect and put hides or skins into process within hours after flaying. Furthermore, the scale of tannery operation should be large enough to permit sorting and grading of raw material (or leather) into uniform, commercial lots. Otherwise, the advantage of tanning fresh hides would be more than offset by the depreciated return for miscellaneous output.

Water

Tanning technicians regard water as their primary processing chemical. It should not be taken for granted with respect to quality and dependability. A back-up or "fail safe" resource is just as important as the obvious or main supply. Low float processing and recycling systems have diminished water requirements in modern tanneries, at substantial capital costs. In conventional plants, consumption should be anticipated in a range of 5 to 12 gallons (18-44 liters) per Kg. of wet salted stock.

Environmental Aspects

These are reviewed in a following section. It is pertinent to note here that the magnitude of effluent control problems is not necessarily related to degree of industrial development. Problems due to effluent may actually be more serious in certain developing areas with high population density than in developed regions.

Land and Structure

General observations on land requirements or building specifications are meaningless. Good design emphasizes compact layout for efficient processing flow but climate, land and building costs and available materials involve appropriate variations. Tanneries in San Francisco, with much equipment situated outdoors, cannot be compared with plants in New England or Leningrad.

Energy

Under existing conditions, or the milieu in prospect, energy is a more important consideration than in the past. It is true that the tanning industry is not energy intensive in comparison with metal refining, chemical processing or transportation. In modern tanneries, prior to 1974, the cost of fuel and purchased electricity for process steam and water, motors and building heat varied between 1.7 and 2.5 per cent of total cost of production.[44/] In energy deficient countries supply can be of greater concern than comparative cost. Transportation or shipping cost is another facet of the energy problems with troublesome implications for leather production in many parts of the world.

Management and Labor

In the leather industry, perhaps more than in other industrial pursuits, managerial expertise is the key to viability and success by the standards of every economic system. The reason can be put briefly: It is the object of modern tanning to produce a highly uniform product from raw material which can never be competely homogenous. Hence, contingencies calling for gross or subtle variation of process or treatment are incessant and the knowledge required is not codified in texts. It is acquired by the trial and error of cumulative experience. There is discernment in the truism that the leather industry is a blend of craft and science.

No standard prescription can be written for the size or composition of management cadres. In developed countries men with practical experience, often

capping technical training, gravitate to the helm. They are supported by individuals specializing in raw material, plant management, sales, chemical control and personnel administration. At the operational level plant superintendents and department foremen carry the responsibility of production schedules, quality control, and material usage.

The working force in a tannery comprises three categories: Production employes; non-processing plant workers such as maintenance men, truck drivers, fork-lift operators; the office or clerical staff. Requirements in skills or training periods vary considerably with the degree of mechanization in a tannery. Certain tasks call for training or apprenticeship under an experienced employee: splitting, sorting, color matching. Others can be adequately filled by on-the-job training under foremen supervision. Machinists, pipe fitters, electricians represent crafts which are adapted by experience to the special requirements of tanning machinery.

No representative schematic can be drawn of management and working force numbers in tanneries. Plants with input of the same quantity of hides or skins can vary widely in the character and quality of product and in productivity. For example -

	Plant A	Plant B
Input per day Output per annum	1,000 hides 10,000,000 sq. ft.	1,000 hides 10,000,000 sq. ft.
Output per manhour	60 sq. ft.	40 sq. ft.
Production Workers (at 2,000 hours per year)	83.3	125
Non-Production Workers	10	10
Office Employees	8	8
Total	101.3	143

Plant A in the foregoing example may be more highly mechanized; or, Plant B may be devoted to specialties consuming more labor time in tanning and finishing operations but yielding a market return sufficient to offset greater labor cost; or, Plant B may have labor costs sufficiently low to offset the capital cost of new and more efficient machinery.

In short, the only relevant guides to the size of tannery personnel requirements are output per manhour or value added per manhour.

CAPITAL AND PRODUCTION COSTS

Modern tanning, as noted previously, is a capital intensive enterprise on two counts: First, the investment in fixed assets, including land, building, machinery and auxiliary equipment. Second, working capital required to finance inventory at all stages of process from raw material to finished leather as well as stocks of chemicals and other supplies and credit extended to customers. On both counts, any formulas or approximations or rule of thumb estimates of capital requirements made prior to 1979 have, unfortunately, been outdated.

Capital requirements are, of course, directly related to the level of technology employed or proposed. It is possible to produce leather, of a kind, with a fraction of the capital investment needed for a fully modern, mechanized establishment. But, a tannery conceived on primitive or obsolete lines for the sake of low investment terms might not serve any genuine economic purpose. It could not function as the mainspring of integrated development, or service export demand, or create capital. The practical consequences are more likely to be loss in value of raw material consumed.

It is assumed here that the only relevant approximations of capital needs are concerned with tanneries utilizing current technology and functioning or projected as self-sustaining enterprises.

Three categories of capital cost can be estimated with reasonable accuracy from recent experience and current data:

1. All processing machinery and ancillary equipment including spare parts, power and steam systems, laboratory facilities, fork lifts, trucks and other vehicles.

2. Waste disposal installations.

3. Working capital to finance hide or skin inventory, betterment, chemical and other supplies and credit extension.

Land and building construction costs vary tremendously with country, local site, climate, availability of supplies and pertinent skills. Total installation costs, from preliminary engineering studies to plant start-up, are also subject to great variation due mainly to the presence or absence of technical expertise.

These general observations are confirmed by a survey made in several developed countries of reproduction cost for a model tannery of specific capacity.[45/] The designated model was a cattle side leather tannery processing 1,000 brined hides per day (10,000,000 sq. ft. annually) to finished leather. Estimates of required capital investment in fixed assets ranged from $5,100,000 to $6,300,000. Supplementary information with respect to working capital needs, on the premise of a 16-week turnover cycle, showed greater consensus although uniformly qualified by reference to cattlehide prices. The range of estimates is given below.

TABLE 20

ESTIMATED CAPITAL REQUIREMENTS

MODEL CATTLE SIDE LEATHER TANNERY

PROCESSING 1,000 HIDE PER DAY TO FINISHED LEATHER

	Low	High
Fixed Investment		
Machinery, Power and all auxiliary equipment	$2,190,000	$2,600,000
Total Installation	200,000	180,000
Waste Disposal System	520,000	900,000
Land and Site Improvement	50,000	120,000
Building Construction including piping, electrical, air lines, etc.	2,140,000	2,500,000
Total Fixed Capital	$5,100,000	$6,300,000

	Low	High
Working Capital		
Hides, raw, process and finished at 55¢ per pound	$4,760,000	$4,760,000
Betterment inventory	704,000	839,000
Chemicals, Finishes, Dyes, etc.	360,000	270,000
Total Working Capital	$5,824,000	$5,869,000
Total Capital Requirements	$10,924,000	$12,169,000

A tanning unit with capacity of 1,000 hides per day was selected for the determination of capital requirements for two reasons: First, that level barely reaches the minimum, taking account of periodic departures from rated capacity which justifies the cost of a fully modern installation. Second, economies of scale beyond 1,000 hides daily are moderate because large tanneries are basically replications of the minimum economic unit. Advantages in administrative cost, purchasing, maintenance or laboratory facilities tend to be offset in practice by more rigid overhead and the greater cost of mistakes in market, production or style judgements.

It is impossible to estimate capital requirements for small tanneries, i.e., units with capacity appreciably less than 1,000 hides or equivalent hides per day, without moving backward in technological time. Plants in that class are either extremely specialized virtuoso operations or make-work enterprises. In certain traditional leather districts, small-scale enterprise is sustained by a unique form of industrial synergy. For example, in Santa Croce, Italy, various operations are performed by specialized and separately owned shops of tanners, splitters, embossers, degreasers, finishers, etc.

Analysis of capital employed in skin tanneries is made difficult by the conglomerate nature of the industry. Tanners using pickled skins do not require pre-tanning equipment (beam house) and have considerably less effluent. However, the resultant saving in fixed capital may be offset by greater working

capital requirements due to seasonality of demand for the finished product. Sheepskin garment leather is a case in point; tanners must anticipate and carry inventory to fill seasonal peak demand from manufacturers.

Although tanning can be described as a batch process, all hides and skins must be handled individually at various stages of production. At these stages more machines are required in a skin tannery than in a hide plant because sheep and goatskins are one-eighth to one-fifth the area of cattlehides. For this and other reasons machine technology has made much less progress in skin tanning than in processing of cattlehides.

As a broad guide to the capital structure of skin tanneries it can be assumed that for a given footage production of finished leather a skin tannery will require the following percentages of the capital lodged in a cattle side leather plant:

In fixed assets - 48 per cent; in working capital - 65 per cent. Thus, a sheep or goatskin plant with normal capacity of 10,000,000 sq.ft. yearly will require about $2,700,000 in fixed capital and $3,700,000 in working capital (at May 1979 raw skin prices).

Development of modern tanning plants expressly designed to limit production to blue or crust leather introduced a variant in capital structure. Less equipment is needed in such plants than in conventional integrated tanneries and, since the turnover cycle is more rapid, working capital requirements are reduced. However, the capital base of a blue or crust plant is not a simple duplicate of capital allocated to equivalent segments of a complete tannery. Modern blue and crust tanneries are designed for volume output and to exceed the cost efficiency of the facilities they supplant.

Estimates given below are based on data for blue and crust operations in two countries, Argentina and the U. S.

TABLE 21

ESTIMATED CAPITAL REQUIREMENTS

CATTLEHIDE BLUE AND CRUST LEATHER TANNERIES

(1,000 Hides Per Day)

($1,000)

	Blue Only		Crust	
Fixed Investment	Low	High	Low	High
Machinery, power and all auxiliary equipment	997	1,360	1,700	2,000
Total installation	110	140	180	170
Waste Disposal System	400	150	500	750
Land Site Improvement	38	60	45	65
Building construction, including piping, electrical, etc.	500	700	950	1,200
Total Fixed Capital	2,045	2,410	3,375	4,185
Working Capital				
Hides Raw and Process at 85¢ per lb.	1,480	1,480	2,980	2,980
Betterment Inventory	250	300	540	540
Chemicals and Supplies	170	140	280	300
Total Working Capital	1,900	i,920	3,800	3,820
Total Capital	3,945	4,330	7,175	8,005

Manpower Requirements and Capital Per Worker

The size of the working force in a tannery is a function of productivity.

In the capital schedules outlined in Table 20 for tanneries producing finished leather from raw hides, annual output of 10,000,000 sq. ft. is assumed. On the further assumption of 2,000 hours yearly per worker, the required work force would be:

Sq. Ft. Per Manhour	Working Force
50	100
40	125
30	167
20	250

There is considerable productivity spread in cattlehide leather tanneries, even in the developed countries, for reasons noted previously. Maximum efficiency is associated with an average of 40 sq. ft. or more while less than 30 sq. ft. marks the area of non-economic operation.

Capital requirements per worker will obviously vary with productivity. From the low capital cost example in Table 21 it is evident that the requisite total capital per worker, at a productivity rate of 30 sq. ft., would be $65,412 consisting of $30,538 in fixed capital and $34,874 in working capital. Of course the latter figure reflects the high level of cattlehide prices in May, 1979. However, even at the prices of the past two or three years the capital ratio per worker would certainly qualify the leather industry as capital intensive.

Production Costs

The principal categories of cost in producing leather are: Raw material; Labor; Tanning and Finishing Materials (including water, fuel and purchased power); Overhead (including management, interest, depreciation and fixed costs). Hides and skins always have been and remain the most important factor of cost.

Ratio comparisons of cost elements are meaningless when taken out of money context. It will be useful, therefore, to illustrate the current cost (June 1979) of producing a square foot of cattle side leather.

PRODUCTION COST PER SQ. FT. (June, 1979)

CATTLE SIDE LEATHER

Hide Cost at 85¢/lb (Less split credit)	$0.917
Labor	.192
Tanning Materials, Fuel, etc.	.164
Total Overhead	.159
Cost	$1.432

A roughly comparable cost distribution obtains for all major types of leather including sole leather which is sold mainly by weight rather than area. In fact, costs quoted above for cattle side leather apply with almost equal accuracy to a pound of sole leather. Costs of leather from calfskins, sheepskins and goatskins usually show a slightly higher percentage for labor reflecting the greater time expended per sq. ft. due to the smaller size of skins.

TANNING MATERIALS AND CHEMICALS

Two classes of materials, chemicals or reagents are employed in modern leather production. The first comprises products specifically identified as tanning agents and responsible for transforming putrescible hide substance into stable leather. Sodium and potassium bichromate are the most important, and most universally used tanning materials, but there are many other agents including vegetable tannins used mainly in production of sole and other heavy leather.

Tanning agents, however, must be supplemented by many chemicals and the leather industry uses a wider range of industrial chemicals than any other manufacturing industry. Many of these chemicals are standard market products, but quite a few are specially formulated for tanning. That is particularly true of finishing materials which are developed exclusively for leather production.

Successful leather production is linked, therefore, to supply industries which furnish the standard and specialized materials tanners require. In most instances the supply industries are chemical processors which are meshed into the structure of advanced chemical technology. Reasonable proximity to chemical suppliers is advantageous to tanners for a vital reason other than prompt delivery of required products. It facilitates plant consultation with the chemists or technicians of supply firms to correct process lapses or assure accurate use of various chemicals.

ENVIRONMENTAL ASPECTS

During the past 15 years many countries have adopted far-reaching programs to preserve the environment and avoid ecological imbalance. Industrial waste discharge is a principal area of legislative or regulatory action; the leather industry is involved by virtue of its relatively high water usage and resulting effluent. Proper control of waste is now recognized by the leather industry as an essential adjunct of modern production facilities.

Three widely held views on the subject of tannery waste disposal are inaccurate and merit clarification.

First, the knowledge and technology to meet prescribed standards of effluent purity are still to be developed. On the contrary, intensive chemical and engineering research as well as practical testing have yielded a body of knowledge assuring the feasibility of compliance with extremely high standards of effluent treatment.

Second, the cost of treatment installations is prohibitive and burdens leather producers with extensive and non-productive capital outlays. This view arises from the natural, inevitable and ardent dialogue between regulatory authorities and industrial management. It totally overlooks the positive consequences of stimulated response to exigency. Under the pressure of meeting environmental standards, leather producers have re-examined processing concepts, adopted methods of recycling expensive chemicals and drastically curtailing water usage. In many cases the net result has been a more efficient plant with waste treatment costs actually amortized by savings in chemicals and water usage. For obvious reasons, consequences of this general nature are slow to appear in relevant industrial publications.

Third, the preconception is prevalent that waste disposal is a more onerous problem for tanneries in developed countries than in developing regions. The latter are associated with wide open spaces, unlimited water, indifference to health hazards and boundless natural resources awaiting despoilation. Any factual inquiry discloses the fallacy of such assumptions. Population density in much of the developing world is greater than in developed nations; water supply is very frequently an acute problem; reliance on indifference to health is an affront to social conscience; and natural resources, in many instances, are hard-pressed to maintain subsistence living.

It should also be noted that a majority of tanneries in developed countries have the advantage of municipal or public waste treatment systems. While these large systems require screening and preliminary treatment by tanners, they do obviate the necessity of a complete installation by the leather producer. Scaled levies may be imposed by the public system in accordance with the volume and character of the effluent discharge.

Recent years have witnessed the emergence of specialization in tanning functions with wet blue plants, situated near raw material sources, providing pre-tanned stock for additional processing and finishing by tanners in other areas. Since most of the effluent problems originate in the beamhouse and initial tanning stages, users of wet blue leather maintain very minimal waste treatment and practically none is required by plants only finishing leather. This form of intra-industry organization is certain to expand for several reasons, detailed in the following section, each of which confirms the basic principle of economy in tanning hides at origin or source.

A question of considerable importance to tanners has not yet been resolved in many jurisdictions. Chrome used in tanning is trivalent. Acknowledging that this form is not harmful, and probably even beneficial to vegetation, certain regulatory bodies have proposed the elimination of any chrome from effluent residue. While that goal can be accomplished through recycling and precipitation techniques, the costs would be completely out of proportion to conceivable benefits.

Disposition of solid waste in tanning will undoubtedly require more attention and research in the future. Such wastes include fleshings, raw hide trimmings, hair, leather trimmings, shavings and buffing dust, lime sludge and the solid residue of biologic effluent reduction. Present recourse includes the reduction of fleshings and hide trimmings to grease and animal feed or manufacture of glue and gelatine; use of leather scrap for leather board and fertilizer; briquetting

sludges for use as fuel. However, a certain residue of solid waste seems destined for landfill sites and these will become more difficult to acquire with increasing urbanization.

Air pollution is a minor problem for leather producers. Combustion products and exhaust emission of solvents used in finishing are readily controlled by conventional equipment.

Comprehensive and detailed description of tannery waste disposal systems is available in many recent publications, several of which have been prepared and published by UNIDO. Annex 3 provides a biblicgraphy and a succinct, informative discussion on the subject by UNIDO.

TECHNICAL DEVELOPMENTS AND TRENDS

It is the consensus of leather technologists that the main focus of technical development is presently machinery and equipment. Chemical research is extensive but is directed toward refinements rather than radical change in proven methodology.

A new phase of machine development is the adoption of electronic means for precision control of equipment, metering the flow of chemicals, coordinating loading and unloading of process stock and starting and stopping programmed cycles at different stages of production. In the world's most modern tannery the center of operations is a computer console wired to every drum, mixer, chemical tank and valve in the plant.

Two objectives are dominant in the accelerated pace of machine and equipment development: Better control for the sake of product consistency and greater productivity. The first purpose is served by improved design of basic machine concepts and more sensitive application of power through hydraulic devices. Efforts to attain the second objective are directed toward continuity in the movement of process stock and reduction in handling and moving time of hides and skins.

Tanning remains a batch process, even in the most modern and mechanized plants, with the necessity for intermittent handling of individual hides and skins. Variations within each batch require sorting at several stages in order to route hides and skins to the most suitable processing and finishing. A continuous, automatic tannery, with hides entering at one end and finished, sorted leather emerging at the other, is feasible in theory; the technology is available. However, development and capital costs of such a plant would be orders of magnitude beyond present investment disposition. Mechanization, therefore, is currently equated with feed-through machines and automatic stackers wherever possible. This has been successfully accomplished in many operations from the wet stages to measuring and packing.

Drums and mixers continue to vie for technical approval in efficiency with a possible rival in augur-type tunnel processors combining beamhouse and tanning operations. Accessible information on the latter, as of June 1979, seemed to indicate that further development was necessary.

In finishing techniques, leather producers can draw on a wider armory than ever before, including polymers such as the urethanes for extraordinary durability and abrasion resistance. Paradoxically, consumer preference has shifted to natural appearing, soft leathers with minimum finish.

Brief reference was made in the preceding section to portents of change in the economic structure of the leather industry, namely, the establishment of tanneries producing wet blue leather near the source of hides. Advantages of primary tanning in proximity to raw material source are familiar. It becomes possible to tan fresh hides and eliminate cost of curing which is currently $1.60 to $2.00 per hide or .04¢ to .05¢ per foot of leather. Superior quality of leather made from fresh hides has a greater market value estimated at 3 per cent.[46/] Eliminating extraneous material at source reduces the cost of transporting hide substance. Specialized function in a "blue" tannery permits thorough mechanization and maximum productivity. And, most important, the large-scale

producer and seller of blue leather will be able to sort and grade to match the specific product requirements of his tanner customers at home and abroad.

Specialized production tends to distribute the burden of carrying process inventories. It also enhances industry ability in rapidly meeting shifts in demand caused by style change or to adjust leather in accordance with varying specifications of footwear and other product manufacturers.

In periods of large hide and skin supply and low prices, consideration is given to the use of poorer grades for food. Hide substance is protein. It lacks a couple of amino acids but that deficiency can be chemically restored, if necessary. Hence, in addition to gelatine and sausage casings, researchers anticipate a wide market for edible collagen derived from hides, provided the "price is right".[47/] Market analyses and production cost calculations indicated, in 1978, that, except for gelatine and sausage casings, an upset price of .07¢ per pound would be necessary to divert hides and skins from leather production in ponderable quantity. That price level does not seem imminent!

FACTORS INFLUENCING PRODUCTION AND DEMAND

Stress has previously been given in this study to the basic fact that available hide and skin supply is the limiting factor to aggregate production and consumption of leather. That fact is central in considering apparently independent factors such as patterns of end use or competition from substitutes, synthetic or natural. These factors and many others are linked to a complex and constantly changing market process which allocates the finite supply of hides, skins and leather. It will be useful to note certain aspects of the world leather (or hide and skin) market before commenting on leather end use patterns or the influence of substitutes.

In market-oriented economies it is taken for granted that all individuals are part of the market process. Their mass ability or inability to buy leather shoes at a stated price will determine the sale and future output of the product. Every

centrally planned economy engaged in foreign trade, buying or selling hides,skins, leather and leather products, also participates in the market's operations and helps frame its decisions. Country X undertakes to increase domestic supply of leather products by purchase of Argentine crust leather or Italian shoes. Consummation of its plans will affect the price at which leather loafers become available in Waukegan, Illinois. Similarly, a country restricting foreign access to its domestic raw material plays an active role, thereby, in the world market.

Changes in the pattern of leather end use or in the relative consumption of substitutes are not spontaneous or inexplicable phenomena. They are primarily resultants of market distribution of limited leather supply at optimum prices. Price and purchasing power are the shears which cut the pattern of consumption.

Data on consumption of leather in products other than footwear is confined for the most part to the developed countries. In this group a remarkable change began in the mid-60's and has been accelerated in the present decade. Leather consumption in products other than footwear has grown sharply in absolute volume and in ratio to total usage. Within the OECD area the calculated ratio of leather consumed in footwear declined from 81 per cent in 1965 to 66.7 per cent in 1978. In several countries footwear has become or is close to being a minority interest. For example, products of leather goods other than footwear now absorb 49 per cent of leather consumption in the F.R. of Germany, 53 per cent in the U. K., 38 per cent in Italy and the U. S., 35 per cent in France. Principal categories of merchandise involved are leather apparel and accessories, furniture and auto upholstery, handbags, personal leather goods, saddlery and sporting goods.

Recurrent style innovations test consumer effective demand response to new uses. A rage for knee-high fashion boots drains upper leather supply to the discomfiture of both manufacturers and consumers of conventional footgear. A French manufacturer introduces a leather tennis shoe and, almost overnight, the athletic shoe business begins consuming large quantities of cattle side leather in

several countries. In the United States, the recently acquired addiction to jogging has sustained total leather demand because leather is de rigeur for the best running shoes. However, a bureau representing manufacturers of conventional shoes has publicized the merits of walking.

As pointed out in Chapter II, synthetics fill needs for which leather is not economically available. The comparative volume of synthetic use in nominal competition with leather has varied universally with the relative supply of hides and skins. Leather, so to speak, is not displaced by synthetics; it merely relinquishes territory it cannot cover.

In a narrow sense there are specific factors influencing production levels. For example, in the adjustment to price levels caused by changes in the supply base, new business stagnates. Leather producers face the choice of curtailing and thereby absorbing heavy overhead loss or producing for inventory with the consequent risk. In recent years the weight of decision has been for curtailed production. As a result, inventory pipelines tend to be exhausted and when demand from manufacturers returns, inevitably, frantic production schedules are set to satisfy customer needs.

Seasonality is another short-term factor influencing production in every important leather market. Shoe production with an average swing of 21 per cent from monthly high to monthly low output is more stable than the leather apparel or small leather goods industries. In the latter, seasonal variation reaches 40 per cent. The problem is somewhat mitigated for leather producers with multi-product lines because seasonal patterns in consuming industries do not coincide.

REORGANIZATION OF PRODUCTION IN DEVELOPING COUNTRIES

In Chapter II the deep changes in hide and skin trade flows were examined at length. It was found that the export status of developing countries was dramatically reduced and that in several instances the former supplying regions had

moved to the import side of the trade ledger. Parallel and equivalent changes in the utilization of indigenous raw material has obviously taken place.

The reorganization of leather production in the developing regions merits careful scrutiny to avoid fallible generalization. Composite statistical measures of the change in leather output of the developing regions cover very wide variations in accomplishment and potential. It is perfectly clear, for example, that the most striking gains correlate with the availability of raw material in quantity and quality.

Comparison of leather production over a ten-year period points up the extreme concentration both in regional output and the increases scored by developing countries.

PRODUCTION IN DEVELOPING REGIONS

Million Square Feet	1966	1976
Bovine Light Leather		
All Developing Regions	712.2	1,094.7
Latin America	304.6	497.5
Far East	16.8	112.0
Sheep and Goat Leather		
All Developing Regions	560.6	857.7
Latin America	70.5	117.0
Far East	322.2	474.6

In light bovine leather, Latin America and the Far East accounted for 75 per cent of increased production in the entire developing group, and 67 per cent of the gain in sheep and goat leather volume. FAO data compilations (CCP:HS 78/2) were employed in the foregoing. Estimates of UNIDO country consultants indicate an even greater relative gain in Latin America and the Far East.

Four objectives are implicit in every national program to process available raw material:

1. Create greater value for export purposes than the shipment of raw hides and skins.

2. Expand job opportunity.

3. Establish a base for further industrial development in the manufacture of leather products.

4. Elevate domestic living standards with the availability of domestic leather products.

The first of these aims is the takeoff point for the others and calls for a summary of the reorganization of leather production in the developing regions.

Latin America

Argentina and Brazil have led the way, closely followed by Mexico, Colombia Uruguay, Peru and Chile. Many tanneries in the region equal the degree of mechanization in developed countries. In Argentina, the principal producer, crust leather for export is the major staple product. Brazil absorbs a larger proportion of leather output for the manufacture of shoes and other products. Mexican leather enterprise has outstripped domestic hide supply and depends on imports for 20-25 per cent of requirements. In 1978 the region was a net importer of cattlehides.

There can be no question that the rapid advance in leather processing of this region rests on the base of available raw material supply. In addition, general industrial development has provided a growing degree of independence in chemical and machinery requirements.

Near East

Although the region has a long tradition of artisan skill in leather, development has been inhibited by inadequate raw material, lack of transport from raw material sources to tanning centers and the absence of supporting crafts or industries. A number of comparatively modern tanneries in Egypt and Turkey serve domestic requirements and, must import part of their raw material needs for that purpose. Tanneries and sheepskin processing plants in Iran absorb almost all of the country's hide and skin supply. Pickled sheepskins are a

major export item, largely to garment leather tanneries in Western Europe and the U. S. It is very unlikely that pickled skin exports will be supplanted by tanned or finished leather because buyer requirements are too varied and too exact.

Far East

India, the main producer, forbids the export of raw hides and skins and processes approximately 23 million cattle and buffalo hides, 21 million sheepskins and 45 million goatskins to "finished" leather for domestic consumption and exports. Cottage industry and large-scale modern tanning are interlocked in a unique relationship. On the whole, added value is created but it has been frequently demonstrated that returns from the export of raw skins would equal or exceed realization for processed material. A system of government subsidy, graded to degree of processing, appears to distort values and incentives.[48/] Tanning industries of Pakistan and Bangladesh are much smaller versions of Indian organization with similar restrictions on raw material export and a blend of cottage and fairly modern plants. Available hide and skin supply in both countries is fully utilized, leaving considerable unused capacity. Exports absorb the better grades of leather, both rough-tanned and finished, and are the major objective of government support.

In the Philippines and Indonesia, leather production utilizes all the available domestic raw material supply which has been outstripped by rapid expansion of tanning capacity. The supply problem is particularly acute in the Philippines where livestock numbers are extremely low in ratio to population. Thailand has moved progressively since 1970 from the export of raw hides and skins to production of wet blue, crust and finished leather. Here, too, however, domestic supply falls short of rated tanning capacity by a wide margin, a condition aggravated by abnormal conditions in former adjacent import sources, the Lao People's Democratic Republic, Democratic Kampuchea and Burma.

The Republic of Korea and Taiwan, it has been noted, are anomalies in development since domestic raw material supply in both countries is scant and the leather industries depend almost entirely on imported hides. With respect to the Republic of Korea, "There is capacity in fact to take over 7 million hides a year, but this has never been reached and at present high raw prices and depressed market conditions are forcing the tanneries to run at about 60 per cent capacity."[49/] Most of the Korean and Taiwan leather output is consumed domestically in production of shoes, garments and leather goods for export. Reports from the Republic of Korea in June 1978 highlight the problems to which leather and leather products industries are exposed in the absence of a domestic raw material base. A New York Times despatch reports: "South Korea's footwear industry, critically dependent on exports, is in a slump that could force major manufacturers to turn to other businesses."[50/]

Africa

The course of development and the present state of leather production challenge accurate description. No other region is in more urgent need of systematic and uniform collection of the most rudimentary data of supply and production. Surveys by UNIDO consultants have shed light on conditions in several countries but, in some countries, have raised as many questions as they have answered.

In several African countries tanning has reached a semblance of modern organization. These countries include the Sudan, Tunisia and Algeria in the North, Kenya in the East, and Nigeria in Western Africa. Other countries, with a tradition of artisan production of leather and leather goods, have not yet established reasonably modern facilities. Moreover, mechanized leather plants installed in certain countries with foreign assistance operate far below capacity or are idle due to lack of raw material. Africa epitomizes the necessity of translating potential hide and skin supply into the reality of available supply as the economic condition precedent for development of leather production.

China

The only obstacle to extraordinary expansion of leather output in China is the ubiquitous problem of raw material supply. Existing tanneries consume all the available hide and skin supply with the exception of small exports of goatskins. Plants are mechanized, although lacking refinements and innovations of recent years. Foreign machines are often used as models and are duplicated in China. Chemical and technical expertise is first-rate and ancillary industries produce almost all the tanning materials, chemicals and supplies required by the tanneries. Hide and skin supply in China, in ratio to population, is probably the lowest in the world.

MARKETING AND DISTRIBUTION

In developed market economies, and in a number of countries with well-organized leather industries such as Argentina, Brazil and India, a typical pattern of marketing and distribution prevails. The objective is simple - to get sufficient orders so that the tannery operates as close to capacity as possible and at a profit.

Sales or marketing management at the apex directs the activity of sales representatives or agents. These representatives know the company's product lines and are expected to be familiar with customer requirements in their assigned territories. They are kept apprised of changes in costs and of merchandise in stock. They are in constant contact with customers to be aware of the latter's needs or prospects or to plan delivery schedules. It is also their function to generate new business possibilities by exploring every possible market outlet for the company's leather.

Direct sales contacts are supplemented by participation in trade shows or fairs, E.G., the Semaine du Cuir held annually in Paris. Advertising in trade publications is a form of market identification and also communicates new product

developments. In various countries, tanners of similar leathers join forces in promotional activity to stimulate consumer demand for their products. Tanners may also subsidize advertising by their customers to increase the sale of goods in which their leather is a component.

Tanning companies rarely maintain inventories of finished leather at separate locations to enable spot selling and immediate delivery. Production of manufacturers' orders are scheduled for delivery at stipulated times. Odd lots, obsolete colors, or rejects are usually sold in bulk to jobbers who specialize in finding nooks and crannies of demand from repair shops, small producers of leather goods or hobbyists. Environmentalists are comforted by the fact that when leather is finally scrapped it is biodegradable and nourishes the source from which it is issued.

Leather Production Capacities in Developing Countries

During the ten years ending in 1977 leather production capacity expanded rapidly in the developing regions. Estimates based on available data of production and trade, observers' reports and discussion with international suppliers of equipment and chemicals indicate a total weighted increase of 40 per cent in rated capacity of developing countries for processing hides and skins beyond the pickled stage. A proportion of this increase represents capacity to produce blue and crust leather only.

Argentina led the developing countries in expansion, and the explanation is two-fold: First, the size and quality of Argentine cattlehide supply and second, an already functioning leather industry and the existence of auxiliary industries, services and skills.

Growth in Asia was also based on large hide and skin supply plus an extensive industry in India, Pakistan, Bangladesh and Thailand engaged for decades in production of semi-tans for export. The exceptional character of the swift growth

TABLE 22

DEVELOPING COUNTRIES

ESTIMATED LEATHER PROCESSING CAPACITY

Million Pieces

	HIDES		SKINS	
	1966	1977	1966	1977
Latin America	23.0	46.0	27.0	25.0
Argentina*	4.6	15.0	10.0	9.0
Brazil*	6.1	12.0	5.0	3.0
Mexico*	3.8	6.4	3.1	3.1
Colombia*	2.5	3.2	.8	.7
Africa	5.0	11.0	16.0	38.0
Near East	5.0	9.5	42.0	60.0
Egypt*	1.0	2.2	4.7	6.5
Turkey*	1.5	3.0	14.0	18.0
Iran*	1.0	2.5	7.0	11.3
Far East	50.0	56.0	86.0	96.0
Asia, CPE	18.0	23.0	42.0	58.0
Total Developing Countries	101.0	145.5	213.0	277.0

* Included in Regional Totals.

Sources: Reports by UNIDO Consultants; FAO production data; U. S. Foreign Service Reports; Hide, Skin and Leather trading companies.

of tanning capacity in the Republic of Korea and Taiwan, devoid of indigenous raw material has previously been noted. In the Near East, government sponsorship as well as commercial impulse have brought new plants into being. However, cattlehide supply is limited and poor in quality; the region is a net hide importer. Supply of sheep and goatskins is more favorable to long-term growth.

Africa and China pose questions for which there are no simple or formula answers. Limitations of available hide and skin supply are the core problem. Increased capacity in Africa does not reflect a solidly grounded course of development. Capacity in a number of new, modern installations bears no relation to available hide or skin supply and these plants must operate at a fraction of reasonable output rating. Leather capacity in China has increased during the last three years with construction of several new tanneries and the re-equipment of older plants. Capacity attributed to China in Table 22 is an arbitrary and minimum estimate based on observation of plant efficiency in handling low grade material.

Current Level of Capacity Utilization

Developments in 1979 increase the usual difficulty of appraising current operating levels in relation to capacity. Raw material supply worldwide is sharply lower than in the preceding five years and hide and skin prices have reached record peaks. Under these conditions curtailment is the typical consequence of inordinate demands on working capital as well as the reduced availability of supply.

A review of current conditions in developing countries underlines three facts of more than passing significance:

1. Tanning industries in developing countries with domestic raw material supply normally filling the bulk of their requirements are weathering the world raw material situation.

2. Tanning operations in countries dependent upon imports are encountering serious difficulties.

3. With hides and skins worth two or three times their value in 1978 or 1977, the world market has begun to explore every possible source of supply. Since the relative increment of value added by processing diminishes with higher raw material prices, available supply in some developing countries may be adversely affected.

Current rates of operation in ratio to capacity are estimated regionally in Table 23 below. The basis for the capacity estimates is indicated in Table 22. Estimated current operating levels reflect the appraisal and judgment of trade observers.

It is apparent from Table 23 that tanning capacity is currently more or less fully utilized in Latin America and Asia and the Far East. These are areas distinguished by indigenous supply, or restricted export of raw material, or an established export trade in accepted types and grades of semi-processed or finished leather. Operating levels are reported lower in countries where rawstock must be imported or where hide and skin supply is inadequate in quantity and quality.

Utilization of Domestic Raw Material

Table 12 in the preceding chapter compared available hide and skin supply with tannery input for all regions and thereby measured the degree to which domestic supply was utilized in 1977. The data used in Table 12 are recapitulated in Table 24 with the addition of statistics for a number of developing countries and percentages of utilization.

Tannery input is defined as processing beyond the pickled stage, whether to wet blue or vegetable semi-tan equivalent or to crust and finished leather. An effort to differentiate degree of utilization by the stages to which processing is carried proved impossible because valid and comparable information in that

TABLE 23

ESTIMATED CURRENT RATE OF TANNING OPERATIONS,

Capacity - 100

	% Capacity Hides	Annual Equivalent in Million Pieces	% Capacity Skins	Annual Equivalent in Million Pieces
Latin America	93	42.7	86	21.5
Argentina	95	13.8	80	7.2
Brazil	100	12.0	73	2.2
Colombia	100	3.2	100	.6
Uruguay	100	2.2	100	.6
Mexico	85	5.4	100	3.1
Africa	60	6.6	74	28.0
Nigeria	70	1.2	85	6.5
Algeria	100	.3	100	3.6
Morocco	100	.7	100	.8
United Republic of Tansania	50	.6	45	.9
Near East	78	7.4	80	48.0
Egypt	55	1.2	95	1.9
Turkey	63	1.9	80	14.0
Iran	52	1.3	83	9.4
Far East	85	47.8	100	95.4
India	100	34.4	100	59.0
Thailand	100	1.6	100	.9
Pakistan	100	6.0	95	12.0
Republic of Korea	60	2.9	-	-
Taiwan	65	.8	-	-
Asia, CPE	70	16.0	75	44.0

TABLE 24

RATE OF UTILIZATION OF DOMESTIC SUPPLY, 1977
Million Pieces

	BOVINE		
	Available Supply	Tannery Input*	% of Supply**
Latin America	**42.0**	**43.2**	**102.9**
Argentina	14.3	13.9	97.2
Brazil	11.6	12.0	103.4
Colombia	2.9	3.2	110.3
Uruguay	1.8	2.0	111.1
Mexico	3.3	5.2	157.6
Africa	**14.4**	**6.7**	**46.5**
Nigeria	1.6	1.1	68.7
Sudan	1.0	1.0	100.0
Algeria	0.3	0.3	100.0
Morocco	0.8	0.8	100.0
United Republic of Tanzania	1.4	0.7	50.0
Near East	**7.9**	**8.5**	**107.6**
Egypt	1.8	1.3	72.2
Iran	1.3	1.7	130.8
Turkey	2.4	2.6	108.3
Far East	**50.4**	**54.3**	**107.7**
India	34.4	34.4	100.0
Thailand	1.5	1.5	100.0
Pakistan	6.2	6.2	100.0
South Korea	0.4	3.8	950.0
Taiwan	0.1	1.1	1100.0
Asia, CPE	**14.9**	**15.6**	**104.7**
All Developing Regions	129.6	128.3	99.0

* Hides further processed than pickled.

** Input greater than supply represents imports.

TABLE 24 (Continued)

RATE OF UTILIZATION OF DOMESTIC SUPPLY, 1977
Million Pieces

	SHEEP AND LAMBSKINS		
	Available Supply	Tannery Input *	% of Supply**
Latin America	21.0	16.3	77.6
Argentina	8.3	5.9	71.1
Brazil	3.8	3.1	81.6
Colombia	0.2	0.2	100.0
Uruguay	2.0	1.7	85.0
Mexico	0.9	0.9	100.0
Africa	34.3	12.0	35.0
Nigeria	2.6	2.0	76.9
Ethiopia	7.6	3.0	39.5
Algeria	3.2	3.2	100.0
Morocco	4.5	4.5	100.0
Sudan	4.9	2.1	42.9
Near East	66.9	34.3	51.3
Egypt	1.2	1.2	100.0
Iran	25.0	6.6	26.4
Turkey	18.7	9.0	48.1
Far East	33.3	34.0	102.1
India	19.8	20.5	103.5
Pakistan	10.9	10.9	100.0
Asia, CPE	27.7	27.7	100.0
All Developing Regions	183.2	124.3	67.8

*. Skins further processed than pickled.

** Input greater than supply represents imports.

TABLE 24 (Continued)

RATE OF UTILIZATION OF DOMESTIC SUPPLY, 1977
Million Pieces

	GOAT AND KIDSKINS		
	Available Supply	Tannery Input *	% of Supply**
Latin America	9.7	6.5	67.0
Argentina	1.8	1.5	83.3
Brazil	3.3	3.0	91.0
Peru	0.8	0.8	100.0
Mexico	1.4	1.4	100.0
Africa	35.3	15.0	42.5
Nigeria	9.6	3.8	39.6
Sudan	1.7	1.4	82.4
Algeria	2.9	2.9	100.0
Morocco	2.9	2.9	100.0
United Republic of Tanzania	1.3	0.4	30.8
Near East	26.0	19.0	73.0
Egypt	1.1	1.0	91.0
Iran	9.0	3.6	40.0
Turkey	6.5	6.1	94.0
Far East	62.4	61.0	98.0
India	39.1	39.1	100.0
Bangladesh	4.5	4.0	89.0
Pakistan	12.1	13.4	110.7
Asia, CPE	20.1	16.0	79.6
All Developing Regions	153.5	117.5	76.5

* Skins further processed than pickled.

** Input greater than supply represents imports.

regard is available from very few countries, developed or developing. National foreign trade classifications of leather are not uniform and, more frequently than not, mingle semi-processed and finished leather in export or import tallies. Furthermore, as A. D. Parpia observes,[51/] a system of incentives for further processing may lead to psychological upgrading.

Analysis of information from several countries invites a general observation: Extent of processing is too loosely equated with "value added". It would be more accurate to identify degrees of processing with "costs added". Unless such costs are recovered in sales prices, there has been no true "value added" to raw material from the standpoint of the producing organization or country. Other considerations, such as maintenance of employment, may be deemed more important than the accounting facts of capital and production costs. However, the latter facts should at least be known in order to assess the cost-benefit ratios of alternative development tracks.

SUPPLY, DEMAND AND TRADE PROJECTIONS, 1985

One forecast for the near term can be made with complete impunity: All available hides and skins will be sought and utilized, to the maximum possible extent, to meet world demand for leather. Total output of leather must decline by approximately 500 million square feet in 1979, matching the reduction in U.S., Argentine and Australian hide supply. It is dubious whether significant supply increase will be evident before late 1981 or 1982 and the year of return to the peak supply level of 1976-1977 is conjectural. At best, the curve of world supply is not likely to emerge completely from the current trough before 1983-1984.

With the exception of physical trauma due to war, the modern leather industry of the world has never been subjected to similar interruption of the supply curve. World population will continue to increase while hide production resources recuperate. Assuming return of cattlehide supply by 1985 to the record pace of 1976-1977, per capita leather consumption must still be lower. (See Table 13).

In brief, projecting the statistical setting calls for more than extrapolation of available supply. Qualitative changes in the structure of world leather production, consumption and foreign trade are inevitable.

The "invisible hand" has already begun to re-shuffle supply and demand in the parts of the world exposed to market influence. Leather consumption is declining in lower grade products and supply is gravitating toward goods absorbed by higher income levels. This tendency will be evident but less pronounced in the developed countries than in regions with markedly lower per capita income. Redistribution of leather consumption by end usage is a certain development. Discerning eyes will find new character in the square foot previously thought suitable for lining leather. It may find its ultimate resting place, figuratively, in an elegant clutch bag purveyed in the Faubourg-St.-Honore.

Another consequence of hide and prices moving substantially above the general commodity price index (Figure 1) is a redistribution in the production cost ratios of leather. For example,

Hides per lb.	25.0¢	85.0¢
Hide Cost, per ft.	29.4¢	91.7¢
Labor, per ft.	19.2	19.2
All other manufacturing cost, per ft.	32.3	32.3
Total manufacturing cost, per ft.	80.9¢	143.2¢
Per Cent hide cost	36.3	64.0
Per Cent labor cost	23.7	13.4

At higher raw material costs, the incentive to assure the market value of leather outstrips concern over relatively minor variations in labor cost.

A major uncertainty in the outlook for the next few years is the course of action elected by the centrally planned economies of the West and the East. In the context of reduced raw material supply, a phrase previously used in this study - abridgement of the market process - may deserve consideration as more than rhetorical extravagance. In the simplest terms, the issue is the distribution of available supply between market-oriented bidders and buyers guided by plan.

PRODUCTION PROJECTIONS

A projection of 1985 input, that is hides and skins entering tanneries for processing beyond the pickled state, is given in Table 12. Considerations on which these forecasts were based include:

Cattlehide Leather

North America

Recovery in hide supply plus growth of specialized blueing plants in the Southwest will increase U. S. production.

Western Europe

Cattlehide input will drop moderately, reflecting greater purchase of crust leather from Argentina and wet blue from the U. S.

Eastern Europe

The projection of minor increase in cattlehide input is based on two premises: First, rate of increase in domestic hide supply will slow down; second, import of cattlehides to fill regional deficiency will shift moderately to the import of blue, crust and finished leather. A trend in that direction has been observed in 1978 and 1979; it will be facilitated by the expansion of tanning capacity in Argentina and the likelihood of rising cattle slaughter in that country by 1980.

Japan

Liberalization of the present ban on import of leather will reduce raw hide usage. Statistically, it is indifferent whether that result is caused by import of finished leather, crust stock or even blue leather made in foreign plants controlled by Japanese interests.

Latin America

Projected hide usage in 1985 will be 13 per cent greater than in 1977 and the growth will be largely in Argentina and Brazil. Reports by UNIDO consultants are even more optimistic and foresee a gain of 20 per cent in Latin America

based on expanding raw material supply. The more moderate forecast gives weight to the export market for beef and to the probable easing of the South American ban on hide exports.

Africa

It is assumed that utilization of domestic supply will increase from 47 per cent to 86 per cent by 1985. Adequate capacity is in place; world market conditions may provide the necessary stimulus and incentives. A substantial part of the increased production will be terminated at the blue or crust stages.

Near East

A small increase in production is anticipated.

Far East

The projected decline will not take place in countries with domestic supply. It will occur entirely in the Republic of Korea and Taiwan which are completely dependent on imported hides and, therefore, exposed to the costs and risks of high raw material prices.

China

The increase projected, 27 per cent from 1977, will be assisted only slightly by growth in domestic supply. By 1985, China will import several million hides both for internal consumption and for re-export as finished leather products. Contract production for export, with raw material furnished by developed countries, was initiated in 1978.

Sheepskin Leather Production

No large or striking changes in output of sheepskin leather are forecast by 1985. Modest growth in developing countries will absorb a slight increase in available supply. In the developed regions, total production of all types of sheepskin leather will remain static. A number of offsetting factors are involved in these projections including the general effect of skin prices on product usage,

garment requirements in grain leather and shearlings, and expanded consumption of sheepskin leather in linings and small leather goods.

Production of Goat and Kid Leather

In 1985 the developing countries will utilize 83 per cent of their composite supply of goat and kidskins. A good portion of the output in semi-finished and finished leather will be exported to developed countries where kid leather will partly fill the gap left by shrinking world supply of calfskin leather. Production in the developed countries would decline even further than projected but for the premium prices quality goatskins are expected to command.

DEMAND (CONSUMPTION) PROJECTIONS

In the preceding chapter a distinction was drawn between potential demand for and actual consumption of leather. The first, it was stressed, simply defines consumer aspiration but consumption per se can never exceed the production of available supply of leather. World consumption, therefore, may be equated with world production of leather. Foreign trade in leather and leather products determines final regional and country consumption levels.

Purchasing power is the determinant of leather consumption and, therefore, price allocates the available supply with the qualifications previously noted arising from operations by non-market economies. There is no merit in reviewing the latter point; it must be accepted as factual reality in a world of differing economic systems. It poses problems for economic analysis, especially in projecting future consumption under drastically altered supply and price conditions. In the present study these problems have been approached pragmatically. Final consumption of leather in finished products, by country or region, can be approximated only by adjustment of base supply for exports and imports of raw material, leather and finished leather products. This was given regionally by the principal raw materials in Table 14, with estimates for 1977 and projections for 1985. In

summary form, estimated and projected final consumption of leather by developed and developing regions compare as follows:

TABLE 25

NET LEATHER CONSUMPTION*

Million Sq. Ft.	1972-74	%	1977	%	Projected 1985	%
Developing Regions	2,998	28.0	3,730	29.9	4,040	31.1
Developed Regions	7,727	72.0	8,738	70.1	8,952	68.9
World	10,725		12,468		12,992	
Per Capita Sq. Ft.						
Developing Regions	1.0		1.2		1.1	
Developed Regions	7.6		7.8		7.6	
World	2.9		3.0		2.7	

* Adjusted for foreign trade in leather

Appraisal of future leather consumption globally and by regions entails scrutiny of leather end uses. Footwear has been and will continue to be the largest end-use of aggregate leather supply. Although footwear consumption varies with income, the elasticity of demand is obviously greatest at low income levels where initial acquisition may be more compelling than mere replacement. Weight has been given, therefore, in projecting consumption, to rising footwear demand trends engendered by development and urbanization. But, an offsetting factor of substantial magnitude also enters the 1985 projection, namely the rising proportion of leather consumed in products other than footwear.

Data on consumption of leather in products other than footwear is confined for the most part to the developed countries. In this group a notable change began in the mid-60's and has been accelerated in the present decade. Leather consumption in products other than footwear has grown sharply in absolute volume and in ratio to total usage. Within the OECD area the calculated ratio of leather consumed in footwear declined from 81 per cent in 1965 to 66.7 per cent

in 1978. In several countries footwear has become or is close to being a minority interest. For example, products of leather goods other than footwear now absorb 49 per cent of leather consumption in the F.R. of Germany, 53 per cent in the U.K., 34 per cent in Italy, 36 per cent in the U. S., 35 per cent in France. Principal categories of merchandise involved are leather apparel and accessories, furniture and auto upholstery, handbags, personal leather goods, saddlery and sporting goods.

A summary is given in Table 26 of the three major indexes of the leather industry: Available hide and skin supply, tannery input and net leather consumption. World aggregates for all three are identical in 1977 and in the 1985 projections because inventory variations have been ignored as minor. A much lower rate of growth in consumption is anticipated by 1985 than in the decade preceding 1977, in parallel with the trends of raw material supply and leather output. Since the only significant gain in supply will occur in South American cattlehide production, tanning output and leather consumption in that region will be favored. Net consumption in the developing regions as a whole will increase to 31.9 per cent of the world total from 29.9 per cent in 1977. Per capita consumption, however, will decline in both the developed and developing regions.

INTERNATIONAL TRADE

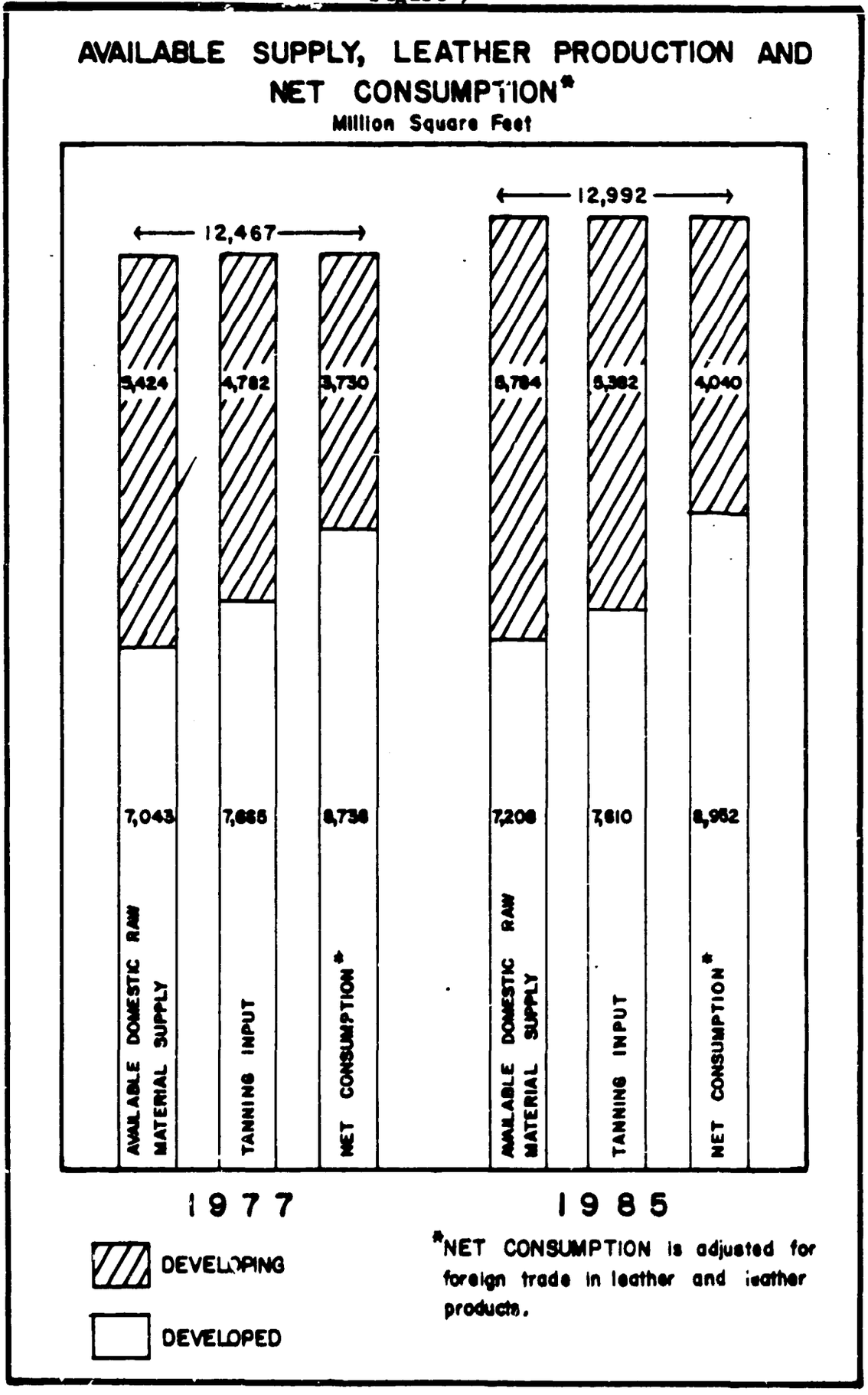
Historically, the factors governing foreign trade in leather always were, and remain, significantly different than in other processed or manufactured products. Hides and skins, it will be recalled, are somewhat less than ideally homogenous and leather can reflect the variability of raw material from which it is produced. Since the typical leather buyer is a manufacturer, to whom consistency in leather is a prime virtue, domestic resources were characteristically preferred. Leather producers close at hand provided prompt recourse for quality grievance, shipping delay, style changes, stock replenishment, etc. Foreign trade was

TABLE 26

AVAILABLE SUPPLY AND NET CONSUMPTION OF LEATHER
Million Sq. Ft.

	Estimated - 1977						Projected - 1985					
	Available Supply	%	Tanning Input	%	Net Consumption	%	Available Supply	%	Tanning Input	%	Net Consumption	%
BOVINE												
Developing	3,369	37.9	3,324	37.4	2,740	30.8	3,628	39.2	3,716	40.2	2,928	31.7
Developed	5 526	62,1	5,571	62,6	6,156	69,2	5,621	60,8	5,533	59,8	6,321	68,3
Total	8,895	100.0	8,895	100.0	8,896	100.0	9,249	100.0	9,249	100.0	9,249	100.0
SHEEPSKIN												
Developing	1,284	46.9	870	31.8	689	25.2	1,346	46.9	996	34.7	777	27.1
Developed	1,454	53.1	1,868	68,2	2,049	74.8	1,525	53,1	1,875	65,3	2,094	72,9
Total	2,738	100.0	2,738	100.0	2,738	100.0	2,871	100.0	2,871	100.0	2,871	100.0
GOAT & KID												
Developing	771	92.4	588	70.5	301	36.0	810	92.9	670	76.8	335	38.4
Developed	63	7,6	246	29.5	535	64,0	62	7,1	202	23,2	537	61,6
Total	834	100.0	834	100.0	834	100.0	872	100.0	872	100.0	872	100.0
COMPOSITE, ALL TYPES												
Developing	5,424	43.5	4,782	38.4	3,730	29.9	5,784	44.5	5,382	41.4	4,040	31.1
Developed	7,043	56.5	7,685	61,6	8,738	70.1	7,208	55,5	7,610	58,6	8,952	68,9
Total	12,467	100.0	12,467	100.0	12,468	100.0	12,992	100.0	12,992	100.0	12,992	100.0

Figure 9


AVAILABLE SUPPLY, LEATHER PRODUCTION AND NET CONSUMPTION*
Million Square Feet
12,467
12,992
3,424
4,782
3,730
8,784
8,382
4,040
7,043
7,885
8,738
7,208
7,810
8,952
AVAILABLE DOMESTIC RAW MATERIAL SUPPLY
TANNING INPUT
NET CONSUMPTION*
1977
1985
DEVELOPING
DEVELOPED
*NET CONSUMPTION is adjusted for foreign trade in leather and leather products.

confined largely to specialties and to certain staples in which buyer confidence had been established by accepted commercial standards. India semi-tanned skins were an example of the latter with huge volume moving to Europe and the U. S.

More rapid communication has facilitated foreign trade in leather, as well as in leather products. However, the greatest part of the total trade in leather is conducted among the developed countries. South America and South Asia have become important trade factors within the past fifteen years but mainly in semi-tanned or crust leather. Argentina staged a break-through in this respect by overcoming traditional lack of confidence among European and American tanners in crust leather not basically tanned on their own premises.

World Volume

Available data are too inadequate to permit more than approximations of global trade in leather and the flows between principal exporting and importing regions. National statistics when available are generally stated in value; there is no uniformity in description by type, such as rough tanned or finished, or of quantity, that is, by weight or area. Estimates in the following table compare, in equivalent area, tanning input, exports and imports of leather by developing and developed regions.

TABLE 27

LEATHER EXPORTS AND IMPORTS - 1977*

Million Square Feet	Developing Countries	Developed Countries
Tannery Input	4,782	7,685
Total Leather Exports	1,016	1,282
Total Leather Imports	152	1,931
Imports from Developing Countries	47	969
Imports from Developed Countries	105	962

Source: FAO, OECD, UNCTAD

The approximations of trade volume in Table 27 should be considered in light of two highly relevant facts. First, only a small percentage of leather

exports by the developing countries consists of finished leather; between 80 per cent and 85 per cent is rough tanned or crust leather selling at a considerable differential below finished leather prices in developed country markets. Second, exports from South America and Southeast Asia accounted in 1977 for 83 per cent of leather exports from the developing sector.

A tabulation made by UNCTAD, in terms of value, on the sources of leather imports by 21 developed market economies substantiates import estimates in Table 27. The dollar value of imports by these countries in 1977 came to $1,869 million. Of that total, $596 million was imported from developing countries and $1,273 million from other market economy countries. The values given are consistent with footage totals shown in Table 27.

It is apparent that international trade is composed of two major elements: Trade among the developed countries and exports of semi-tanned or crust leather from South America and Southeast Asia to the developed countries. To an extent which cannot be accurately estimated, the unfinished leather flowing to the developed areas is subsequently exported as finished leather.

Eastern Europe in recent years has been an important importer of leather from the developed countries and from Argentina and Southeast Asia. Total imports, largely by the USSR, are estimated to have reached 110 million sq. ft. in 1978. Exports from Eastern Europe are primarily pigskin leather from Yugoslavia and Poland. China's role in leather trade is extremely limited; small quantities of pigskin leather have been exported and imports have barely exceeded sampling levels.

In broad terms, international trade in leather reached approximately 2,300 million sq. ft. in 1977 with a value of roughly U. S. $1,990 million. About 70 per cent of the trade, in value, was conducted by the developed countries and the balance was concentrated in shipments of unfinished leather from South America and Southeast Asia. The existing pattern of foreign trade coincides with the availability of raw material in the exporting nations.

CURRENT PRODUCTION OF LEATHER PRODUCTS

There are few, if any, enclaves remaining in the world where leather is unfamiliar or not used for some purpose. In that respect fabrication of leather products vies with the use of textiles as a universal activity of humanity. Footwear has traditionally been the major end use of leather and continues to absorb more leather than all other products combined. However, in the developed countries consumption of leather in other products has progressively increased with the rise in disposable income and living standards. In fact, the survey summarized in Table 28 indicates that in several OECD countries leather usage for footwear has declined to approximately 50 per cent of total consumption. This development has substantial economic significance for several reasons:

1. Other products compete with footwear for the available leather supply.

2. Per capita consumption of leather is no longer the exclusive corollary of shoe production.

3. The nature of leather products other than footwear and the structure of the producing industries affects the location of output and of marketing methods.

TABLE 28

PERCENT LEATHER CONSUMPTION
FOOTWEAR AND OTHER LEATHER PRODUCTS

	For Shoes	For Other		For Shoes	For Other
F.R.G.	51%	49%	Finland	65%	35%
BLEU	68	32	Greece	85	15
Denmark	64	36	Norway	72	28
France	65	35	Portugal	80	20
Ireland	83	17	Sweden	66	34
Italy	66	34	Switzerland	70	30
Netherlands	68	32	Turkey	77	23
United Kingdom	47	53	Canada	66	34
Austria	66	34	United States	64	36
Spain	70	30	Japan	45	55

In addition to the foregoing another general trend deserves comment.

The market for products traditionally identified with leather has always been polarized into two broad groups - volume goods for the mass market, and better grade or higher priced merchandise for a minority of consumers. In many of the developed countries the relative proportion of these markets has changed; the upper grade market for shoes and other leather products has increased considerably, relative to total demand. While this trend is generally a concomitant of rising disposable income, it has been abetted in the case of leather products by the desire for a natural material and for the prestige identified with leather. Better grade or higher priced goods tend to de-emphasize mass output and, per contra, to stress individuality, style, quality and craftsmanship.

Finally, shoes and all other leather products are currently exposed to a drastic change in the supply and cost of leather. Prediction of the consequences is fallible. All that can be forecast with certainty is that consumption of leather will equal and never exceed available supply. Several possible consequences are noted in the following discussion of product groups.

Leather Shoes

Classification of shoe output suffers from the familiar failing of the entire leather sector: lack of uniformity in national data. In general, it is accepted that shoes with leather uppers should be classified as leather shoes. Many countries, however, make no provision for shoes with part-leather uppers and others include with leather all footwear except canvas-rubber types. Furthermore, there is a wide difference in the upper leather content of sandals and boots, or children's and adults' shoes. Despite a probable margin of error of 2-3 per cent, the following tabulation demonstrates the global and regional trends of leather shoe production between 1968 and 1977.

Excluding Eastern Europe, output in the developed regions declined; greater production in developing countries was a response to rising domestic consumption and to export possibilities. The latter are discussed in a subsequent section.

TABLE 29

WORLD LEATHER SHOE PRODUCTION

Million Pairs	1968	1977
Developing Countries	574	851
Latin America	163	321
Africa	14	28
Near East	22	39
Far East	207	289
Asia, CPE	168	174
Developed Countries	2,295	2,216
North America	549	349
Western Europe	803	732
Eastern Europe	820	1,016
Oceania	39	38
Other Developed	84	81
Total	2,869	3,067

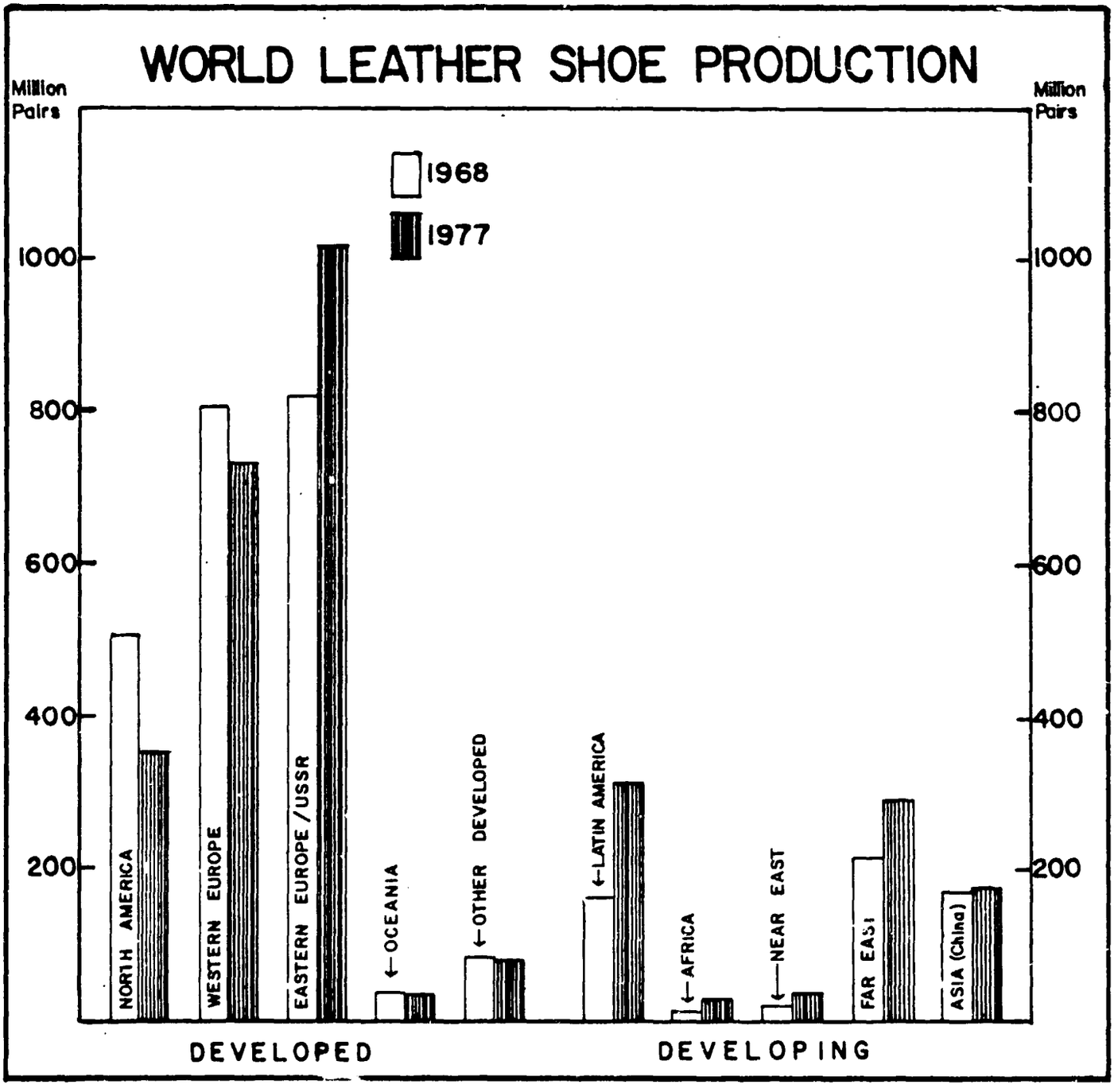
Source: OECD, FAO, U.S., BLS, U. S. Department of Commerce

Intra-regional trends show considerable variation. In Western Europe, for example, Italy and Spain have expanded output and have become the major shoe producers of the area. World per capita production declined in the ten years from 0.73 pairs to 0.69 pairs.

One of the effects of sharply higher leather prices is redesigned shoes to eliminate or curtail leather components without compromising the designation "Leather Shoe". Full leather linings may be replaced with quarter linings, cellulose or fiber insoles used instead of leather and new styles may be introduced for the same purpose. By June, 1979 it was apparent that shoe producers in many areas were coincidently inspired to promote stripping sandals and toeless and backless styles for women. In top-grade shoes the retention of quality reputation takes precedence over cost cutting and leather price advances are passed through to consumers.

Early in 1977 there was evidence of a modest revival in sole leather consumption which had been declining for twenty-five years since the introduction of

FIGURE 10


WORLD LEATHER SHOE PRODUCTION
Million Pairs
Million Pairs
1968
1977
1000
800
600
400
200
NORTH AMERICA
WESTERN EUROPE
EASTERN EUROPE/USSR
←OCEANIA
←OTHER DEVELOPED
←LATIN AMERICA
←AFRICA
←NEAR EAST
FAR EAST
ASIA (China)
DEVELOPED
DEVELOPING

synthetic rubber products. Manufacturers of medium grade shoes sought to exploit the cachet of "All Leather" for their merchandise. This tendency was arrested by hide price escalation in 1978 and 1979. Currently, the percentage of shoes produced with leather soles in the principal manufacturing countries is estimated at:

U. S.	12%	Argentina	23%
Italy	48	USSR	11
Spain	33	India	2
Brazil	27	France	7
U. K.	7	F.R.G.	8

It is noteworthy that the remarkable success of Italy and Spain, during a decade of declining shoe output in the OECD as a whole, appears to be linked to unremitting emphasis on quality of shoe components and workmanship.

In the developed countries, diversity of consumer demand is, more than ever, a continuous and challenging problem to shoe manufacturers. The era of staples, shoes which could be held in inventory for long periods, has virtually disappeared. Fashion change has been accelerated by changing lifestyles which differentiate footwear for dress, work, casual living and a host of sport activities. Producers must accommodate their operations to this milieu, sometimes at the sacrifice of economies inherent in long runs of a shoe pattern or model. Modern communication assures the rapid dissemination of style impulses throughout the world, to developing and developed countries.

Leather Uppers

Specialized production and trade in leather shoe uppers began developing several years ago. Boot tops, for example, are cut, sewn and ornamented in one country, usually a developing nation, and then shipped to the buyer in a developed country for lining, lasting, sole attachment and finishing operations. The incentives include foreign labor costs, skills or the availability of leather abroad which benefits from government subsidy when exported in partially fabricated form.

No statistics are available on the scope of production. Volume in India is estimated at 1,000,000 pairs in 1977 and projected by A. D. Parpia at 4,000,000 pairs in 1985.

Leather Garments

The greatest development in the entire leather products sector has taken place in leather wearing apparel during the last 15 years. In that period the leather garment industry of the world has increased production more than 400 per cent. A single factor was responsible - the development of techniques for producing garment leather from cattlehides.

In former years garment leather was produced mainly from sheep and lambskins, cabrettas (hair sheepskins), and to a lesser extent from goatskins and horsehides, when the latter were still available in commercial quantity. Skins constituted the bulk of the supply because they are sufficiently light and pliable for apparel. However, their small size is a problem in garment production, requiring careful cutting in matching and piecing skins to pattern, and the cutting waste tends to be large. Consequently, supply as well as cost of production restricted the leather apparel market. But, a technical break-through was achieved in the Sixties when it was found possible to produce thin, lightweight and pliable garment leather from cattlehides.

The advantages of suitable cattlehide leather to garment manufacturers are obvious. Cutting restrictions imposed by the size of skins were lifted; mass production became possible; market horizons were tremendously extended. Between 1965 and 1969 output of leather garments doubled and by 1975 doubled again. Cattlehide garment leather did not supplant the use of skins; it expanded the total market so that currently apparel is second to footwear in total leather consumption.

Leather garments are a general category which is made up for the most part of coats and jackets but includes shirts, vests and trousers. Accurate statistics

on unit production are available for only a few countries, although approximations can be made from reported output and foreign trade values. The estimates given below, Table 30 , include garments made of grain and suede leather and of shearlings; they do not include garments made of wooled skins by artisans, herdsmen or village enterprise for local consumption in various countries.

It will be apparent that the developing countries, chiefly Argentina, Brazil, Uruguay, the Republic of Korea and Taiwan, are the main producers of leather garments. Large-scale output in these countries began in 1969 and by 1977 the unit production in developing areas represented 60.8 per cent of the estimated world total. Exports were the generating force in this great surge of development; at least 85 per cent of production in developing countries is exported to the U. S. and other OECD nations. During the past three years additional developing countries have engaged in leather garment production and export to Western Europe and the United States, Newcomers include Hong Kong, Turkey, Mexico, Haiti and Colombia.

An indication of the rapid expansion of garment leather production by the developing countries is given by import values of the U. S. the largest consuming nation.

U. S. LEATHER GARMENT IMPORTS

$ Million	1970	1977
Total	38.2	204.1
From Developing Areas	11.7	165.8

Source: U. S. Department of Commerce

Leather garment production is an outstanding example of development in countries generally classified as developing and lacking an industrial base. It is important, therefore, to isolate and note the factors contributing to an undertaking which has thus far been successful by the criteria of development.

First, in every country the initial impulse and sustained support came from buyers, merchandisers and manufacturers of developed countries. Labor cost

is an appreciable item in all apparel manufacturing. Prior experience with textile products in the Far East suggested, correctly, that similar cost advantage could be derived in leather garments.[52/] To gain such advantage it was in the interest of foreign buyers to aid development with style information, production advice, large purchase contracts and joint ventures. In many instances foreign buyers furnished leather or specified the sources from which it should be purchased.

Second, in the Far Eastern countries both factory facilities and labor skills were available by virtue of well-established textile garment industries. In effect, leather was merely a new material to manufacturers in the Republic of Korea, Taiwan, or Hong Kong. Much existing equipment could be used and vocational training was required only in cutting. It is interesting to note that large imports of cattlehides by these countries were concurrent with major output of leather garments.

Third, the logic of development was totally different in South America where the positive factor was the availability of cattlehides and leather. Each of the leather garment producing nations in South America is endowed with cattlehide supply and modern tanning industry.

Fourth, in every instance, except Hong Kong, various government measures played a vital role. These were discussed at length in the preceding chapter and include the wide spectrum of raw material export embargo, differential export subsidy for manufactured goods, prohibitive import tariffs and outright financing of enterprise.

There is in general a considerable distinction between the character of leather apparel produced in the developed and developing areas. A very much larger proportion of goods made in Western Europe and North America features style and quality for the top-grade market. In the developing countries, production is addressed to the volume or lower-priced market, although producers in Hong Kong have recently sought to upgrade their products.

TABLE 30

ESTIMATED PRODUCTION OF LEATHER GARMENTS

1977 - Million Units

Developing Countries	21.3	Developed Countries	17.0
Latin America	5.6	North America	3.8
Argentina*	2.0	U. S.*	3.1
Uruguay*	1.8	Western Europe	7.2
Brazil*	1.6	France*	1.7
Africa	-	U.K.*	1.8
Near East	2.7	Spain*	.8
Far East	12.0	F.R.G.*	.7
Republic of Korea*	9.0	Eastern Europe; USSR	5.0
Taiwan*	3.0	Oceania	.1
Asia, C.P.E.	.8	Other Developed	.9
World	38.3		

*Included in regional totals.

Leather usage per garment varies widely; the mean of trade estimates in that respect is 27 sq. ft. for the range of products throughout the world. Hence, total consumption of leather in apparel was approximately 1,034 million sq.ft. in 1977, or 8.3 per cent of world leather consumption for all purposes.

Currently, the absorbing question for garment leather producers everywhere is the uncertain impact of raw material costs on prospective consumer demand. After fifteen years of almost uninterrupted and spectacular growth, hide and skin prices pose a crucial test especially for countries lacking domestic supplies. In the second quarter of 1979 there were indications of retrenchment in retail store orders for leather apparel. However, the level of consumer buying zeal will not become evident until September or October. In any event, the competition among all leather products for available raw material supply intensifies during periods of supply reduction and some degree of adjustment in leather garment volume seems probable in 1979 and 1980.

Leather Goods

It is not paradoxical that less statistical information exists on the fastest growing segment of the leather products industries. The explanation is found in

the conglomerate nature of the industry, the character of production, and the size of producing units. In the category of "leather goods" there must be included handbags, gloves, wallets and purse accessories, travel ware, briefcases, sample cases, instrument cases, waist belts, ornamental boxes, dog leashes and collars, bookbinding, desk accessories, sporting goods, holsters and tool kits. Only one country, in a periodic census of manufactures, undertakes the formidable task of collecting and compiling key economic data for this diverse industry group.

Based on a survey made in 1978 the following estimates indicate the dimensions of the leather goods industries group in the OECD areas.

LEATHER GOODS

Estimated Production and Factory Value in OECD Countries

1977 - Millions

	Units Produced	Factory Value
Leather Gloves, pairs	49.2	297
Handbags	62.0	558
Personal Leather Goods	158.7	519
Waist Belts	144.0	372
Leather Luggage	3.6	79
Other (Includes sporting goods)		330
		2,155

Sources: U. S. Department of Commerce, Foreign Service Reports, Trade Publications, Foreign Trade Data, National Trade Associations, U. S. Census of Manufactures, Consultant Survey for UNIDO.

Saddlery or harness products, upholstery leather for furniture or cars are not included in the above estimates. It is evident, however, that in the OECD countries leather goods are a substantial fraction of the total leather fabricating complex. Estimated consumption of all types of leather by the products listed above was approximately 325 million sq. ft.

There is no basis for similar product estimates covering developing countries, Eastern Europe and China. Reports by UNIDO consultants comment on leather handicraft traditions and artisan production in a number of developing

countries but output estimates are necessariiy composites or descriptive of specific districts.

In a few prcducts shifts in output by developing countries are clearly identifiable. Baseball gloves are an example with the Republic of Korea and Taiwan preemptin , a major share of the production which Japan had previously taken over from the U. S. In the Republic of Korea and Taiwan, baseball glove output in 1977 exceeded 7.4 llion pieces. Work gloves, low-priced dress gloves, camera and binocular cases are also produced in greater quantity in the Pacific Far East (the Republic of Korea, Taiwan Hong Kong, Japan) than in any other single region.

Review of all the available information indicates that a considerably lower proportion of leather supply is devoted to leather goods in developing regions than in the developed countries. (Estimates of leather consumption in products other than footwear and garments are given in the following section.)

Analysis of trends in leather goods output points up two salient factors: The character of the industry and the correlation between income levels and consumption.

In addition to the great variety of products the industry is notable for the small size of the median establishment. In the U. S. a majority of 1,760 plants have less than 20 employees per establishment. Frequently in Western Europe, and even in the U. S., the establishment is a family-owned shop merchandising the output of several craftsmen. Whatever the causes, the leather goods industry has resisted to a surprising extent the general trend toward concentration and mass production in the industrial nations.

Reference has previously been made to the growing role in leather consumption of products other than footwear. Garments are one instance of rapid expansion during the past decade and leather goods, in the aggregate, have also experienced significant growth. In the leveloped countries, rising income levels have

been accompanied by marked increase in the consumption of leather goods. One aspect of this consumption trend is notable: The center of market gravity has moved perceptibly upward in product grade.

Other Leather Manufactures

Three classes of product were not considered in the foregoing section, namely, industrial leathers, harness and saddlery, and leather upholstered furniture and cars. These are highly specialized types of manufacture with economic characteristics setting them apart from the more general leather goods category.

Industrial or mechanical leather products consist almost entirely of transmission belting, textile machinery leather and seals, washers and packings for machinery and appliances. Belting for power transmission has been rendered obsolete by direct drive systems and production has virtually ceased.

Leather products for textile machinery remain important and in certain instances cannot be replaced. Roller covers for spinning machines, pickers and combers for yarn preparation and gill box aprons are produced by textile machinery manufacturers or by supply specialists. Volume obviously is directly related to textile production. It is estimated that world annual consumption of leather for these products amounts to 9 million square feet.

Seals, washers and packings made of leather have wide use in almost all industry. The products are made to precise specifications chemically and physically and in hundreds of shapes and sizes. Greater use of hydraulic mechanisms and controls has widened the market for these products but the number of producers is limited due to capital cost of specialized equipment and the cost of carrying an inventory of thousands of items to service industry. No industry figures are available on the amount of leather consumed; engineering authorities place the total at 12-14 million sq. ft.

Production of harness, saddlery and accoutrements is a more vigorous industry than might be inferred from the decline of the horse for draft purposes in the developed world. In fact the popularity of riding has tilted the demand curve moderately upward during the past ten years in Western Europe and North America. Fabrication of saddles, bridles and other leather accessories is a skilled craft with great emphasis on quality. Unit production is meaningless due to the variety of products in the category. Value of 1977 production in Western Europe and North America is estimated at $95 million and $45 million in South America. No reliable information is available on production in Eastern Europe, the Far East or China. The industry is estimated to absorb per annum approximately 400,000 cattlehides or in area equivalent, 15,300,000 sq. ft.

Leather upholstered furniture and cars are one of the larger single items contributing to the total of leather consumed in products other than shoes. They also illustrate the rise in demand for luxury leather products during the last decade in the developed regions. Leather upholstered products are expensive because more labor time is required than in the application of fabric or other sheet materials. Nevertheless, production of leather furniture and leather upholstered cars is estimated to have increased by 50 per cent and 72 per cent respectively since 1970. In both the furniture and automobile industries leather upholstery is associated with top-of-the-line models.

A product count of leather unit output is not available from either industry and cannot be estimated. However, the estimated 1977 consumption of upholstery leather in Western Europe and North America reached 168 million sq. ft. South American consumption is estimated at 32 million sq. ft. In other regions consumption appears to have been negligible.

FACTORS INFLUENCING PRODUCTION AND DEMAND IN DEVELOPING COUNTRIES

Evaluation of development trends and results during the last fifteen years, a period which encompasses significant achievement by several developing countries in the leather products sector, discloses highly disparate trends. In several instances these depart from the classic economic doctrine of comparative advantage. At the present juncture in the world leather economy, in the shadow of a critical raw material prospect, it is useful to note major factors influencing leather product production and demand in developing areas.

Leather Supply

The principal component of leather products is leather. Without adequate supply, shoe factories or any other production enterprises must remain idle. Three different routes can be and have been chosen to secure a leather supply base.

1. Regions favored by adequate raw material supply have elected progressive forward integration by utilizing raw material in tanning and then in manufacture of leather products. This is the course followed by South America and South Asia.

2. Other countries have undertaken to import raw material as the base for a structure of leather processing and manufacture of shoes and other leather products.

3. A few countries found it possible, with cooperation from partners in developed areas, to import leather for subsequent export of leather products.

Generalization on the relative economic advantages or disadvantages of the above options is futile. The first course is obviously soundest in principle, most certain to yield the greatest return in secure development and minimum risk of interrupted production from uncontrollable changes in supply resources. Whichever course is chosen, the viability of a leather products enterprise requires

that certain practical problems be tackled successfully. These include:

Management Expertise and Labor Skills

In the manufacture of leather products, a material of considerable value is exposed to considerable risk. Cutting, the first step in every production line from shoes to key cases, is illustrative because profit or loss may be determined by the yield of suitable pieces from every hide or skin. Excessive cutting waste can destroy any budgeted profit. The degree of risk grows with every stage of fabrication since more labor and auxiliary materials are incorporated in the product. More than routine skills are required and managerial experience is essential to prevent loss and maximize value of product.

Not surprisingly, the availability of experience and comparable labor skills are associated with the start of successful leather product enterprises in developing countries. Brazil, Argentina the Republic of Korea, Taiwan, India, and Hong Kong are examples.

Marketing and Distribution

Efficiency in marketing and distribution can be as vital as efficient production to assure continuity of operations as well as for the sake of economic returns. A review of certain markets, in which developing countries made their export debut several years ago, suggests the need for more planned strategy instead of opportunistic price tactics. Immediate sales volume can be gratifying but also the prelude to fruitless price competition. Buyers who discharge their function properly must take advantage of such competition and encourage it. That lesson can certainly be read from the changing plane routes of retail representatives when new production capacity is announced by developing countries.

Marketing strategy has to be grounded on market information, continuous familiarity with costs and prices, demand trends and prospects, technical innovations, changing styles and colors. In several developing countries communications

are adequate and manufacturers are as well posted as their colleagues in developed zones. That is not the case generally in the developing regions. In many instances, reliance is placed on sporadic contacts with foreign representatives or annual visits to a trade show. These intermittent contacts are not a substitute for the constant information which illuminates market trends and marketing possibilities.

One consequence of past marketing practice was reviewed at some length in the preceding chapter. It is the threat of import restriction in response to the sharp rise in the flow of leather products to developed countries. Obviously, the problem is of great concern to developing countries and hopefully, the precedent of Orderly Marketing Agreements will lead to cooperative international solution. Footwear and leather garments, which constitute the bulk of leather product exports from the developing countries, are the prime objects of concern to importing nations.

From statistical analysis and from observers' reports, it appears that insufficient attention has been given to a great market potential - the developing countries. The reasons and the problems are familiar. On the one hand, in the developed countries purchasing power is taken for granted and organized distribution systems are in place. In the developing world, on the other hand, mass purchasing power is low and distribution methods are sketchy or non-existent. Nevertheless, marketing activity could profitably be directed to domestic markets to develop demand and lay the groundwork for the inevitable growth in consumption. Such effort may well become necessary in the not too distant future.

At the request of UNIDO, a comprehensive report has been prepared by ITC on **Export Marketing and Distribution of Leather and Leather Products from Developing Countries.**[53/] The report deals substantively and extensively with the main points briefly noted above and suggest marketing strategy and tactics for

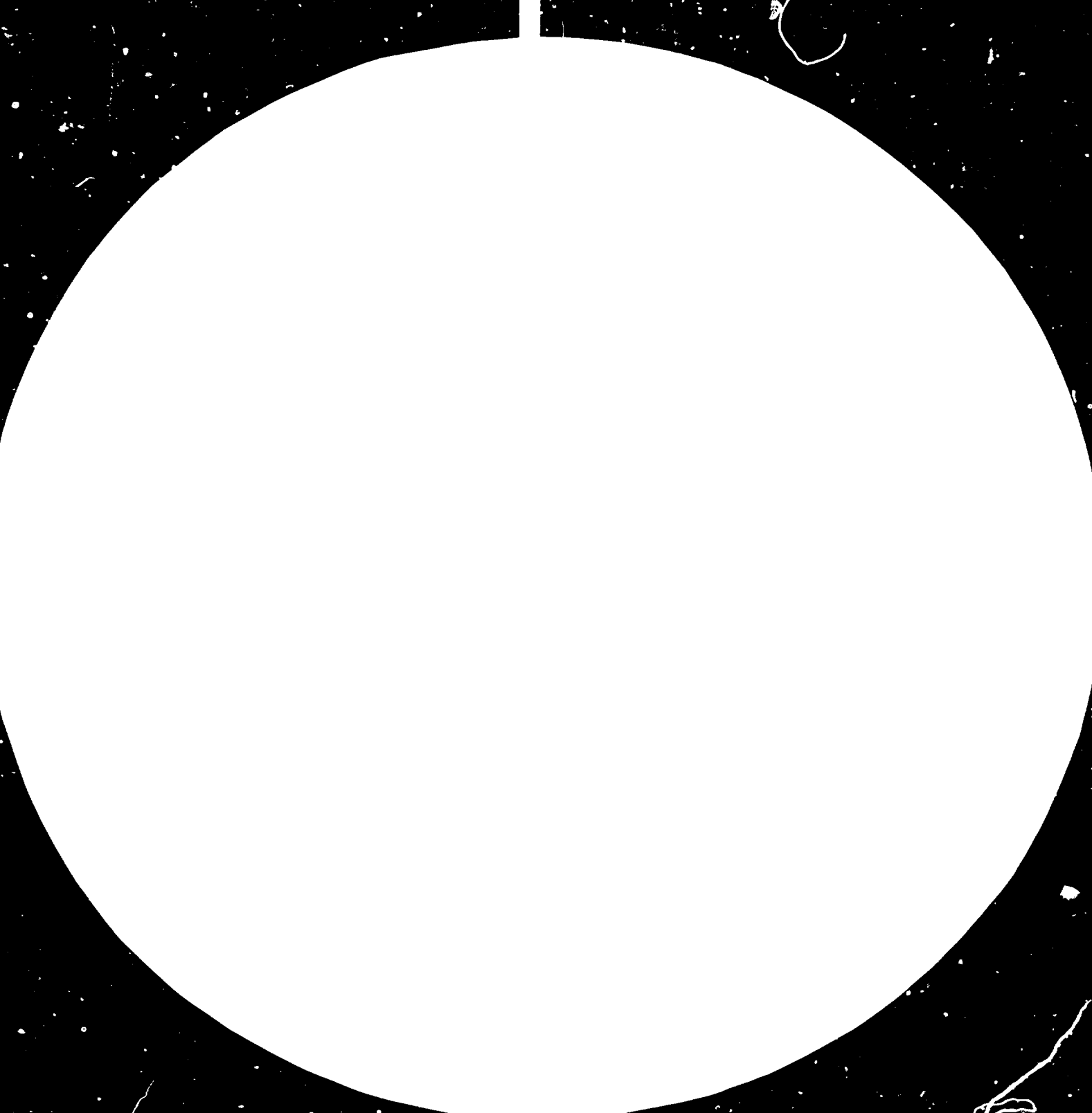
specific leather product groups. An extremely interesting feature of the report is the emphasis given to collaboration of production and marketing to achieve product suitability and quality.

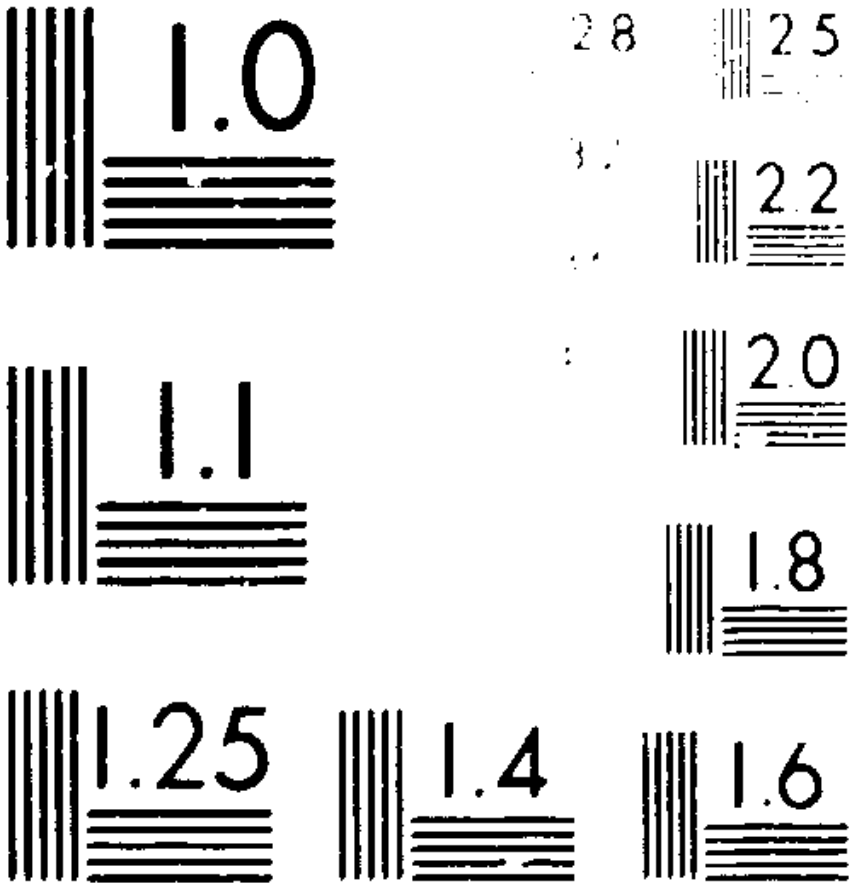
CAPITAL, PRODUCTION COSTS, MANPOWER

It is a tradition of the shoe industry that successful enterprises were conceived by the union of a vigorous salesman, a good designer, a competent fitting room foreman and a modest loan from a benevolent uncle. The moral is applicable to all the leather product industries with the exception of industrial leather products. With the exception noted, these industries are labor intensive. Productivity will vary with capital investment in machinery and equipment, but it is also a function of product design, manufacturing process and market or selling price objective. For these reasons any estimates covering capital investment, manpower requirements and costs in the leather products industries can only be broadly indicative at best. Any suggestion that precise general formulae are feasible or of any value would be misleading.

Shoes

Production of footwear is an assembly operation whether one worker or a thousand are engaged in the sequential process of bringing together all the components of a shoe. Furthermore, there is no single or standard system of assembling shoes; more than a dozen methods and combinations are employed in commercial manufacture including - Goodyear welt, Cements, McKay, Turner, Littleway, Stitchdown, Vulcanized, Injection Molding, etc. Selection of process is, or should be, determined by the product desired, volume goal, market objective, available skills and capital limits. In addition to the variables of product and process, initial fixed capital requirements are affected by whether machinery is purchased or leased. Facilities for the latter, which obviously reduces initial capital outlays, are widely available. Production cost consequences of purchasing or leasing




2.8
2.5
2.2
2.0
1.8
1.6
1.4
1.25
1.1
1.0

depend on the charges imputed to capital investment compared with leasing costs.

Current fixed capital costs, exclusive of building and site, for a modern plant intended to produce 1,000 pairs per day of men's conventional shoes would be approximately:

	Welt Shoes	Cement Shoes
Machinery	$520,000	$360,000
Lasts, Racks, Conveyors, Etc.	100,000	100,000
	$620,000	$460,000

These estimates are for plants sufficiently mechanized to produce 1.6 pairs of shoes per manhour. Reductions of 40 per cent to 50 per cent in the estimated outlays for machinery and equipment are possible by installing less efficient machines or greater reliance on labor for various operations. However, the benefits of such trade-off are always to be measured in terms of productivity and manufacturing cost per unit. Different weight may be given in developing countries to cost parameters in production for domestic markets and for competitive export markets.

Calculation of working capital requirements is almost equally elastic and dependent on the accessibility and stability in supply of leather and other materials. A factory turning out 1,000 pairs of men's shoes daily will consume at least 3,000 sq. ft. of upper leather, including cutting waste. Upper leather alone, therefore, would require working capital at June 1979 costs of:

Uncut leather, 30 days	$180,000
Leather in Process, 20 days	120,000
Leather in Finished Stock, 10 days	60,000
	$360,000

Comparable supply levels are needed for soles, insoles, heels, linings, thread, stays, shanks, counters, boxtoes, etc., to an estimated total of $200,000. Provision for wages and other continuous operating expense such as power, freight, vehicles and utilities could hardly require less than $100,000 in working capital. In total, therefore, a minimum of $660,000 in working capital would be required,

assuming continuous turnover. In summary, total capital needed for the plants specified would be:

	Welt Factory	Cement Factory
Fixed Capital	$620,000	$360,000
Working Capital	660,000	660,000
	$1,280,000	$1,020,000

Production Cost

Three facts must be emphasized in considering estimates of leather shoe production costs.

1. Leather is the largest and most variable item of cost. Other elements tend to be much more stable. When leather prices rise sharply, as they have in 1978-79, the ratio of other factors to total cost declines sharply.

2. Labor costs vary tremendously both in wages paid and in social benefits normally charged to labor cost.

3. There is equally great difference in the accounting treatment of overhead, selling expense and profit.

Leather shoes made in plants, for which capital requirements were estimated above, might involve production cost per pair in June 1979 as estimated below.

	Manufacturing Cost Per Pair	
Upper Leather	$6.00	36.3%
Other Leather Items	2.25	13.6
All Findings	1.35	8.1
Production & Other Labor	3.60	21.7
Overhead	2.70	16.3
Sales	.67	4.0
Total	$16.57	

At leather costs prevailing in 1977, all other costs remaining unchanged, the identical shoes would have cost $13.12 per pair with the ratio of labor cost 27.3 per cent and overhead 20.5 per cent.

Shoes similar in style or pattern to the hypothetical example given above could be produced for considerably more or less by a similar factory. The products would certainly not be identical in quality. Better grade components and more labor time raise costs; eliminating leather soles or other leather components and reduced labor time would cut costs. Shoes are produced to fit price grooves in the market and production costs must be adjusted accordingly by close budgeting of materials and labor. Currently, shoe producers in developed and developing countries alike are subject to exceptionally severe and opposing pressures of retail price resistance and rising costs.

Leather Garments

A plant producing leather garments is essentially a clothing factory and with very similar capital structure and requirements. Investment in fixed assets is moderate, in relation to value of output, consisting mainly of sewing machines and technologically simple cutting facilities. Large factories are extended versions of small plants with little difference in mechanization except for more efficient conveyor systems.

Estimates of fixed capital costs vary considerably because larger plants are often diversified into production of apparel other than leather. Allocation of investment in such instances, based on relative volume in different product groups, has been found of doubtful accuracy. Consequently, capital requirements were calculated for a turnkey operation in terms of 1979 costs. It is estimated that a plant capable of producing 300 medium grade jackets and coats per day would require $165,000 in fixed costs for sewing and cutting machines, finishing and pressing equipment, racks, bins, display fixtures and showroom. Factory space and site are not included in this estimate since these are usually leased.

Working capital requirements are considerably greater than initial fixed investment. Assuming an average of 25 sq. ft. per garment, daily consumption would reach 7,500 sq. ft. or approximately $11,000 for a mix of cattlehide and

sheepskin garment leather. One month's supply of leather, therefore, would require working capital of $330,000. Linings, trimming, thread, and other supplies would bring the cost of working inventory to $390,000. Since the leather garment industry is seasonal, shipment of finished goods normally awaits the buyers' instructions; carrying finished goods inflates the producers' working capital needs. The total for the plant described can amount, at the seasonal peak, to $650,000.

With the exception of fur-trimmed specialties, the major elements of cost in leather apparel are leather and labor, and in that order for more than 90 per cent of production. High fashion and luxury items may embody detail work bringing labor cost above the value of the leather used. Cost estimates shown below apply to a medium grade, cattlehide leather, full length coat.

Leather, 30 sq. ft.	$48.00
Lining	6.00
Fasteners, Trimmings	3.00
All Labor	17.00
Overhead	12.00
Sales	4.50
Total	$90.50

Manpower skills, barring cutting of leather, are interchangeable with most segments of the garment industry.

Leather Goods

In these branches of the leather products industry any generalization on capital requirements and production costs is a futile exercise. The size of establishment ranges, as noted previously, from shops with several employees to plants with several hundred. Machinery has been introduced for a number of operations characteristic of almost all leather goods output. Clicking and die cutting, folding, edge skiving, embossing and transporting goods in process to work stations. However, the industry is predominantly labor intensive and virtually every item produced must be handled individually several times in the course of production by workers trained in specific skills.

Handbags are the most important product and probably more extensively produced throughout the world than any other leather goods. Furthermore, the handbag market is more open to volume output in a restricted number of models than any other leather products. Both cost and variety of supplementary materials are modest and available in many areas. These characteristics have been turned to advantage in several developing countries where handbag production and exports are substantial. Required expenditure for fixed assets is small in ratio to value of output; equipment consists mainly of simple cutting facilities, sewing and skiving machines, punches and riveting devices. Working capital needs are directly proportional to volume and cover leather and other supplies, wages and other operating expense. Leather supplies, uncut, in process of manufacture and in finished goods will absorb 60 per cent of working capital. A plant geared to produce 2,000 medium grade bags per week could begin operations with a total investment of $150,000-$200,000.

Design and marketing range in importance with production expertise because handbags are fashion merchandise and the winds of fashion change quickly. Export producers in the Far East work closely with their sales representatives or large merchandising outlets on selection of design and choice of appropriate leathers.

Personal leather goods describes a very diverse group of products: Wallets for men and women, credit card cases, key cases, French purses and purse accessories, jewel boxes and a miscellany of other items. All of these products can be fabricated in small enterprises where emphasis is given to individuality and quality as distinguished from mass output of uniform goods. Here, too, however, design and marketing are of paramount importance. Small leather goods lend themselves to production of goods with a distinct national or ethnic character in design or decoration.

In developed countries, materials, mostly leather, average 54 per cent to 60 per cent of total production cost and labor and labor cost is approximately 23-28 per cent. These ratios must be regarded with caution since the variations according to product and price class are extremely great. Of all the leather product industries small leather goods entail the least investment in fixed and working capital. For that reason, perhaps enterprise in this field could contribute to the development process as a training ground in leather crafts and skills as well as industrial management and discipline.[54/]

Luggage and travel products deviate from the general economic features of the leather goods industries in two respects: First, the high cost of individual products due to the leather content per unit; second, the larger investment required for status value of output. Leather luggage, brief cases and portfolios are luxury products particularly when leather costs reach levels prevailing in 1979. At the price a leather suitcase must command, consumers expect all the indicia of quality in leather and construction. From the standpoint of manufacturer and retailer, the investment in leather per unit of output is too great to jeopardize by oversight in accessory materials or labor content. Proven reliability of source is, therefore, a major merchandising guideline in leather luggage and travel goods.

In view of the foregoing and the heavy capital investment required it is not surprising that little effort has been made by developing countries to enter the field. And under existing supply and cost of leather circumstances, the times are not propitious.

Leather upholstered products and saddlery are exposed to the same problems noted above. Where supply permits, production of these goods for domestic consumption may be necessary but investment and training for export would be extremely hazardous.

END-USE PATTERNS AND SYNTHETICS

In the preceding chapter a brief exposition was given of the economic significance and role of leather substitutes including synthetics. Those materials are less desired than leather but their use is dictated by price rationing of the limited available supply of leather.

Similar patterns of end use are inevitable in the developing and developed countries alike. In the never-ending quest for equilibrium between supply and demand, leather migrates to the end-uses where it is most desired and commands priority of disposable income. For that matter, centrally planned economies may be subject to the same constraints of the market. According to recent accounts, prices of certain consumer goods have been raised in Eastern Europe to world market levels in order to reflect developments in foreign trade.[55/]

Footwear, leather garments and handbags have been the prime focus of leather manufacturing activity in the developing countries. The economic rationale in each instance is apparent. Shoes are the broadest market for leather, historically the most stable, with domestic and export potential and a labor intensive structure. The boom in leather garments meshed fortuitously with the experience of certain developing countries in apparel production. Handbags are the prerogative of at least 51.8 per cent of the human race and the production of handbags is labor intensive.

In footwear production, the developing countries without domestic raw material supply have concentrated on grades with leather uppers and very little leather in other components. Outsoles, insoles, linings, heel seats and so on have been replaced by substitutes, chiefly synthetics.

Although leather garment volume continued to increase through 1978, several developing countries in the Far East have begun production, in the same factories, of garments made from synthetic imitations of grain leather.

In handbags, also, vinyl and urethane simulations of leather are being used in lower price goods where leather was formerly employed by producers in the Far East.

Much less change in end-use patterns is evident in the developing countries where domestic supplies obviate the need for importing raw material. In these countries there appears to be a growing tendency to "trade up", to stress the leather content of products and take advantage of the price brackets where leather products will be consumed. Leather soles are still used on a substantial percentage of Argentine and Brazilian shoes. Uruguay and Brazil have entered the market for leather-upholstered products and plastic imitations of leather garments have not been offered by Argentina.

Despite the more favorable supply position of South America and South Asia, all developing, and developed, countries must react in some measure to the changed dimensions of world leather supply and to the cost consequences. This can be noted domestically as well as in production for export. As FAO has aptly noted, "...in many developing countries a rapid decline in the use of traditional hand-made sandals has been noted, which can be ascribed to their high price vis-a-vis low cost mass produced PVC products."[56/]

TECHNOLOGY TRANSFER AND ADAPTATION

Review of leather products output in developing regions and countries leads to an unqualified conclusion: There are no barriers to the most rapid diffusion of production technology; in several developing countries the methods, systems and facilities for producing shoes and other leather products are on a par with or superior to counterparts in developed countries. The spread and the adoption of modern technology has progressed swiftly in South America and the Far East. It has been moderately impeded until recently in India by government control of

machinery and equipment imports. China possesses a surprising degree of technology but lacks sufficient hardware. In the Middle East progress has been modest and desultory. Africa lags; except for a few oases of industrial output, the continent remains devoted to artisan methods and traditional practice.

It must be strongly emphasized that the well-springs of technology, the developed countries, have not been reluctant or restrictive sellers. On the contrary, agents and representatives of the world's leading producers of machinery and equipment scan the planet for customers. In fact, those torch-bearers of technology have been over-zealous on occasion, promoting and aiding the financing of modern plants which subsequently were idle or grossly under-utilized for lack of raw material and ancillary supplies.

The lesson to be drawn from the development record of the leather products industries is obvious: Technology cannot be foisted upon any social or economic complex. Incentives must be present within the country or community professing desire for modern technology. Supporting conditions must be in place or be capable of concurrent development.

LEATHER PRODUCTS CAPACITIES, DEVELOPING COUNTRIES

Current Level of Capacity Utilization

Shoes and to a lesser extent leather garments are the two products on which capacity utilization estimates can be hazarded. These are given in Table 31 on the following page. Information on capacity and output of other leather products is completely inadequate.

PRODUCT ADAPTATION AND DEVELOPMENT

There are few instances of product innovation or adaptation by any of the developing countries. Product design and construction are almost completely derivative from the markets of developed regions. This is hardly surprising

TABLE 31

LEATHER FOOTWEAR

(million pairs)	Estimated Capacity 1978	Estimated % Current Utilization 1979
Latin America	340	86
Argentina*	55	92
Brazil*	170	88
Mexico*	65	95
Africa	40	64
Near East	63	60
Far East	410	74
India*	325	76
Korea*	22	55
Taiwan*	38	78
China	140	54
Total	993	77

LEATHER GARMENTS

(million units)	Estimated Capacity 1978	Estimated % Current Utilization 1979
Latin America	9.0	68
Argentina*	4.0	75
Brazil*	3.0	65
Mexico*	2.0	70
Uruguay*	2.5	65
Africa	-	-
Near East	4.0	70
Far East	20.0	60
South Korea*	12.0	60
Taiwan*	5.0	70
Asia, CPE	5.0	40

* Included in regional total.

Sources: UNIDO Consultants' Reports; Trade Publications; U. S. Foreign Service Reports.

since the stimulus to produce beyond domestic needs invariably originated in the developed areas. Manufacturers and retail buyers from the latter specified styles, patterns and construction for export goods. Nuevo Hamburgo in Brazil has recently begun to show evidence of independence in style but for export purposes foreign buyers retain the power of decision.

RESEARCH AND DEVELOPMENT PROGRAMS

Organized research in manufacturing techniques, product development or design, distinguished from chemical or physical research is limited in the developing countries. There is scope for such effort, more particularly in the countries with a raw material base which can be enhanced in value by product manufacture. At present, however, the only institutes engaged in such activity are located in Brazil, India and China.

SUPPLY, DEMAND AND TRADE PROJECTIONS, 1985

Regional Variations in Leather Products Industries

In the developed regions of the world the leather products industries are comprehensive, involving in varying proportions every type and category of leather manufactures. Leather products in different degree are an integral aspect of developed industrial cultures. This is well illustrated in Western Europe where every country manufactures footwear and most, if not all, the other types of leather products. Several countries are pre-eminent in certain products - Italy and Spain in shoes, France in gloves, the U.K. in saddlery, Austria in travel ware and the scale of output in each product group varies tremendously with each country. Nevertheless, in spite of national specialization, a distinct industry in almost every leather product group continues to exist in every country of the region. Footwear, of course, remains the largest leather industry but, as

previously observed, products other than shoes now represent an unprecedented share of the region's leather consumption.

In cross-section North American diversity of leather products closely resembles output in Western Europe. Imports have drastically affected the dimensions of shoe manufacturing and of regional output in leather garments and handbags. However, output in the U. S. and Canada continues to be a well-rounded reflection of consumer demand for all leather products.

In both Western Europe and North America the ratio of leather products in the medium and upper price brackets is greater than in any other region. Disposable income is the causative factor with interesting consequences for regional production and trade. These are noted in a following paragraph.

From all available information it appears that in Eastern Europe shoe production is a more dominant leather manufacturing activity than in the other developed regions. Yugoslavia and Poland are apparently the largest producers of other leather products. Shoe production in the region is almost one-third of the entire world output of leather footwear.

The structure and range of leather product industry in Japan is something of an enigma for a major developed country and the second largest hide importer in the world. Shoe output is relatively small, approximately 58 million pairs in 1978, and roughly one-half pair per capita. Many other leather products are manufactured with heavy concentration in camera and optical cases, gloves and sporting goods. Volume in handbags and personal leather goods is very moderate by the standards of other developed market economies.

In developing regions significant industrial diversity in output of leather products is evident only in South America and the Far East. Everywhere else,

including China, leather products other than shoes are peripheral. Production of leather goods by artisans and craftsmen is universal but does not contribute significantly to exports, except via tourists.

The character, quality and diversity of leather products in South America are beginning to resemble output trends in Western Europe and North America. Rapid progress has been made in Argentina, Brazil, Mexico, Uruguay, Colombia, and several of the smaller Latin American countries. Expanded shoe production in the region has been followed by growth in leather garment production, handbags, small leather goods and upholstered products.

Development in Africa has achieved very modest industrial production of footwear; other leather products remain the province of traditional artisans or village craftsmen. Limitations of leather supply are the endemic problem of the continent.

Although shoes are by far the largest leather product activity in the Middle East, factory production of other leather goods has become evident during recent years. Leather garments, handbags and small leather goods are produced for regional consumption and to a limited extent for export.

The Far East is kaleidoscopic in the rapid emergence of leather product industries and their shifting location. India produces every variety of leather product and conducts export trade in footwear, leather uppers, small leather goods, sporting equipment, and other items. The Republic of Korea and Taiwan led other countries in large-scale production of shoes, garments, baseball gloves and handbags. Hong Kong, Singapore, Thailand and Pakistan are newer locales offering production cost economies and attracting the interest of peripatetic foreign buyers.

Manufacturing activity in China is concentrated almost entirely on footwear. Small quantities of leather travel goods are produced, chiefly for sale by Chinese Government stores in Hong Kong.

CURRENT AND HISTORIC TRENDS

Several long-term developments, culminating in present trends, have been identified in previous sections of this study. At this point they require explicit statement prefatory to projection of future production and consumption.

1. The explosion of raw material supply in the U. S., beginning in the 1950's and ending in 1976, gave enormous impetus to world production of leather products. Until supply recovers, growth in worldwide output of leather products will be arrested. The adjustment to supply will be effected, alternatively, by region, by country or by product.

2. The developing regions formerly described as major raw material producing and exporting areas and which pursued the goal of domestic utilization of their supply have, for all practical purposes, reached that goal.

3. In the developed countries footwear consumption has reached a plateau, the economic corollary of replacement demand. Footwear consumption in developing regions will increase with urbanization and rising income. However, demand for leather products other than shoes, in the developed regions, has attained major proportions. The resulting distribution of basic supply will be an important influence on production of leather products.

4. New forms of social and economic organization raise new questions on the regional and national distribution of world supply and the allocation of supply to the various leather products. Only qualitative surmise of the results is possible.

PRODUCTION PROJECTION

Global production of all leather products, ignoring for the moment volume in the different groups, cannot exceed available supply of leather. The following projection of world output of all leather products is indexed to 1977:

1977	100.0	1981	97.0
1978	99.0	1982	98.0
1979	97.4	1983	101.5
1980	96.0	1984	102.5

1985 104

Patently, the foregoing merely defines in a crude sense the overall limits imposed by projected leather supply. It does not deal with possible changes in quantity of leather per unit of product or with shifts in demand between footwear and all other leather products or among the latter. For example, average reduction of one-quarter sq. ft. of leather per pair of shoes, would permit production of 8 per cent more shoes from a given quantity of leather. Or, a single leather coat is equal in surface content to 10 pairs of shoes so that a favorable trend in garments will restrict supply for other leather products.

Principal implications of the projection of total leather product output by 1985 are:

1. Growth rate of total production will be considerably less than in the preceding decade as the result of leather supply limitations. World shoe production for example, will increase by only 8.0 per cent compared with a gain of 11.5 per cent in the ten years ending 1977. The sharp upward trend of recent years in leather garment output will come to a halt. Moderate growth in cattlehide leather garment output will proceed in South America; both the Near East and China will process more wooled sheepskins for garments. There will be very little increase in production of all other leather goods.

2. Substitution by synthetics or other materials will increase sharply in the lower grades of footwear and other traditional leather products. To maintain the same rate of per capita leather consumption in 1985 as in 1977, world supply would have to be 13.9 billion sq. ft. The projected supply (Table 11) is only 13 billion sq. ft., a short fall equal to 0.2 of a sq. ft. per capita globally. A billion sq. ft. of market will be filled by substitutes.

3. Changes in the location of production will be minor. The problem of raw material supply as well as existing excess capacity will dampen incentives for new commercial production facilities. Expansion will occur mainly in South America with greater shoe production in Brazil and Argentina, Eastern Europe and the USSR will follow, if the seemingly planned correlation between population and shoe output in this area is maintained. China will produce more sheepskin garments for export and also become a factor in shoe exports. Also in the Far East, Singapore, Hong Kong, Thailand, India and Pakistan will absorb some of the shoe production and export market developed by the Republic of Korea and Taiwan.

Projected unit output of leather shoes and garments is compared below with estimated 1977 production.

TABLE 32

PROJECTED PRODUCTION: LEATHER SHOES AND LEATHER GARMENTS
(million pairs and pieces)

	Shoes		Garments	
	Est. 1977	Projected 1985	Est. 1977	Projected 1985
Developing	851	987	21.3	24.0
Latin America	321	400	5.8	9.0
Africa	28	35	-	-
Near East	39	50	2.7	5.0
Far East	289	310	12.0	6.0
Asia, CPE	174	192	.8	4.0
Developed	2,216	2,307	17.0	18.0
North America	349	370	3.8	3.5
Western Europe	732	750	7.2	7.5
Eastern Europe	1,016	1,060	5.0	5.5
Oceania	38	42	.1	.2
Other	81	85	.5	1.3
Total	3,067	3,294	38.3	42.0

No attempt is made here to estimate 1985 unit production of all other leather products because the scant current data is available only for the OECD countries. In comparative terms the following changes are anticipated:

	Per Cent Change 1985 from 1977
Leather Gloves	+ 2.0
Leather Handbags	- 5.0
Personal Leather Goods	+ 3.0
Waist Belts	+ 1.0
Luggage	- 6.0
Saddlery and Harness	- 2.0
Upholstered Products	+ 2.0
Other, Including Sporting	+ 2.0

DEMAND PROJECTION

World

In the preceding chapter it was stressed that the unique economies of the leather industry dictate the equivalence of leather supply and consumption. Potential demand has always exceeded supply and price brings supply and consumption into balance. An additional factor, however, is operative in the leather products industries. These compete for consumer income (demand) and thereby compete for the distribution of leather supply. The latter, of course, is fixed at any point in time.

Hence, projection of future consumption of leather products must reflect appraisal of the intensity of consumer demand for the different leather products and the income levels to satisfy such demand. Greater consumption of leather garments in one part of the world, for example, might compel curtailed consumption of leather shoes elsewhere.

Projections of leather product output given in the preceding section are, in fact, estimates of world consumption by product in 1985. The expected leather supply of 12,992 million sq. ft. in 1985 will be distributed among leather products, globally, as indicated. Consumption, regionally and by countries, will reflect net transfers in foreign trade.

Table 14, a pivotal statistical statement of this study, anticipates the subject of total leather product consumption. The pertinent figures from Table 14 are:

NET LEATHER CONSUMPTION

Adjusted for Foreign Trade in Leather Products

Million Sq. Ft.	Estimated 1977	%	Projected 1985	%
Developing Regions	3,730	29.9	4,040	31.1
Developed Regions	8,738	70.1	8,952	68.9
World	12,468		12,992	

Total leather consumption, in whatever product form, will only increase 4.2 per cent by 1985. In developing regions the gain will be 8.3 per cent and only 2.4 per cent in developed areas. Consumption of footwear will be the single factor responsible for the relative consumption increase in developing countries.

TABLE 33

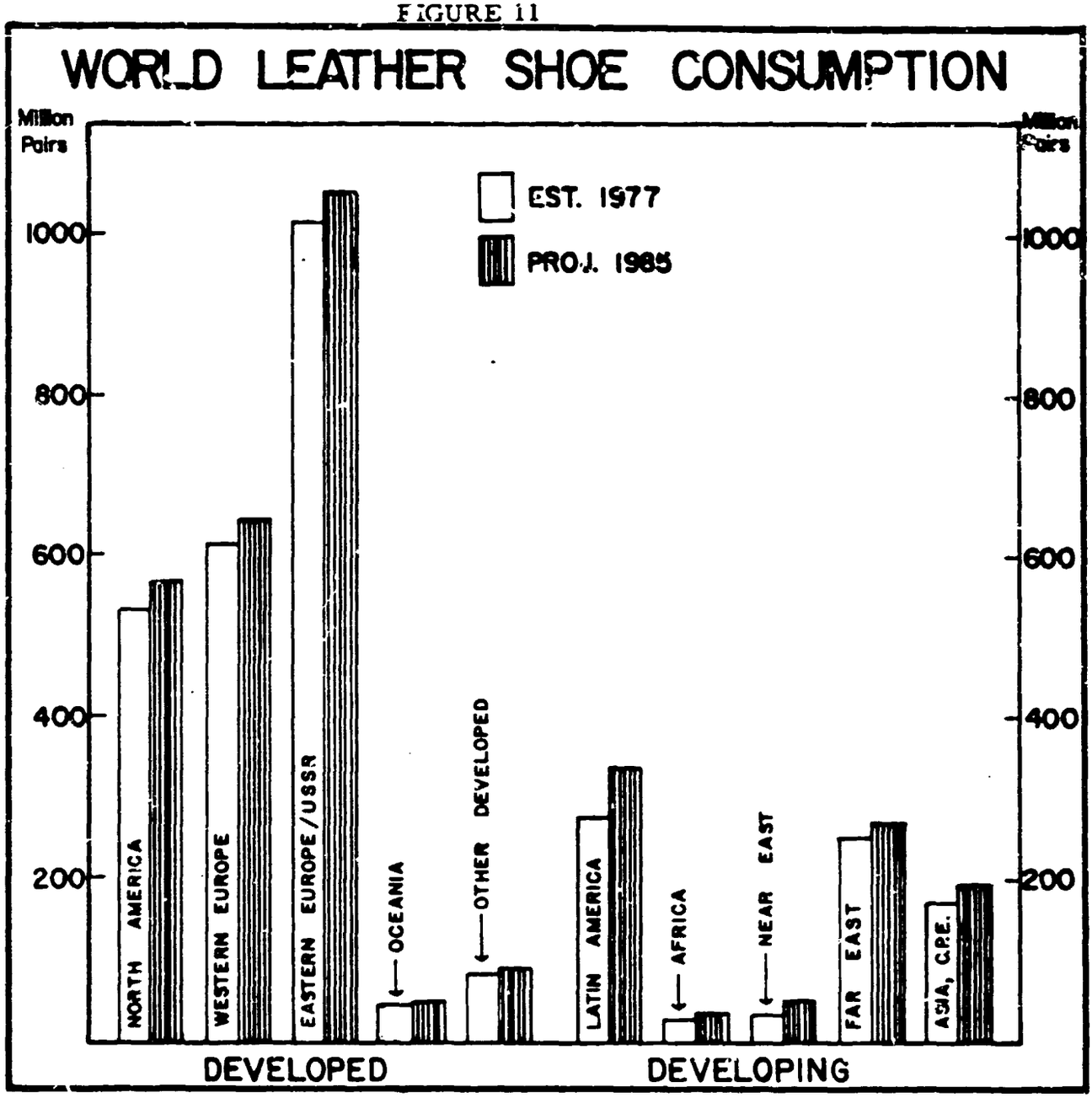
ESTIMATED AND PROJECTED LEATHER SHOE CONSUMPTION

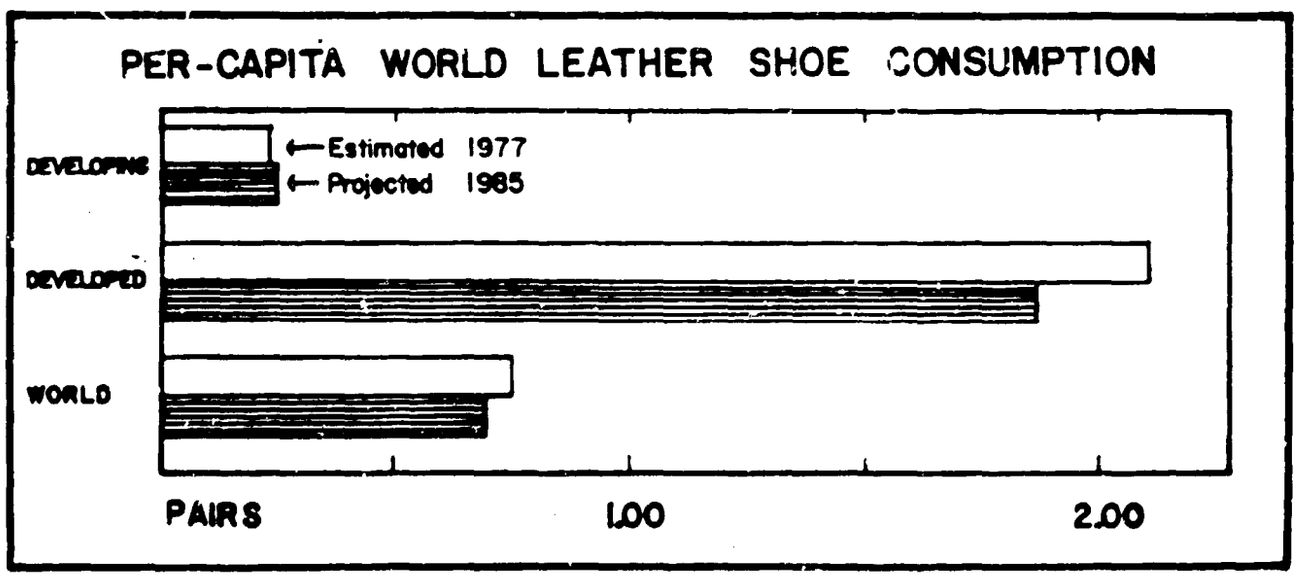
Million Pairs	Estimated 1977	Projected 1985
Developing	769	888
Latin America	279	340
Africa	29	36
Near East	38	50
Far East	250	270
Asia, CPE	172	192
Developed	2,298	2,406
North America	537	569
Western Europe	618	644
Eastern Europe, USSR	1,018	1,055
Oceania	43	47
Other Developed	82	91
World	3,066	3,294

In per capita terms the projected consumption total for 1985 represented 0.69 pairs globally compared with 0.75 pairs in 1977. World per capita consumption ratios will follow the same trend in varying degree.

Projected total consumption of leather garments is, of course, identical with the estimated 1985 output of 41 million units. Consumption will decline for several

FIGURE 11


WORLD LEATHER SHOE CONSUMPTION
Million Pairs
EST. 1977
PROJ. 1985
1000
800
600
400
200
NORTH AMERICA
WESTERN EUROPE
EASTERN EUROPE/USSR
OCEANIA
OTHER DEVELOPED
LATIN AMERICA
AFRICA
NEAR EAST
FAR EAST
ASIA, C.P.E.
DEVELOPED
DEVELOPING


PER-CAPITA WORLD LEATHER SHOE CONSUMPTION
DEVELOPING
DEVELOPED
WORLD
Estimated 1977
Projected 1985
PAIRS
1.00
2.00

years from the 1977 level but will show a gain of 7 per cent by 1985. However, a larger proportion of future output will be concentrated in higher priced grades of merchandise. Estimated consumption by regions will change only slightly from 1977.

TABLE 34

ESTIMATED AND PROJECTED LEATHER GARMENT CONSUMPTION

Million Units	Estimated 1977	Projected 1985
Developing	3.9	6.8
Latin America	1.0	1.8
Africa	-	-
Near East	1.4	2.0
Far East	.7	1.0
Asia, CPE	.8	2.0
Developed	34.4	35.2
North America	10.9	10.5
Western Europe	14.7	15.0
Eastern Europe, USSR	5.3	5.8
Oceania	1.2	1.4
Other Developed	2.3	2.5
World	38.3	42.0

It should be emphasized again that demand for leather products will remain as vigorous as ever; world consumption, however, must reflect available supply. There will be important and interesting variations in the process of adjustment to supply in the developed and developing countries.

Developed Countries - Projected Consumption and Demand

Footwear remains the largest leather product in the developed countries absorbing 73 per cent of leather consumed in the entire developed area. However, signs of maturity are clearly evident both in the trend of total shoe output as well as in demand and consumption. This appears to be the case in the OECD and in Eastern Europe.

Per capita consumption of leather footwear has shown little change in the developed regions during recent years, particularly in the market oriented economies distinguished by high average income. The underlying reasons are:

1. When basic requirements are satisfied and consumers possess a "closet inventory," replacement becomes a major factor in demand. Style change is often cited as a stimulus to sluggish consumption. However, the results do not seem to have been notable because the percentage of consumer budgets spent on footwear has declined in all the major OECD countries.[57/]

2. To an important extent shoe requirements are filled by specialty types of non-leather footwear. Canvas shoes with rubber soles, for example, carry over from their initial sports or play purpose to general casual use particularly among the younger age groups. As noted previously, when leather footwear of this type became available demand proved substantial, but consumption of conventional leather shoes was not helped.

3. Declining birth rates and a rise in the average age of population in developed countries tend to depress per capita shoe consumption.
Hence, projected 1985 consumption of leather shoes in the developed regions will not keep pace with population.

Conversely, the very factors noted above are responsible for the diversion of more income in the developed countries to other leather products. Consumption of leather garments and other leather goods has grown substantially. Developed countries consume about 90 per cent of world leather garment production, other than sheepskin coats made by farmers, herdsmen or village artisans. Other leather goods fall into the same demand category which is identified with high disposable income. The upward trend in demand for these goods during recent years may become less pronounced, but it will continue as a potent consumption factor in developed countries.

In summary, the developed nations of the world are projected to consume in 1985:

Shoes - 2,440 million pairs, or 73.0 per cent of world consumption

Leather Garments - 42 million, or 83.8 per cent of world consumption

Other Leather Products - 75-80 per cent of world consumption

Developing Countries - Projected Consumption and Demand

There are no economic tools for estimating or calibrating potential demand for leather products. Per capita gross national product is indicative but not accurate because human wants vary with the level of industrial development and are affected by geography, climate and social institutions. Consequently, projections for developing regions are concerned exclusively with consumption. It is a reasonable presumption that potential demand will be far in excess of consumption.

Footwear consumption in developing countries is still at a low point in the growth curve which has paralleled industrial and economic progress in developed nations. In 1977 per capita leather shoe consumption in the developing regions as a whole was 0.23 pairs compared with a world ratio of 0.75 and 2.1 for the developed countries. Regional differences are extreme. In Latin America per capita consumption was highest among developing areas with an average of 0.83 pairs while the data indicate less than 0.1 pair for Africa.

The projection for 1985 assumes growth in footwear consumption pairage at a more rapid rate than in the developed countries. Urbanization and a rise in the gross national product of various nations will increase demand. However, a large part of the growth is forecast to occur in Latin America as one of the consequences of expanding raw material supply and utilization in that region. Overall, per capita leather shoe consumption will be slightly lower in the developing sector since population growth is predicted to outstrip the modest gain forecast in unit volume of consumption.

Consumption of other leather products cannot increase by 1985 since projected shoe output will absorb practically all of the gain in available supply (see Table 26.) Output of an additional 136 million pairs will require at least 340 million sq. ft. of leather and the total gain foreseen in the developing regions

was 360 million sq. ft. in leather equivalent of raw material prior to foreign trade and tanning. In short, barring a massive and unforeseen flow in basic raw material, or leather, to the developing countries, projected consumption in 1985 will approximate:

Shoes - 888 million pairs, or 27 per cent of world consumption

Leather Garments - 6.8 million units, or 16.2 per cent of world consumption

Other Leather Products - 20-25 per cent of world consumption

INTERNATIONAL TRADE

Current and Historic Trends

The gross value of international trade in leather products has shown a remarkable increase during the past twenty-five years. In that period it is estimated that the gain in physical volume increased six to seven fold and turnover in monetary terms rose more than 1,200 per cent. In footwear, the principal product, world exports were less than 90 million pairs in 1955 and grew to 527 million pairs by 1977.

Several factors responsible for this growth were common to expanding trade in many other consumer products:

Rising income levels in the developed countries with a resulting diversification of demand;

More rapid communication, especially the jet plane, thereby facilitating the quest for new product sources;

Intensified search for low labor costs, a prime consideration in manufacture of labor intensive products such as apparel, footwear and leather goods.

But, a unique development coincided with the foregoing general causes to increase consumption and spark trade growth in leather products. It has been referred to previously in this study - the phenomenal increase in cattlehide supply beginning

in the 50's and continuing until 1977. Perhaps for the first time in modern history growth in cattlehide supply outstripped population increase. Two consequences cannot be overlooked:

First, cattlehides were cheap in relation to the general commodity price index for an extended period. Between 1955 and 1970 hides averaged less than 15¢ per lb. and the latter was the forty-year average prior to World War II.

Second, low priced hides highlighted manufacturing costs in leather and leather products, especially labor rates, and stimulated new production in low wage areas. Buyers from developed countries were a major factor in expanded shoe production by Italy and Spain or the establishment of new leather product enterprise in Brazil, Argentina, Korea, Taiwan, Hong Kong, and other developing nations.

Initially the expansion of foreign trade in leather products was confined to the developed world; by 1965 developing countries began to participate with significant exports to developed countries. However, the number of developing countries involved is limited. The Republic of Korea, Brazil, Argentina, India, Taiwan, Hong Kong and Singapore accounted in 1977 for more than 85 per cent of developing region exports to the world.

By 1979 the upward trend in world leather product trade flattened out and exports by developing countries without indigenous raw material supply began to decline.

World Trade Data

Analysis of world trade in leather products is subject to somewhat lesser problems than compilation of basic supply and production data in the leather sector. In many cases it is possible to compare figures of the exporting and importing countries to resolve data discrepancies. Nevertheless, the problems are serious and can only be properly met by international adoption of more exact and

uniform product classification. In too many cases present official customs tallies are guided by the doctrine of "similitude", lumping plastic goods with leather products of the same general character. UNCTAD notes, for example, with respect to Travel Goods, Handbags and Similar Articles (SITC 831) that not all of the products belonging to this product group are made of leather, but "the conventional international trade statistics do not distinguish the product group by raw materials used".[58/] A total of $1,216 million is cited as the 1977 import of 21 developed market economies, which would make this product class second only to footwear in value. In point of fact, much less than half the dollar value given is in leather goods; plastic and fabric items compose the bulk of the reported total.

Inaccuracy also stems from trade comparisons in value without reference to physical units or adjustment for price change. Such comparisons can be misleading with respect to trends in total trade volume as well as the differences in character of goods from different origins.

The following table summarizes world trade in leather products by units, wherever possible, and by value. Adjustments have been made to UNCTAD compilations to eliminate non-leather products from SITC 831 since leather is a minority interest in that category. Also, volume figures given under "Leather Garments and Accessories" cover garments only; information on volume of accessories is completely inadequate.

It is apparent from Table 35 that footwear represents 70 per cent in value of world trade in all leather products, followed by garments with 15 per cent. The balance is distributed among the variety of leather products previously described in this chapter and generally grouped in a few arbitrary customs classifications. It is also obvious that Table 35 can be taken as the composite of world import trade in leather products during 1977.

TABLE 35

WORLD EXPORTS OF LEATHER PRODUCTS in 1977

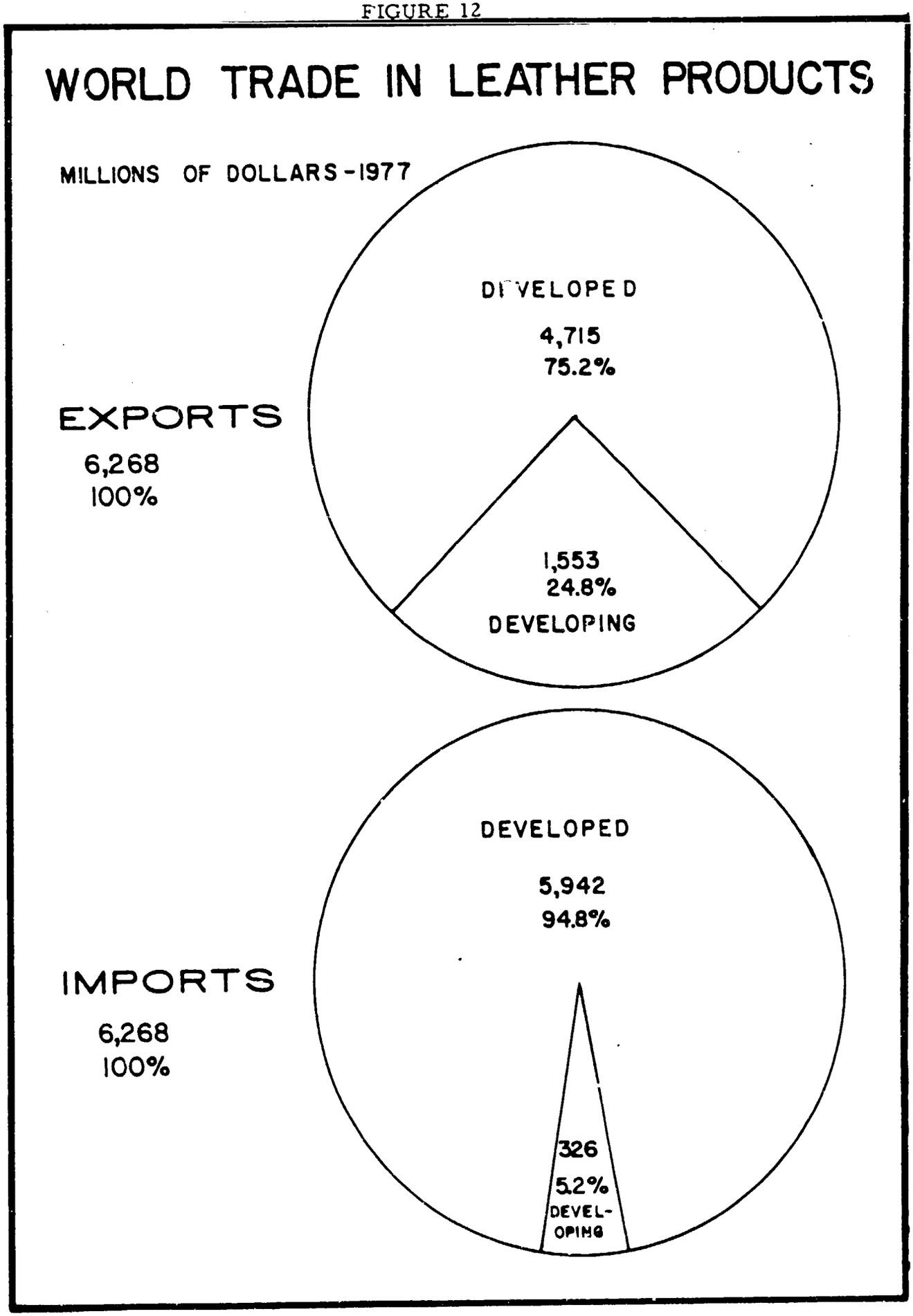
(Million Units and $)

From	To Developed Countries	To Developing Countries	Total Exports
	FOOTWEAR		
Developed, prs.	459	25	484
Value, $	3,420	186	3,606
Developing, prs.	153	9	162
Value, $	720	35	755
World, prs.	612	34	646
Value, $	4,140	221	4,361
	LEATHER GARMENTS AND ACCESSORIES*		
Developed, units	9	1	10
Value, $	408	27	435
Developing, units	18	-	18
Value, $	516	4	520
World, units	27	1	28
Value, $	924	31	955
	ALL OTHER LEATHER PRODUCTS**		
Developed, $	635	39	674
Developing, $	243	35	278
World, $	878	74	952
Total, All Products			
Developed, $	4,463	252	4,715
Developing, $	1,479	74	1,553
World, $	5,942	326	6,268

* Unit volume for Garments only.

** Includes Industrial Leather, SITC 612.1; Saddlery, 612.2; Manufacturers of Leather, N.E.S., 612.9; Travel Goods, Handbags, etc., 831. Adjusted to eliminate estimated value of non-leather products.

FIGURE 12


WORLD TRADE IN LEATHER PRODUCTS
MILLIONS OF DOLLARS - 1977
EXPORTS
6,268
100%
DEVELOPED
4,715
75.2%
1,553
24.8%
DEVELOPING
IMPORTS
6,268
100%
DEVELOPED
5,942
94.8%
326
5.2%
DEVEL-
OPING

According to the UNCTAD tabulation for 1970, world trade in leather products totaled $1,893 million. The distribution between developed and developing regions compares as follows with the corresponding 1977 data:

	1970	%	1977	%
Exports of Developed Regions	1,709	90.3	4,715	75.2
Exports of Developing Regions	184	9.7	1,553	24.8
Total	1,893		6,268	

This striking increase in overall volume and the sharp gain in the status of the developing countries requires detailed discussion.

Trade Trends in Developed Regions

While a substantial part of the expansion in world trade is attributable to the higher prices of raw material and rising production cost, physical volume did increase greatly. In footwear, alone, for example, it is estimated that in 1977 world exports grew by nearly 500 per cent since 1961 and by 95 per cent since 1970. Within the developed regions shoe trade volume reflects a huge shift in production from the most highly industrialized nations in developed countries with more abundant labor resources such as Italy, Spain, Portugal and Greece. Principal leather shoe importers in the developed world are:

Million Pairs	1977
United States	164
F.R.G.	81
BLEU	20
Netherlands	19
U. K.	18
France	12

Principal exporting nations were:

Italy	173
Spain	56
Portugal	5
Greece	5

Total 1977 leather shoe production in North America and Western Europe in 1977 amounted to 1,081 million pairs while apparent consumption reached 1,155 millions. When the comparison is expanded to include the other developed regions, the net production deficiency reached 82 million pairs. That gap was filled by imports from developing countries; the United States was the principal buyer; Korea and Brazil were the major suppliers.

Compilation by UNCTAD of 1977 footwear trade flows in value confirm the above observation.

SHOE EXPORTS OF DEVELOPING COUNTRIES
TO 21 DEVELOPED MARKET ECONOMIES

Million Dollars

From	To: U. S.	All Other DME	Total
Korea	278	111	389
Brazil	119	56	175
All Other Developing	82	109	191
	479	276	755

Other developing countries exporting more than $10 million in footwear to all destinations were: Hong Kong - $42 million; Mexico - $26 million; Uruguay - $23 million: India - $22 million; Argentina - $21 million. It would appear from the foregoing that a single country, the U. S., is the bulwark of the footwear export market for the developing regions and that one country, Korea, enjoyed 58 per cent of that export market in 1977.

On the other side of the footwear ledger, the developed countries exported $186 million in 1977 to developing nations, mainly Nigeria, Algeria, the Libyan Arab Jamahiriya, Hong Kong and Singapore. Of the net import deficit on footwear account with the developing regions, amounting to $569 million in 1977, the U.S. represented $479 million.

The total leather shoe export volume of the developed regions in 1977 came to $3,606 million or 82.6 per cent of the world export volume. Major exporters were:

Italy	-	$1,635
Spain	-	387
France	-	233
Yugoslavia	-	220
Germany	-	191

Trade volume in leather garments and accessories produced by developed countries was less than the value of import from developing areas. From Table 35 it will be noted that developing countries shipped $516 million to the developed zones in 1977 and that the latter exported $435 million. Principal exporters among the developed countries were Italy, Spain and Yugoslavia. Imports came from Korea, Hong Kong, Uruguay, Argentina, Brazil, Mexico, Taiwan and several other developing nations. In this product group as in footwear the U. S. was by far the largest buyer accounting for more than a third of the imports from developing countries.

Trade volume in leather products other than footwear and garments can only be approximated as a result of the classification problem previously noted. Table 35 attempts to correct the deficiency and provide a more realistic measure of volume than indicated by such blanket categories as "Travel Goods, Handbags and Similar Articles" which includes vinyl, cloth or straw items as well as leather products.

In several products referring explicitly to leather, such as saddlery, machine belting, or cut shoe parts, the trade data is reliable. The proportion of world trade by the developed countries in these goods is higher than in footwear.

However, it is regrettable that the trend of world trade in personal leather goods and leather handbags can only be estimated because these are the most

important of the secondary leather products. Developed countries' share of the export market in handbags declined appreciably between 1970 and 1977. That trend continued in 1978 with shipments increasing from the Far East and Latin America. Italy and Spain alone among the developed countries achieved gains in exports.

Developing Countries

Two aspects of leather product trade by developing countries are noteworthy:

First, an extraordinary proportion of these countries' exports moved to the U. S. In 1977 the U. S. received 63.4 per cent of footwear shipments, 50.6 per cent of leather garment and accessory exports, 46.7 per cent of travel goods and handbags, 35.9 per cent of leather manufactures and in baseball gloves the ratio was undoubtedly 100 per cent. This export concentration was evident at the earliest stages of manufacturing and export development and persisted through 1978. Whatever reasons may have favored emphasis on the U. S. market at the inception of new enterprises in developing countries, the absence of greater sales diversification spells economic risk.

Second, and equally striking, is the minimal volume exported to other developing countries. In footwear the percentage in 1977 was only 5.5 per cent, in garments, etc., 1.0 per cent, travel goods and handbags 8.2 per cent and 8.6 per cent in leather manufactures.[59/] Preponderance of sales to developed markets is to be expected, particularly during the early stages of the development process. However, the continued absence of significant trade in leather products among developing countries as recently as 1977 is somewhat difficult to explain.

Finally, the bulk of leather product exports by the developing regions was carried on in 1977 by a small number of countries.

TABLE 36

LEATHER PRODUCT EXPORTS*

Selected Developing Countries	$ Million Exports	% Total Developing Country Exports
Republic of Korea	668	43.0
Hong Kong	229	14.7
Brazil	208	13.4
Uruguay	72	4.6
Argentina	59	3.8
India	48	3.1
Taiwan	43	2.8
Total	1,327	85.4
All Developing Countries	1,553	

* Adjusted to eliminate non-leather products from UNCTAD compilation.

The remarkable implication of Table 36 is self-evident: Three countries accounted for approximately 70 per cent of the developing regions' leather products exports in 1977. Other developing nations have also expanded output and participated in the export market but aggregate volume minus the Republic of Korea, Brazil, and Hong Kong would not testify to handle change in world trade flows.

Brazil exemplifies complete, and purposeful, integration in the use of large domestic raw material supply. Cattlehide exports are embargoed; differential incentives encourage production of finished leather and the manufacture and export of leather products. The Republic of Korea and Hong Kong, on the other hand, must rely almost entirely on the import of raw material and leather as well as the other supplies required for tanning and manufacturing. In view of these varied circumstances it is difficult to isolate the common factor of outstanding achievement in the leather products sector. Most observers are inclined to agree that a key factor is composed of urban centers, a large labor force familiar with industrial routines and discipline, and low wages. In the Republic of Korea, government financial assistance has undoubtedly been helpful to Korean entrepreneurs and their foreign associates.

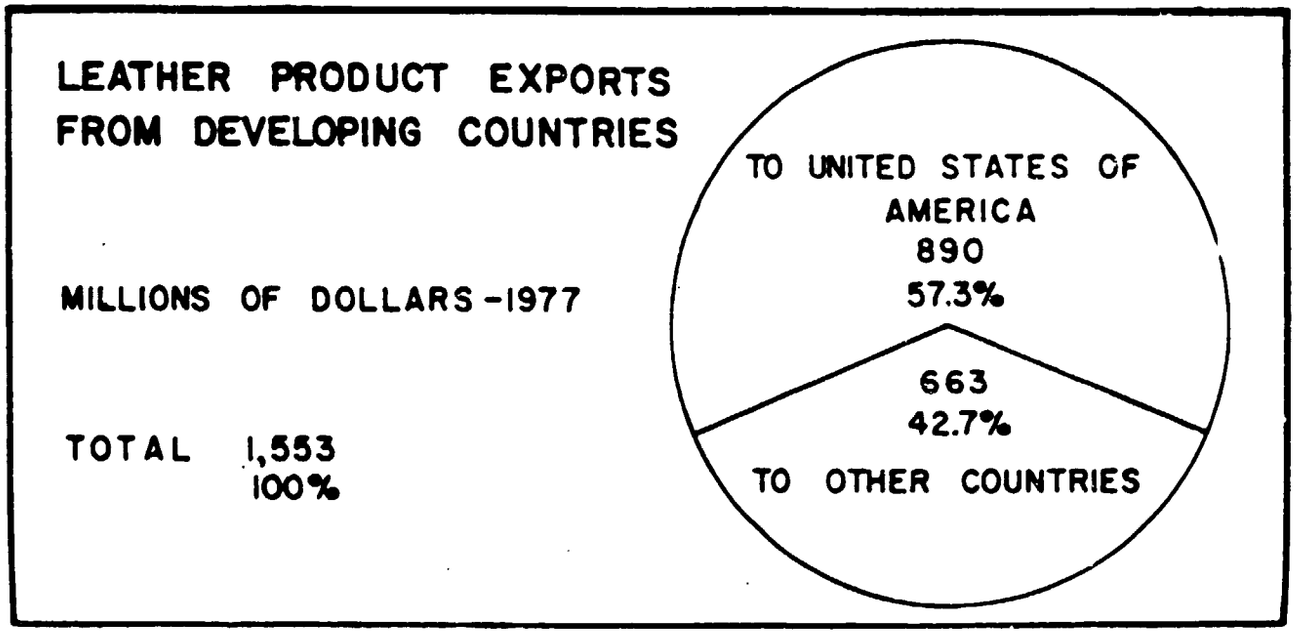
On a smaller scale Taiwan has followed the patterns of Korea - importing raw material to produce leather and leather products. In Taiwan also, government measures have helped finance new enterprise and encouraged expansion. On a much smaller scale several Caribbean countries appear to have elected a similar course, importing hides for ultimate sale of fabricated products in the U. S. The Dominican Republic, Jamaica and Honduras are examples. Everywhere else in the developing regions, the utilization of domestic supply seems to be regarded as the basis for existent or eventual foreign trade activity.

CONCLUSIONS AND MAIN DEVELOPMENT ISSUES

Hides and skins are tanned to be consumed as leather products. The final import of this study, therefore, is - where are the goods produced, where are they consumed and what are the prospects for change in either respect? Preceding paragraphs have indicated the relevant current facts:

The last decade has witnessed substantial growth of world production and trade in leather products. By 1977 total trade volume exceeded $6,000 million, roughly twice the aggregate value of 1970. Growth in footwear, the primary article of leather product commerce, was amplified by sharp expansion in leather garments and in other leather products such as handbags and small leather goods.

FIGURE 13



Developed countries remained the nexus of both imports and exports. Export volume of these countries was almost entirely with other developed nations and the shipments of developing areas was also directed to the developed regions, primarily North America. In foreign trade, at any rate, developing countries do not seem to have addressed marketing effort to their economic compatriots.

Although the total foreign trade position of the developing countries grew sharply, generalization on the score is fallible. Examination reveals that the greatest part of the increase was concentrated in a few countries. Moreover, a single foreign market, the U. S., has been the central focus of trade expansion by the developing group.

Two lines of development mark the growth of production and trade in leather products by the developing countries. One is based on the utilization of domestic raw material as a primary avenue of industrialization. The other is based on the import of raw material and the utilization of labor to produce competitive goods for export. There can be no exception taken to either course on any grounds other than economic viability.

PROBLEMS AND PROSPECTS - LEATHER PRODUCTS IN DEVELOPING COUNTRIES

For the next few years supply will be the dominant problem of developing nations as well as the developed regions. Countries favored by adequate available supply will be able to sustain output of leather products and exploit potentials in foreign trade. The countries which must compete for scarcer raw material supply will encounter serious problems in maintaining output and trade levels reached by 1978. Countries in this group are Korea, Hong Kong, Taiwan and the Philippines.

An indication of the new problems generated by changing raw material supply circumstances surfaced during the early months of 1979. Hide importers in the Republic of Korea, mainly tanners, were unable to accept delivery of a large quantity of

imported hides, reportedly more than 700,000, already unloaded and on the piers of ports in the Republic of Korea. Presumably, factors responsible were lack of working capital, non-availability of bank financing and dislocation of the cost structure of leather products due to record hide prices. Default on this scale is unprecedented in world hide trade.

It has previously been indicated that the Republic of Korea and Hong Kong accounted for more than 50 per cent, in value, of all leather product exports by developing countries. Both countries as well as Taiwan are the most exposed of all developing areas to raw material difficulties since their domestic supplies are completely inadequate. At best, therefore, it seems certain that the growth of recent years in leather product output and export marketing will be suspended. Reduction in output by the supply deficient countries is probable. Types of goods which will be affected are leather shoes, garments and handbags.

A possible straw in the wind is given by the U. S. shoe import statistics for the first half of 1979. In that period shipments from Italy rose to 53.8 million pairs compared with 29.2 million in the like months of 1978. Conversely arrivals from the Republic of Korea were some 4 million pairs less than permitted under the U.S. Orderly Marketing Agreement with that country.

Supply limitations will constrain significant production growth in other Asian countries. In all of these, utilization of domestic raw material supply had reached 100 per cent by 1977. However, diversion of output from domestic consumption and export of leather to export marketing of leather products is both feasible and a distinct probability. India, Pakistan, Thailand, Bangladesh, Sri Lanka will increase their export of leather products during the next six years. For the most part this will represent a shift in production for the several developing countries dependent on import of raw material or leather from manufacture of finished products.

Production and marketing opportunity in the Middle East are related to the availability of sheepskins - hair skins in Iran and wooled skins in Turkey. The latter country has made progress in output and export sale of sheepskin garments. Improvement in skin quality could lead to substantial increase in the marketing of Turkish garment production. Trade forecasts in Western Europe and the U. S. anticipate continued demand growthfor garments using wooled sheepskins a- the equivalent of furs. Iranian hair sheepskins are valued for grain garment leather. However, production of garments in Iran is minor; recent political events interrupted planned joint ventures with developed country interests in leather garment production. However, the potential remains; under conditions more favorable to new enterprise, Iran could become a major producer and exporter of leather garments.

Problems in Africa have been enumerated at length in Chapter II and prospects for growth in leather products are dim. Unless basic supply improves, in quantity and quality, the continent cannot become a ponderable factor in production or marketing of leather products.

South America is the developing region with the brightest prospects for growth of output in leather products. Cattlehide supply in Brazil and in temperate South America will increase sharply in coming years. Modern facilities exist for production of leather and leather products. Both manufacturing and marketing expertise have been developed, and an industrial labor force exists in most countries of the region. Any errors in forecasting the future status of South America as a center of leather product output and export are likely to be on the low side.

In summary: With the exception of South America, the curve of total leather product manufacturing and export marketing by developing countries will not rise during the next few years. Raw material and leather supply will be the crucial

limiting factor. Certain countries wholly dependent on raw material imports may have to curtail production. Other countries possessing domestic supply will increase output and export sales. In the aggregate, excepting South America, a period of rapid growth in production of shoes and other leather products by developing countries has come to an end. It may resume when and if world raw material supply once again shows signs of positive growth.

INTERNATIONAL TRADE;

TARIFF AND NON-TARIFF BARRIERS

In Chapter II the issue of trade restrictions was discussed at length with special reference to the possible consequences of retaliatory escalation. Non-tariff barriers in hides and skins, leather and leather products were noted as clear instances of dangerous trade restriction. At this point, a brief review of comparative tariff rates will clarify the extent to which import duties are nominal or imposed to foster or protect domestic industry.

Table 37 includes the principal countries involved in hide, leather and footwear trade, the major trade categories in the sector. Although for the sake of simplicity rates are not given for other leather products, the table plainly defines tariff policy of the countries listed. It should also be noted that, the developed countries are committed to the General System of Preferences, of which almost all developing countries are beneficiaries.

TABLE 37

TARIFF RATES - HIDES, LEATHER AND FOOTWEAR

Per Cent

Country	Hides	Leather	Footwear
Argentina	10	10	55
Australia	Free	0-15	Free - 22.5
Brazil	120	160	170
Canada	Free	7.5-12.5	25
European Community	Free	8	8
India	Free	60	100
Japan	Fre	20	10-30
Republic of Korea		40	60
Mexico	Fre.	10-22	10-40
United States	Free	5	Free - 20

With the exception of Japan the duties of the developed countries can be characterized as low or nominal and they are MFN rates applicable to developed and developing countries alike with the GSP benefit granted only to developing countries. Tariff rates imposed by Japan are somewhat pointless since the country maintains a rigorous quota system under which only the most miniscule quantities of leather and leather products can be imported. Duty rates by all the developed countries are now subject to further reduction under the multilateral trade agreement endorsed by GATT signatories, April 1979.

The record of trade development in leather and leather products, as well as the tariffs listed above, support the conclusion that import duties of the developed nations, except Japan, are not a barrier to trade. Pertinent facts are simple enough to obviate elaborate exercise in weighted averages or calculation of "effective rates" as opposed to "nominal rates".[60/]

It is estimated that the trade volume of the developing countries in the above table exceeds 75 per cent of total volume by all developing countries in leather and leather products. Tariff rates of the countries listed are uniformly higher than rates of the developed nations. Duties on raw hides by Argentina and Brazil are parts of a system intended to stimulate domestic production and promote the export of semi-manufactured or manufactured goods. The Korean duty of 30 per cent on raw hides is subject to a drawback provision on the imported content of export goods. Since virtually all the output of leather shoes and other leather products in Korea is destined for export, and 90 per cent of hide supply is imported, the rate shown is fictitious.

Disparity in tariff rates between developed and developing national entities is generally recognized as one of the aspects of the development process. At the stage when a country's industrial classification is no longer obvious, pressure will mount for reciprocity in terms of trade. For example, until March, 1979,

the Argentine duty on leather was 70 per cent and was then reduced to 10 per cent. However, the ban on hide exports by Argentina continues to assure a domestic price for leather which effectively precludes imports. The Republic of Korea is another country to which the appellation of "developing" may not be deemed accurate by trading partners.

On the whole, existing and prospective tariff rates are a lesser danger to sound trade than the proliferation of non-tariff barriers. Several of these with a bearing on hides and skins were discussed in Chapter II, but a broader statement of the issues in the leather and leather products economy is desirable.

Non-tariff barriers are not confined to publicly posted restrictions on the movement of goods across national borders. The forms and the methods used to gain trade advantage and to frustrate equitable competition are legion and range from outright embargoes to quota systems, direct or indirect subsidies, differential export taxes, special exchange rates, allocation or control of raw material, currency control, etc. Denial of access to raw material can be just as potent a trade barrier as the crass prohibition of manufactured imports.

For the first time the complexity of NTB's and their danger to the structure of foreign trade was recognized in the Tokyo Round negotiations. Provisions adopted will, at the least, highlight such practices as the leather import quota system of Japan or the export subsidies of several South American countries and provide negotiating recourse. There is not, however, any resolution in sight of problems posed by countries where foreign trade is exclusively a government function and market criteria of value are absent.

It has previously been stressed that several developed countries have innovated a dramatically new approach through Orderly Marketing Agreements with leather product exporting nations. This concept of sharing market growth is basically a response to production stimulated by some type of open or indirect subsidy. Such aid is clear and acknowledged by India; in other countries more

complex methods are used to encourage leather product exports or to restrain imports. Special financing through State banks is a favored device in several Far Eastern countries.

Problems due to differences in technical standards or health and sanitary regulations are minor in the leather and leather products sector. These are customs trivia which do not impede the flow of trade among developed countries or between developed and developing regions.

The core issue of non-tariff barriers arises from the differences between market oriented enterprise and government supported or subsidized production and exports. In the long term that difference must be bridged, resolved or adjudicated; OMA's are a forward step, but are only provisional in the long term. Viable trade in leather and its end products requires reciprocity and equality in terms of trade among trading partners.

INTERNATIONAL COOPERATION MEASURES

Developments in 1978 and 1979 have cleared the stage for a new approach to the problems of the entire leather sector from hides and skins to finished products. Misconceptions and illusions spawned during the last two decades have been succeeded by forced recognition of hard facts: Supply is finite; expansion in output and trade cannot be taken for granted; increasing and improving raw material resources is the common concern of all countries.

Against this changed background, international cooperation need not be a vague ideal. It can be a practical and profitable undertaking grounded in realistic self interest of all leather producing and consuming nations. The approach and the measures on which international cooperation can be built were detailed in Chapter II under the general heading of "Strategy For Action". The necessity of the cooperative measures suggested there is reinforced by the examination in this chapter of manifest problems in the leather and leather product industries.

FOOTNOTE REFERENCES

1. FAO, CCP:HS 78/2 Part 1, May 1978

2. IBID

3. FAO World Hide, Skin and Leather Economy, 1970; CCP:HS 78/5; Report on First Consultation Meeting, 1977, Report on Raw Material Availability, January 1979.

4. UNIDO Consultants' Reports, October 1978, Higham, Bouchet, Parpia, Winterbottom, Villa, Glass, hereafter cited as UNIDO Consultation Report.

5. Alligator, bison, camel, carpincho, peccary, deer, elk, elephant, reptiles, seal, shark, walrus, etc.

6. Higham et al., op. cit.

7. Expansion of cattle herds is slow due to single births; length of gestation period; age of reproductive maturity by heifers.

8. Foreign Agricultural Service, United States Department of Agriculture, FLM 10-77.

9. Report of U. S. Forage Team on Visit to USSR Forage and Research Centers, 1974.

10. Higham et al., op. cit.

11. Reports by UNIDO Consultants on Middle East, Africa, ESCAP, Latin America, October-December 1978.

12. A. D. Parpia, Report to UNIDO on India, October 1978.

13. Hides and Skins, Arnold, Van Nostrand, New York, 1925.

14. Higham et al., op. cit.

15. See FAO CCP:HS 78/4 August 1978 for another approach to supply/demand equilibrium as a function of price.

16. Higham et al., op. cit.

17. Trends in Argentina, address by E. J. Koppany, April 9, 1979 before Tanners' Council of America.

18. Higham et al., op. cit.

19. Estimated fuel and purchased power costs in tanneries is approximately 2.0 per cent of total cost of production.

20. The New York Times, April 23, 1979, quotes extensively to this effect from an official Peking report of April 21, 1979.

21. FAO,CCP:HS 78/4 August 1978.

22. Parpia, op. cit.

23. As late as October, 1975 the Tanners' Council of America projected continued increase through 1985 in the per capita availability of cattlehide leather for the world population. Leather Industry Projection, Tanners' Council, October 1975, New York.

24. FAO, CCP:HS 78/2, Part I.

25. IBID.

26. FAO, CCP:HS 78/4 August 1978.

27. Draft Report on International Trade, Hide, Skin, Leather, etc. February 1979.

28. Oscar Mayer, Wisconsin; Jimmy Dean Meat Company.

29. Koppany, op. cit.

30. Ibid.

31. Ibid.

32. Ibid.

33. Merrill A. Watson, Economics of Cattlehide Leather Tanning, pp. 164-177, Rumpf Publishing Co., Chicago, 1950.

34. Japan is a remarkable example of socio-biological adaptation. Import bans on leather were imposed in 1947 to protect the "Buraku-Min" (ETA), a caste or social group able to handle animal tissue. The size of this group has apparently grown in exact correspondence with the scope of the Japanese tanning industry.

35. Food Protein Sources, edited by N. W. Pirie, Cambridge University Press, 1975.

36. UNIDO Consultants' Reports on ESCAP, Egypt, Sudan and other countries.

37. FAO, CCP:HS 78/5 August 1978.

38. Merrill A. Watson, previously cited.

39. Parpia, op. cit.

40. Politics and Markets, Charles E. Lindblom, Basic Books, Inc., New York, 1977.

41. Higham, op. cit.

42. Parpia, op. cit.

43. Fresh versus Salt Cured Cattlehides, U. S. Department of Agriculture, MRR 1032, October, 1973.

44. Costs for Tanning, F. J. Poats, U. S. Department of Agriculture, 1974.

45. Data Economic Research, New York, May 1979.

46. Costs for Tanning Fresh Hides, F. J. Poats, previously cited.

47. Report by Oklahoma State University, May 1978.

48. Parpia, op. cit.

49. UNIDO re ESCAP, op. cit.

50. The New York Times, June 18, 1979.

51. Parpia, op. cit.

52. Ralph Edwards, Report on Far East to Tanners' Council of America, October 1971.

53. UNIDO/ICIS. 105, April 1979.

54. Andrew Barkin, Regional Peace Corps Director, March 1979.

55. New York Times, July 21, 1978; Le Monde, July 18, 1979.

56. FAO, CCP:HS 78/5.

57. The Footwear Industry, pp. 12-13, OECD, 1976.

58. UNCTAD, "International Trade in Hides, Skins, Leather and Leather Products in Footwear," February 1979.

59. Ibid.

60. Ibid.

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ANNEX I

CURING HIDES AND SKINS

The subject of hide and skin curing is interesting and important for technical and economic reasons. With regard to the first, the facts are generally familiar. Hides and skins are perishable and if not treated to prevent putrefaction they decompose within hours after removal from the animal carcass. Since tanneries are usually located at considerable distances from slaughtering points, hides and skins must be protected against decay during transit and storage, and the latter may take months. Treatment to prevent decay is universally described as curing, and the purpose is to create a chemical environment in situ where protein-destroying organisms cannot survive.

Probably the oldest method of curing was air drying; this is still practiced in hot and dry climates. Bacteria which need moisture for reproduction are thus rendered inactive. Drying cannot be precisely controlled and, therefore, the quality of hides and skins cured by this method tends to be variable.

Far superior quality in hides and skins is achieved by using salt as the principal curing agent. Until 20 years ago, salt curing was practiced by literally salting hides individually. Hides are first washed and then spread hair side down with a substantial coating of granular salt placed on the flesh side. Additional hides are then superimposed, each being liberally covered with salt. Piles up to 7 or 8 feet high are thus built and in the course of the curing period, the salt dissolves in the hide or skin moisture and thereby thoroughly penetrates the substance of each hide or skin. For cattlehides, thorough curing requires a period of 30 days.

Salt curing is accomplished much more rapidly at present by the use of brine solutions and mechanical agitation of hides and skins. Washed hides are placed in large tanks termed raceways which contain a concentrated salt solution. Continuous agitation results in effective penetration of the sodium chloride

solution within 12 hours. After removal from the raceways the hides are sprinkled with salt as a safety measure and are then ready for shipment to tanneries, effectively protected against decay.

Other methods and systems of protecting hides and skins during the time they are in storage or in transit to tanneries have been proposed and tried. These include freezing, solvent dehydration and the application of biocides to prevent bacterial growth. No method, however, has been found as effective or as economically feasible as brine curing.

An economic aspect of change in curing practice from wet salting to brining deserves attention. When hides were salted and held in cure for 30 days, one-twelfth of the annual hide supply of a given area was in packers' inventory. Adoption of brine curing, in North America and by large slaughtering establishments in Western Europe and South America, has eliminated the inventory of hides in process of curing. In the United States it is estimated that during the past 15 years brine curing released approximately 3 million cattlehides from inventory, thereby temporarily enlarging available supply.

With the adoption of brine curing, packing plants were able to dispense with the hide cellars in which hides were stored during the curing period. Elimination of the inventory of hides being cured has tended to exaggerate price volatility. In modern packing plants hides must be sold promptly and sales cannot be regulated in accordance with the state of demand. Inelasticity of supply from the sellers' viewpoint contributes to price instability arising from inelasticity of supply from the tanners' standpoint.

ANNEX II

THE TANNING PROCESS

The purpose of tanning as noted in the text is conversion of an organic putrescible raw material into a product which will not decay and can be fabricated into long-lasting and useful products. Tanning process and materials are innumerable. The summary given below describes the production of cattle side upper leather, the most important type of leather in world commerce. Variants of the process stages noted, for other raw materials, and classes of leather, do not alter the basic technological succession described below.

Process Flow Sheet For Side Upper Leather

1. Trimming and Sorting - (Object: Preparation of skins for processing.) The initial tannery operation consists of opening up the bundles and trimming off the heads, long shanks, and other perimeter areas. These offal areas generally do not make good leather and, if left on, would interfere with much of the tannery equipment through which the hides will be processed.

2. Soaking - (Object: Restore lost moisture to the skins.) As a result of the curing process the hides will have lost a good deal of their natural moisture. The tanner must now restore moisture so that the chemical treatments that are to follow can fulfill their purpose. This is done by soaking the skins in water to which chemical wetting agents (similar to household detergents) and disinfectants are usually added.

3. Fleshing - (Object: Removal of excess flesh and fatty substances.) Fleshing is a mechanical operation that rids the hides of excess flesh, fat, and muscle that is to be found on the inside (flesh side) of the skins.

4. Unhairing - (Object: Removal of hair, epidermis, and certain soluble proteins.) The hides are now ready to have the hair removed. This is primarily a

chemical process, although mechanical unhairing equipment is called upon at times to effect complete removal of hair after it has been loosened.

5. Bating - (Object: Removal of residual unhairing chemicals and non-leather making substances.) The first phase of the bating process, termed deliming, eliminates the lime and alkaline chemicals present. The second phase of this process commences with the addition of the bate itself. It attacks and destroys most of the remaining undesirable constituents of the skin.

6. Pickling - (Object: Transform the hides into an acid environment.) Pickling places skins in an acid (low pH) environment ready to accept the tanning materials. This step is necessary because the chrome tanning agents that are to follow are not soluble under alkaline conditions.

7. Tanning - (Object: Conversion of the skin into a stable, non-putrescible material.) The primary function of any tanning agent is to convert the raw collagen fibers of the hide into a stable product which is no longer susceptible to putrefaction or rotting.

8. Wringing - (Object: Remove excess moisture for splitting.) Wringing removes excess moisture from the stock so that it can be properly handled on the splitting machine which follows.

9. Splitting and Shaving - (Object: Adjust the thickness to that required for the end use.) The thickness of all hides and skins can vary. Various end uses require different thicknesses. The bulk of this thickness adjustment is accomplished by splitting. The shaving machine is used to clean off any areas that show evidence of fleshy matter.

10. Retanning - (Object: Impart properties of other tanning agents.) Coloring - (Object: Color with aniline derived dyestuffs.) Fatliquoring - (Object: Lubricate the fibers for flexibility.) Although each of these has a vastly different purpose, the tanner considers them as a unit because they follow one another without

interruption, requiring a total time of about 4 to 6 hours. The retanning operation gives the tanner an opportunity to combine the desirable properties of more than one tanning agent into his leather. Coloring is accomplished with aniline-type dyestuffs which combine with the skin fibers to form an insoluble compound which becomes part of the skin itself. Fatliquoring is a process by which the fibers are lubricated; the fatliquor contributes greatly to tensile strength of leather.

11. Setting Out - (Object: Smooth and remove excess moisture.) Setting out puts leather into the proper condition for drying.

12. Drying - (Object: Removal of all but equilibrium moisture.) Leather drying can be accomplished by different methods. The method that is chosen will have a bearing on the final characteristics of the leather.

13. Conditioning - (Object: Introduction of controlled amounts of moisture.) The shoe manufacturer requires varying degrees of softness or temper. The conditioning of leather, sometimes called wetting back is the first step in adjusting for the final temper.

14. Staking and Dry Milling - (Object: Mechanically soften the leather.) Leather is staked to make it pliable. In combination with the correct fatliquoring treatment, staking governs the final firmness or softness of the leather.

15. Buffing - (Object: Smooth the grain surface by mechanical sanding.) Some skins have natural healed scratches or parasitic damage in the grain of the leather. To improve its final appearance it is frequently desirable to minimize such a condition by lightly buffing the grain surface of the leather.

16. Finishing - (Object: Application of film-forming materials to the grain to provide abrasion and stain resistance, and enhance color.) The type of finishing system that is employed is dictated by the nature of the skins and the intended end use.

17. Plating - (Object: Smooth the finished grain surface; also, produce varied grain textures.) Plating and embossing operations are carried out in presses capable of developing extremely high pressures - up to 300 tons per square inch.

18. Measuring - (Object: Determine the area of each side.) By the use of photoelectric cells and built-in computers, the square footage is measured for each individual side.

19. Grading - (Object: Determine the quality of the finished product.) Leather is graded for temper, uniformity of color and thickness, and the extent of any defects which appear in its surface.

ANNEX - III

BIBLIOGRAPHY - EFFLUENT DISPOSAL

Draft Development Document For Effluent Limitations Guidelines and Standards Of Performance. Leather Tanning and Finishing Industry, prepared by Stanley Consultants, Inc., for the U. S. Environmental Protection Agency, contract #68-01-0594 June, 1973.

Leather Tanning and Finishing Waste Management Research and Development Program EPA Technology Series 600/2-76-120, Industrial Environmental Research Laboratory, Office of Research and Development, EPA Cincinnati, Ohio 45268, September 1976.

Development Document For Proposed Effluent Limitations Guidelines and New Source Performance Standard for the Leather and Tanning Finishing, Point Source Category, EPA 440/1-73-015, November 1973.

Supplement For Pretreatment To The Development Document For The Leather Tanning and Finishing, Point Source Category, EPA 440/1-76/082, November 1976.

Economic Report - Impact of Water Pollution Controls on Selected Food Industries, Volume VIII The Leather Tanning Industry, for National Commission on Water Quality, June 1975, Development Planning and Research Associates, Inc.

Water Quality Strategy Paper, Second edition. A Statement of Policy For Implementing the Requirements of the 1972 Federal Water Pollution Control Act Amendments and Certain Requirements of the 1972 Marine Protection, Research, and Sanctuaries Act, EPA, Washington, D. C. March 15, 1974.

EPA Series: Leather Tannery Waste Management through Process Change, Reuse and Pretreatment. Industrial Environmental Research Laboratory, Office of Research and Development, U. S. Environmental Protection Agency, Cincinnati, Ohio 45268. EPA-600/2-77-034, January 1977.

Effluent Treatment For A Small Tannery, H. H. Young, Journal of the American Leather Chemists Association, Vol. 68, pp. 305-315 (1973).

Leather Tannery Waste Management Through Process Change, Reuse and Pre-treatment, James M. Constantin and George B. Stockman, Pfister and Vogel Tanning Company, Milwaukee, Wisconsin, January 1977.

Environmental Impacts and Policies For The EEC Tanning Industry, prepared for the EEC by Urwick Technology Management Ltd., Graham and Trotman, Limited, Publishers, 1977.

A Comparison of Tannery Chrome Recovery Systems, Max S. Maire, Journal of the American Leather Chemists Association, Vol. 72, pp. 404-418, 1977.

Industrial Pollution Control, Vol. 2: Technological Strategies, Ralph Stone and Company, Inc., Los Angeles, California, April 1977.