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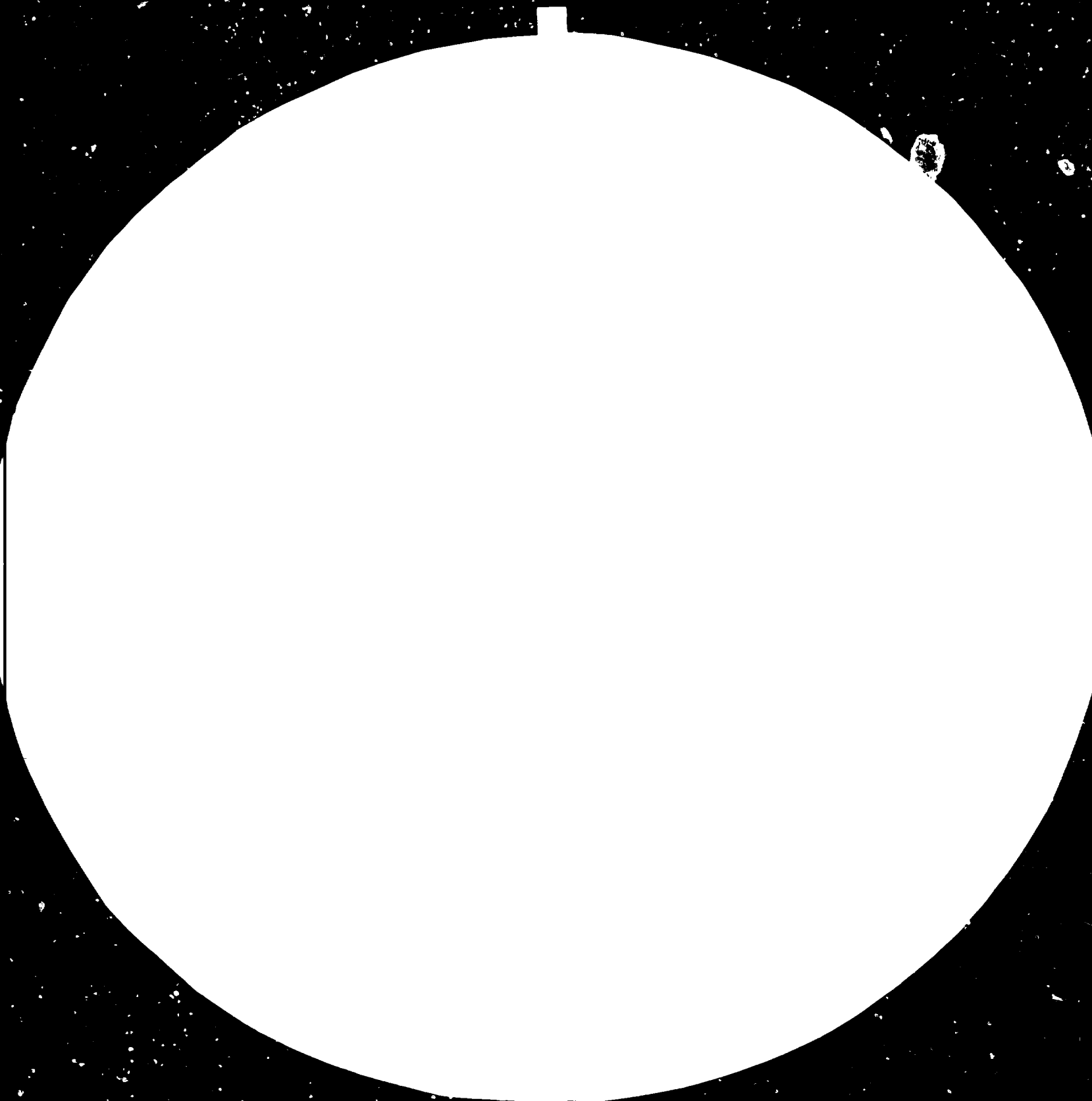
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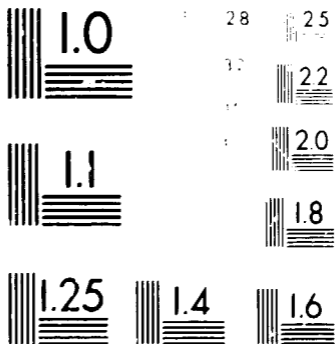
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Issue No. 2

MEASURES TO FACILITATE THE PRODUCTION AND ACQUISITION OF
TANNING CHEMICALS AND FOOTWEAR AUXILIARIES IN DEVELOPING COUNTRIES,
INCLUDING REGIONAL CO-OPERATION AMONG DEVELOPING COUNTRIES *

prepared by

the UNIDO secretariat

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I. SUMMARY

1. The issue paper examines the major constraints imposed upon the tanning and footwear industries in developing countries with regard to the acquisition of tanning chemicals and footwear auxiliaries, and suggests possibilities to alleviate these constraints through regional co-operation among developing countries.
2. With regard to tanning chemicals, it is suggested that the prospects for regional co-operation should be based on existing facilities within the regions concerned for the production of basic tanning chemicals. For more specialized chemicals, it may be more viable to formulate regional measures for improving the acquisition of the chemicals concerned.
3. The manufacture of footwear components in developing countries is considered to be both viable and necessary on technical and economic considerations; and regional co-operation is suggested in this area in order to optimize investments and the utilization of skills for the manufacture of these products.
4. The Consultation is asked to deliberate on:
 - Ways and means of promoting regional co-operation in the areas under discussion, with the involvement of partners from the developed and the more advanced developing countries;
 - The catalytic role which could be played by UNIDO in enhancing this co-operation.
5. The points for discussion proposed to the Consultation are included in para.33 of this paper.

II. BACKGROUND

6. The UNIDO Leather and Leather Products Industry Panel, at its Seventh Session, ^{1/} * endorsed the Secretariat's suggestion that the Third Consultation discuss the constraints imposed upon the tanning and footwear industries in developing countries with regard to the acquisition of tanning chemicals and footwear auxiliaries.

7. Given the fundamentally different nature of these two product groups the discussion of co-operation with regard to tanning chemicals is separated from that of footwear auxiliaries. This paper is supported by two background studies to which the reader is referred, for details. ^{2/}

III. TANNING CHEMICALS

Introduction

8. The constraints faced by developing countries in relation to tanning chemicals arise from two interrelated factors:

- In most instances tanning chemicals have to be imported by developing countries, and the scarcity of foreign exchange constrains the import of the required chemicals for the tanning process;
- A weak trading infrastructure in many developing countries prevents the timely availability of such chemicals, with consequent interruption of workflow and losses to the enterprises and national economies concerned. The unavailability of the right chemicals at the right time prevent the tanning enterprise from producing according to the tight delivery schedules demanded by the market.

9. Some developing countries have attempted to ease the situation by initiating import substitution in the chemicals industry with or without collaboration from foreign chemicals manufactures. However, this alternative is viable only when the production of leather is large enough to generate a sufficient demand and/or the country concerned has a suitable raw material base for engaging in economical production of certain chemicals. Furthermore,

* Notes are provided at the end of this paper.

the production of these chemicals requires the relevant support infrastructure for the chemicals industry. In addition it is necessary to have the process know-how for both the production and application of the tanning chemicals.

10. Another constraint on import substitution for tanning chemicals is imposed by the sheer variety of chemicals used in the tanning process. These products include general chemicals (e.g. sodium, calcium and ammonium salts and various acids), basic tanning chemicals (e.g. chrome and other mineral salts and vegetable tanning materials), petrochemical based products (e.g. retanning agents, syntans, dyes and finishes), bactericides and animal and vegetable oils based products (e.g. fatliquors) ^{3/}.

11. These chemicals are principal or by-products of different source industries, and many of them are produced for a wide range of industrial usages, with the tanning industry generating only a small portion of the total demand for them. As a result, it is impossible to view an individual industrial installation as being capable of producing the entire range of chemicals required by the tanning industry of a given country.

12. Thus, the alleviation of the constraint on the availability of tanning chemicals through import substituting production can be undertaken at the national level on three conditions, i.e.:

- That the size of the tanning industry be large enough to generate the volume of demand justifying the economies of scale required for the manufacture of tanning chemicals by modern production technology;
- That the chemicals or other source industries be large and diversified enough to respond to the needs of the tanning industry;
- That capital be available for investment in the chemicals industry.

13. These three conditions are met in very few developing countries. For most other developing countries, a more realistic approach would lie in regional co-operation with regard to the production and acquisition of certain chemicals. Given the complexity of the subject under discussion, this issue paper touches upon the following points:

- Present and future demand for tanning chemicals in developing countries;

- Potential possibilities and constraints for production of tanning chemicals in developing countries;
- Possible areas for regional co-operation.

Demand for tanning chemicals ^{4/}

14. A crude estimate of future demand for tanning chemicals by various regions may be derived by projecting the growth patterns of the leather industry.

Based on FAO data, projections to the year 2000 suggest that:

- World demand for tanning chemicals can be expected to grow by about 33 % over the period 1980-2000;
- The demand by developing market economy countries will grow about 55 % and that of the Asian centrally planned economy countries will grow about 35 % over the period;
- The share of developing countries (including Asian centrally planned economies) in world demand for tanning chemicals should increase from less than 45 % in 1980 to over 50 %, by the year 2000.

15. However, the composition of world demand is very difficult to estimate due to at least three factors:

- Changes in the variety of leather articles produced and tanning processes applied;
- The effects of product innovations and process changes, such as the substitution of chrome salts by vegetable/non-chromium mineral tannages, or the reduction of chromium salts used in the tanning process;
- The composition of global production of leather. For example, a fundamental consideration is the extent to which developing countries will be able to produce finished leather, as opposed to producing mainly semi-finished leather for export markets.

16. Despite these qualifications, it should be noted that the developing world will generate a higher growth in demand than the developed world over the next two decades and that the developing countries will account for about half the world demand for certain tanning chemicals.

Potential possibilities and constraints for production of tanning chemicals in developing countries

17. The relevant chemicals, from the point of view of the tanning industry, are:

- Basic mineral and vegetable tanning materials;
- Oils and fatliquors;
- Syntans, dyes, finishes and auxiliaries.

18. The general chemicals listed in annex I are not discussed in the present context, since they are produced by numerous source industries, over the development of which the leather industry has negligible determining effect. The most important chemicals for basic mineral tannages are various chromium salts. It is estimated that the tanning industry uses about 25 per cent of world production of chromium chemicals. Among the factors which favour the enhanced production of chromium salts in the developing world are the availability of chrome ore and the existence of facilities for production of chromium salts in some developing countries. This potential is offset by the disadvantages posed by the high investment and energy requirements of the chrome reduction process, the economies of scale accruing to large volume chromium salts production and the technical control that needs to be exercised over the process of transformation of chrome ore into chromium salts of the consistent quality needed in tanning. In other words, substantial investment and technological constraints exist on the expansion of the production of these chemicals in developing countries. For this reason, it would be realistic to base strategies of co-operation, at the regional level, on the basis of existing chrome transformation facilities available in the region, and to engage on a case-by-case examination of the feasibility and modalities of such co-operation.

19. The prospects for developing country production of vegetable tanning materials are more optimistic on production criteria alone. Most developing countries have vegetable substances which could be used to produce tanning materials. In addition, long standing research efforts have been devoted to the development of alternative vegetable tanning materials to the conventional Quebracho, Mimosa and Chestnut based products, so at least the theoretical possibilities for import substitution exist, based on the utilization of

indigineously available vegetable substances. The disadvantages with regard to this group of chemicals arises from the shrinking demand for vegetable tanning materials by the leather industry, and the varying performance characteristics of tannages derived from the non-conventional (non-QMC) sources.

20. Import substitution in oils and fatliquors seems a good prospect. Most developing countries have the resource base from the output of their edible oils and fats industry: The treatment of these oils and fats for usage in leather production involves a relatively small capital investment. The major constraint would be in the volume of demand provided by the tanning industry.

21. Syntans, dyes, finishes and auxiliaries are mostly petrochemical based products and modern production technology relies on integrated plants producing diversified product ranges. There are at least three important constraints on import substitution which need to be considered in this product category:

- In order to effectively meet the demand for such products, the production facilities should be able to diversify over the product ranges required by the market;
- Both the plant and process technologies for these products are expensive, and require considerable investment;
- The advantages of import substitution may be offset by the potential losses that could be incurred by applying chemicals with non-optimal characteristics in finishing leather.

22. On these considerations it is suggested that in most instances, developing countries may have to rely on strategies for improved acquisition and availability, rather than attempting the production of these chemicals.

Possible areas for regional co-operation

23. With the exception of four or five of the largest developing countries (where there is already a significant production of tanning chemicals), the volume of market demand in individual developing countries strictly limits the scope for economically efficient production of tanning chemicals. Thus, substitution for imports will have to rely on a pooling of regional demands and regional co-operation. This regional co-operation, with the support of

the developed and the more advanced developing countries, could operate at two levels:

- To examine and implement policies of import substituting production in chemicals such as basic tanning materials, using in the the first instance, established chemicals production facilities in a given region;
- To advance strategies of improved acquisition, such as joint purchasing, warehousing and distribution for more specialized chemicals, for which the technology and performance characteristics are too sophisticated to undertake viable manufacture in the region.

24. These areas need to be empirically investigated at the regional level. Should the Consultation feel that the prospects warrant further examination, UNIDO could initiate regional deliberations with the tanning and chemicals industries in order to enhance the prospects for the co-operation outlined above, and ascertain the interest of partners from developed and the more advanced developing countries in such co-operation.

IV. FOOTWEAR AUXILIARIES

Introduction

25. The production of footwear auxiliaries is considered important on similar considerations as those for tanning chemicals. In addition, a specific characteristic of the footwear industry in the industrialized countries at least, has been its evolution towards becoming a sort of assembling industry, i.e. shoe manufacturers no longer produce components such as unit soles, insoles, stiffeners (counters and toe puffs) and in some cases, even contract out the production of stitched uppers. Not only has here been a specialization process in the production of such footwear components, but there has been an enhancement of the linkages between the footwear industry and the woodworking, plastics and metal working sectors, in addition to its traditional links to the tanning industry.

26. In contrast in developing countries, the footwear industry tends to produce most of the necessary components within its own production units, and others are usually imported from the industrialized countries. There are major problems with this approach:

- When footwear units produce their own components, production is usually economically inefficient, especially when production runs are oriented to the demands of individual small and medium scale footwear manufacturing units;
- The quality and fashion standards of these components are not up to international standards, which is an impediment to the exportability of final products;
- In the case of imported components such as lasts, the configuration or specifications of foreign manufacturers do not fit the needs or fitting requirements of the domestic population;
- As is well known, components imported from different foreign manufacturers are incompatible, and many developing country footwear manufacturers face problems in trying to produce footwear with incompatible components. For example, unit soles imported from one manufacturer will not, unless made to specific measurements, fit the lasts imported from another, and the tooling of other components is unsuitable or difficult to engineer.

27. It is argued that in order to develop a more rational and comprehensive infrastructure for the footwear industry, developing countries should embark on the manufacture of footwear components whether on an individual basis or within the framework of regional co-operation. The balance of this section outlines the main possibilities and constraints on the production of footwear components.

Potentials for the production of footwear components in developing countries

28. The basic footwear manufacturing accessories and footwear components are manufactured by specialized industries using wood, plastics, metal, leather etc. as their raw materials. These raw materials are easily available in most developing countries and do not place a constraint on the manufacture of footwear components.

29. The major potential advantage in the manufacture of components are:

- The investment requirements for equipment to manufacture most components are relatively low, and can easily be sustained at a regional level or at the national level for those countries with a relatively large footwear industry;
- Most components can be manufactured with different technologies, and the scale of production can be varied to suit different market sizes;

- Component manufacturing plants need not concentrate on only one product. Due to alternative raw materials (e.g. plastic instead of wooden lasts) and product adaptability, it is possible to combine the production of several types of components within one industrial unit, thus providing for a rational use of investment and manufacturing skills. 5/

Constraints on the manufacture of components

30. The major constraint on the manufacture of components lies in the know-how and technical skills of manufacturing and not in the physical investments involved. For this reason, it is argued that a collaborative effort by footwear manufactures to create commonly available focal points of specialized manufacture is preferred over the alternative of self-sufficiency at every stage.

31. There are four main areas where constraints may be envisaged:

- The technical know-how for the manufacture of most components is acquired by practice, rather than theoretical training, and most footwear accessories require manufacturing within precise and mutually consistent parameters. Lasts, for example, must be designed in accordance with the fitting requirements of the consumer population;
- There is a need for an effective co-ordination between raw material suppliers, components manufacturers and the footwear industry;
- The fashion element of footwear manufacture can be influenced by component manufacturers. This means that components manufacturers must be aware of and able to set and respond to fashion trends;
- Finally, the need for product diversity and innovation requires a necessary element of creativity in components manufacture. This is a skill, which like entrepreneurship, cannot be taught easily.

32. On the basis of preliminary investigations of the subject, it is concluded that the manufacture of all types of footwear components is a technically and economically feasible prospect for developing countries. Component manufacture already exists in some of the more advanced developing countries, and technical co-operation could be visualized between these countries and other potential manufacturers of footwear components, in addition to collaboration offered by component manufacturers in industrialized countries. It is suggested that an active programme of regional co-operation should be developed in this area.

Points for discussion

33. The Consultation is invited to consider the following points, taking into account UNIDO's catalytic role in international co-operation:

- (i) What are the possibilities and constraints on implementing policies of regional co-operation, among developing countries, for import substituting production of certain tanning chemicals? For which chemicals would import substituting production be more viable?
- (ii) For specialized chemicals, would it be possible to implement regional policies for improved acquisition from the industrialized countries?
- (iii) To what extent are developing countries prepared to co-operate on a regional basis for the manufacture of footwear components along the lines suggested in this issue paper?
- (iv) Would producers of tanning chemicals and footwear auxiliaries from industrialized and the more advanced developing countries have an interest in participating in such regional co-operation?

Notes

1/ Report of the Seventh Session of the Leather and Leather Products Industry Panel, Vienna, Austria, 14-16 December 1983 (UNIDO/PC.86).

2/ See the background studies "Strategies for Increasing the Production of Tanning Chemicals in Developing Countries" (UNIDO/IS.448) and "Component and Auxiliaries Manufacture for the Shoe and Other Leather Products Industry in Developing Countries" (ID/WG.411/3).

3/ See annex I for a listing of the chemicals.

4/ Estimates of productwise demand can be found in the statistical annexes of the background study, UNIDO/IS.448.

5/ For an illustration of the combination possibilities in footwear components manufacture, see table 2, p. 29, of the background study.

Annex I

Chemicals and tanning materials for leather production per unit of hide;
factors used in deriving total requirements *

Chemicals/materials		Heavy leather	Light leathers raw hides
		kg per 100 kg	
<u>General purpose chemicals</u>			
Sodium sulphide	Na ₂ S	3.0	3.0
Calcium hydroxide	Ca(OH) ₂	4.5	4.5
Hydrochloric acid (con)	HCl	0.3	0.3
Ammonium sulphate	(NH ₄) ₂ (SO ₄)	2.0	2.0
Sodium bisulphite	NaHSO ₃	1.5	1.5
Sodium chloride	NaCl	15.0	15.0
Calcium formate	Ca(COOH) ₂		2.0
Sulphuric acid (con) 96%	H ₂ SO ₄	4.0	4.0
Sodium carbonate	Na ₂ CO ₃		2.0
Sodium sulphite	Na ₂ SO ₃		2.0
<u>Basic tanning materials</u>			
Chrome salts	Cr ₂ (SO ₄) ₃		10.0
Vegetable tanning materials**	12.0	3.0	
<u>Performance chemicals</u>			
Bates		0.8	0.8
Bactericides		0.3	0.3
Syntans**			3.0
Fatliquors			4.0
		kg per 100 kg shaved weight	
Dyeing auxiliaries			3.8
Dyes			0.6
Finishes			4.0

Source: Appendix Table A2, UNIDO/IS.448.

* Due to a variety of recipes and change in fashion, colour, etc., the actual amounts of chemicals and tanning materials per unit of hide vary within rather wide ranges; the unit values given in the table should be considered illustrative only.

** It has been assumed that on aggregate for all light leathers the use of vegetable tanning materials will equal the use of syntans. Hence the use of 6 kg of each material needed per 100 kg raw hides has been shown as 3 kg per 100 kg raw hides for each of the two materials.

