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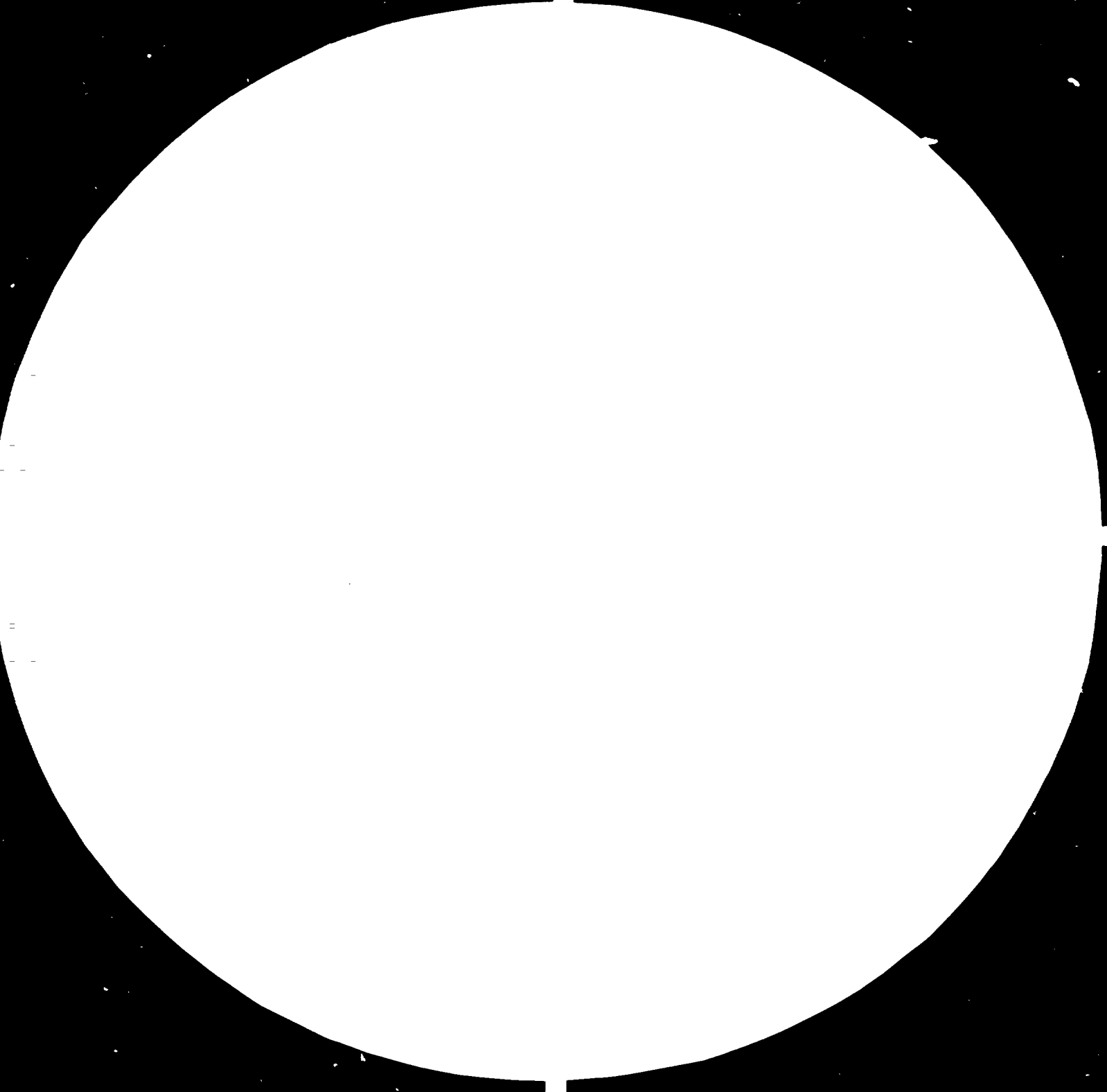

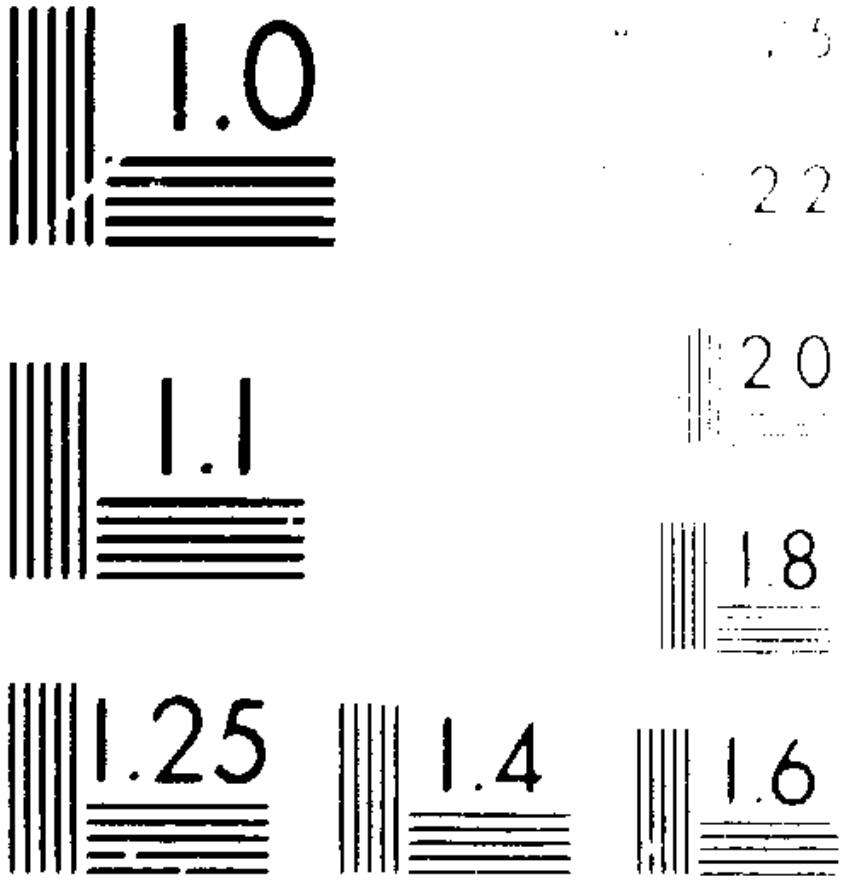
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May 1982
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BSMI-UNIDO QUALITY CONTROL AND
PRODUCTIVITY IMPROVEMENT PROJECT
DP/PHI/77/007/11-03

Terminal Report

Philippines: SMALL SCALE TANNING INDUSTRY

Prepared for the Government of Philippines
by the United Nations Industrial Development Organization,
executing agency for the United Nations Development
Programme

Based on the work of Victor Dumoulin, Leather
Tanning Expert

United Nations Industrial Development Organization
Vienna

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This report has not been cleared with the United Nations Industrial Development Organization which does not, therefore, necessarily share the views presented.

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## EXPLANATORY NOTES

### Value of the Philippine Peso

1 Peso = 0.1188 US$

### Acronyms

| | | |
|---|---|---|
| BAI | - | Bureau of Animal Industry |
| BSMI | - | Bureau of Small and Medium Industry |
| FLTDC | - | Footwear and Leathergoods Training and Demonstration Centre, US/PHI/79/109 |
| KKK | - | "Kilusang Kabuhayan at Kaunlaran" Movement for Livelihood and Progress |
| MTI | - | Ministry of Trade and Industry |
| NACIDA | - | National Cottage Industries Development Authority |
| PSA | - | Philippine Standards Agency |
| ₱ | - | Philippine Peso |
| SBAC | - | Small Business Assistance Center |

### Remark

Mention of companies or trade names in this report and annexes does not imply any endorsement from the UNIDO.

ABSTRACT

This report refers to a four-month mission (February - June 1982) within the BSMI-UNIDO Quality Control and Productivity Improvement project no. DP/PHI/77/007/11-03.

The purpose of the project is to strengthen the capabilities of the small tanneries by providing them in-plant consultancy services and the conduct of short term training course on basic tanning principles.

The main conclusions and recommendations are:

1. raw hide and skin improvement,
2. establishment of hide semi-processing plants,
3. adjustment of import costs on raw materials and chemicals,
4. technical assistance to the small and medium tanneries,
5. establishment of a leather testing laboratory, and
6. extension of UNIDO technical assistance:
   - 12 m/m in modern leather technology,
   - 12 m/m in leather testing (already forseen for 1983 in FLTDC project)

   with corresponding counterpart fellowships.

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## INTRODUCTION

In 1978, the Ministry of Industry included the leather and footwear as the fifth priority industry to be given a package of assistance by the then Commission of Small and Medium Industries.

Part of this assistance was planned through a CSMI-UNIDO project - Quality Control and Productivity Improvement for tanning, which was implemented in two phases:

- phase I, May - August 1979, UNIDO Leather Expert
- phase II, February - June 1982, UNIDO Leather Tanning Expert

The general study on the leather tanning industry conducted in phase I revealed that the major deterring factor in the introduction of in-plant quality control systems and modern technologies was the inadequate knowledge of small-scale tanners on basic tanning principles and appropriate methods of tanning.

The UNDP-UNIDO contributions covered the 8 man-month expertise at the current UNDP rate.

# I. ACTIVITIES

## A. Job description

| | |
|---|---|
| Post title | Leather Tanning Expert |
| Duration | Four months |
| Duty station | Manila, with travel within the country |
| Duties | The expert will be attached to the Bureau of Small and Medium-scale Industries (BSMI) of the Ministry of Industry and the Small-scale Tanners Association in Meycauayan, Bulacan. The expert should work in co-operation with UNIDO large-scale project US/PHI/79/109 - Footwear and Leather Goods Training and Demonstration Centre. He should co-ordinate his activities with the Chief Technical Adviser of that project. |

Specially he will be expected to:

1. Familiarize himself with the local small-scale tanning industry for which some data is already available.
2. Plan and implement a short-term training course on basic tanning principles and appropriate methods of tanning to be attended by entrepreneurs and supervisors of small-scale tanning establishments.
3. Provide in-plant technical consultancy services to selected small-scale tanning firms.
4. Provide recommendations on the implemented as follow-up projects by the BSMI.

The expert will also be expected to prepare a final report, setting out the findings of his mission and his recommendations to the Government for further action which might be taken.

Qualifications — Tanning expert with broad experience in all aspects of leather production and the tanning industry, with special regard to small-scale industries.

## B. Counterpart organism

The expert was assigned to the Bureau of Small and Medium Industries. He has received from the BSMI directoral, professional and administrative staff all the assistance needed for the implementation of his mission.

More particularly, the three counterpart personnels assigned to the expert were very effective ; proved to be very valuable aid.

## C. Analytical account of activities

1. Survey of the Philippine leather tanning industry, which has been detailed in the mid-term report (annex No. 6, contents)
2. In-plant technical consultancy services to selected small-scale tanning firms, refer to annex no. 5, list of small tanners visites and annex no. 7, contents of technical report: "Notes on Reptile Skin Tanning"
3. Seminar on Leather Tanning Technology, Meycauayan, Bulacan, 29th April 1982.

   T o p i c s :
   - ° Basic scientific notions of leather tanning technology
   - ° Preparation for tannage (beamhouse processes)
   - ° Vegetable tanning
   - ° Chrome tanning
   - ° Raw hides ans skins
   - ° Practical control of the tannery processes
   - ° Cost accounting

   refer to annex no. 8 for detailed contents

4. Seminar follow-up, in-plant technical training on correct application of modern leather tanning technology and practical control of the tannery processes in small and medium tanneries.

5. Preparation of various reports and lectures:
   - mid-term report (annex no. 6)
   - technical report "Notes on Reptile Skin Tanning" (annex no. 7)
   - 5 seminar lectures (annex no. 8)
   - list of basic equipment for a leather testing laboratory (annex no. 5)
   - terminal report
   - technical notes on physical and analytical testing of leather (annex no. 3)

# II. FINDINGS

## A. Raw hides and skins

A survey of the Philippine leather tanning industry has been detailed in the mid-term report (refer to annex no . 6) therefore, only the more important points are mentioned below:

### 1. Local production

The cattle population in 1980 was estimated to be 1,882,860 cows and 2,870,270 carabaos (water buffalos) with a FAO estimated slaughtering of 570,000 cows and 310,000 carabaos while the official figures in registered National Meat Inspection are: 204,935 cattle and 132,645 carabaos. (refer to annex no. 2, statistic A, C and D).

The local supply of cattle hides (cow and carabao) is insufficient to cover the needs of the leather tanning industry. This chronic shortage is further aggravated, since 1980, by the government ban on the slaughtering of carabaos (not yet reflected in the available statistics). As such, tanneries are working far below their installed capacity, from 20 to 60%.

The production of goats skins is as low as 100,000. skins per year, approximate 20% of the goat slaughtering. FAO estimated for 1980 are: goat population 1,450,000 with a slaughtering of 510,000, official slaughtering being only 50,703 (refer to annex no. 2, statistics C and D)

The production of snake and lizard skins has not been evaluated, but is significant. Several small tanneries are specialized in reptile skin tanning. The exports of reptiles and aquatic animal skins amount to $559,679 in 1980 (refer to annex no. 2, statistics F).

### 2. Quality of local hides

The quality of the cattle hide is very poor due to:

- defects existing on the five animals, specially insect bites,
- flaying defects,
- preservation damages

Because of the grain defects, most of the hides have to be finished in "corrected grain" thus, losing the natural beauty of genuine leather.

The flaying defects considerably reduce the split yield and the output of finished leather.

To sum it up, the raw hide defects redound to at least 30% reject of the finished leather by the shoe and leathergoods manufacturers.

It is also worth noting that the quality level of raw hides vary with their origin, for example Mindanao hides have usually more flaying defects and putrefaction damages than Luzon hides.

3. Commercialization of raw hides

The hide dealers simply collect, salt then sell the hides in bulk, by piece or by weight. The hides are not identified, weighted, classified, quality checked and stored in batches of the same type and weight as in countries where developed tanning industry exists. In the Philippines, the dealers are merchants and not professional hides and skins dealers.

4. Imports of raw hides and skins

The shortage of raw hides could be compensated by imports e.g. from Australia, U.S.A. or Canada. Imports could also provide an increase in the production of "full grain" quality leather. Nevertheless, the imports are minimal due to:

- world price for raw hides and skins,
- high import costs, the 10% import duties are topped by an advance sale tax of 10%, freight cost, brokerage, bank and insurance charges and very high cost of money (23-24%)
- local market orientation towards cheap leather, there is no quality consciousness.

Even large tanneries find importation of raw material very prohibitive. Only one medium sole leather tannery is currently importing heavy raw cow hides.

The drastic reduction of raw hides imports is reflected in the statistics, from 3,512,557 Kg. in 1976 down to 876,330 Kg. in 1980, according to the Tanners' Association of the Philippines the figures are still decreasing (refer to annex no .2, Statistics E).

## B. Chemicals

Most of the needed tanning chemicals are available. However, some shortage occur for few chemicals such as vegetable tanning extracts.

The main problem is the high import costs (refer to A.1.4), aggravated by the higher import duties ranging from 20 to 90%.

Since pricing to end consumers are inversely related to volume, the small tanners pay up to 50% higher retail prices.

## C. Philippine leather tanning industry

### 1. Structure

The size of the enterprises varies from artisan opendoor workshop processing few hides per week up to industrial tanneries completely mechanized with the facilities to produce up to 800 hides (12 metric tons) per day.

This wide scale of enterprises is reflected by the existence of two associations of tanners.

- the Tanners' Association of the Philippines, composed of industrial tanners,
- the Small Tanners' Association of the Philippines, the membership of which are the partly mechanized tanneries usually NACIDA registered which entitle them for five-year sales tax exemption, the use of NDC-NACIDA Raw Material Corporation for bulk purchase of raw materials (tax exempt if finished product for export) and the availment of soft loan i.e. Cottage Industry Guarantee Loan Fund.

2. Location (refer to annex no. 1, maps 1, 2, and 3)

The location of the industrial and partly mechanized tanneries is very much concentrated within a limited area North-West of Metro-Manila: Meycauayan, Guiguinto, Malabon, Navotas, e.g. almost 80% of the tanneries are located in Meycauayan, Bulacan.

This specific location of the leather tanning industry is mainly due to the propagation of leather technology developed by a few tanneries about 30 years ago.

3. Machinery and equipment

Few big tanneries have the standard equipment of industrial tanning plants, rather somewhat obsolete machines than up-to-date ones. The lay-out of these tanneries are usually satisfactory to ensure a correct flow of the production.

By contrast the small tanneries lack essential machines and are bound to rent machinery services from more mechanized tanneries. The lay-out is often dreadful, a join of equipment, pile of hides and leather, chemicals, wastes, etc. within inadequate premises.

4. Production capacity

Industrial production figures are not available and an accurate estimate of the total capacity of the leather tanning industry will require an exhaustive survey. Nevertheless, according to the Tanners' Association, the industrial tanneries presently operate below 50% of their normal production because of the shortage of raw hides and skins and the depressed market. The present production would be from 16 to 20 million square feet of chrome leather and approximately 400 to 500 metric tons of sole and insole leather, which is about 60% of the estimated production of 30 million square feet (based on a 1979 report).

The increase in imports of finished leather reflects the decline of the local leather tanning industry, the imports of sole leather increase from 65,101 Kg. in 1977 to 100,546 Kg. in 1980, while the imports of upper leather increase from 878 Kg. in 1977 to 40,042 Kg' in 1980 (refer to annex no. 2, Statistics G).

## D. Technical know-how

Leather tanning is not a manufacturing industry, like shoe and leathergoo s making which mainly require skill, but a complex chemical industry. The tannery technical managers must be able to control the numerous chemical processes of the leather tanning, logically they should be leather technologists.

In the Philippines, only two industrial tanneries employ technical managers who have received from abroad academic degree in leather tanning technology.

All the owners of small and medium scale tanneries got their know-how by experience. Most of them do not know:

- the basic tanning principles,
- how to control the chemical processes,
- how to improve the leather quality
- how to adapt their production to modern techniques, to fashion types of leather, and
- how to organize theproduction flow

To solve their technical problems the Small Tanners are generally dependent on the leather technicians supplying chemicals.

## E. Quality control

### 1. Process quality control

During leather tanning, the numerous operations should be carefully controlled, particularly the chemical processes, to ensure a better and reproduceable uniform quality.

Except in some industrial tanneries, there is no systematic control of the leather tanning operations.

Very few small tanners use the ordinary type of pH paper and sometime phenolphtaleine solution for checking the deliming.

2. Quality of the finished leather

2.1 The finished leather is rather of poor to very poor quality, especially the one produced by the small tanneries. This low quality level is mainly due to:

- poor quality of the local raw hides
- production of cheap leather to meet the market demand
- limited technical know-how in most tanneries
- poor organization of the production in many small tanneries
- none or insufficient quality control during the leather tanning manufacture, and
- lack of adequate machinery

2.2 A significant proportion, if not a majority of tanners, merchants of finished leather and manufacturers of leather products are only interested in quick sale at low price of inferior quality leather or leather products.

This orientation is dangerous for the whole leather industry. This contributes to the bad reputation of the Philippine leather, which, in is already achieved.

The consumer confidence in leather, as a material is eroded thus, created a demand for the use of synthe-tics of reasonable quality in place of leather.

On the other hand, the shortage of raw hides should induce the tanners to increase the value of their leather production. In fact, the tanners producing inferior quality leather are wasting the scarce Philippine resources of raw hides and skins.

2.3 Presently, few industrial tanneries with technical staff and complete machinery line posses the technology to manufacture quality leather suitable for shoe and

and leathergoods export market, provided that they have good quality imported raw hides and chemicals at competitive price and that the local market accept to pay the price of the quality.

3. Quality control of the finished leather

Presently, in the Philippines, there is no laboratory which could control the quality of a finished leather, able to determined if the leather meets the requirements for the manufacture of shoes or leathergoods. Such important figures as tensile strength, tear resistance, lasting solidity, dry and wet rubbing fastness, etc. cannot be determined.

The impossibility to quantify the quality levels of a leather is very detrimental for the improvement of the quality of the local leather.

It is still more important to be able to determine the quality levels of the leather intended for export shoes and leathergoods; a foreign market is easily lost by one supply of raw quality products.

## F. Environmental impact and wastes utilization

The leather tanning is a highly polluting industry producing:

- large out flow of very polluted effluent with salt, chemicals, organic matters consuming oxygen, suspended solids,
- important volume of solid wastes; untanned and tanned' trimming, more sludges from effluent treatment
- sometimes obnoxious smells

The most polluting operations are the beamhouse processes responsible for 75-80% of the organic pollution. Next is the chrome, vegetable or combination tannage.

In the Philippines, the environmental impact is amplified by the concentration of the leather tanning industry in a relatively small and populated area. The problem becomes more particularly acute in Meycauayan where more than 30 small, medium and industrial tanneries are located.

The efficient treatment of the tannery effluents is very expensive in terms of capital investment and operating costs, unfortunately there is no-cheap and efficient system available e.g. the effluent treatment plant installed in Meycauayan by an industrial tannery amounts to US$120,000. and its operating costs up to ₱15,000 per month.

Several small and medium tanneries in Meycauayan have installed scant effluent treatment system whose efficacity remains questionable.

A good point worth mentioning regarding the environmental impact of the solid wastes is the installation by an industrial tannery of a glue plant which disposes of the untanned wastes from the leather tanning industry.

# III. CONCLUSIONS

## A. Raw materials and chemicals

### 1. Improvement of the quality and commercialization of the raw hides and skins production

The decline and poor quality of raw hides and skins production are serious threats for the Philippine leather industry.

The loss for the national economy due to defects and wastages of raw hides and skins can be estimated to be 50% of the intrinsic value of raw hides and skins production. This is a tremendous loss when one considers that hides and skins are the basic raw materials for an important industry. An industry of high employment rate transforming local raw material into products of first necessity for the local population or for export.

1.1 The raw hides and skins improvement concerns the Ministry of Agriculture. It is a very difficult and long term task since progress can be expected to be slow because of:

- the geographical dispersal of the livestock
- sociological and financial problems
- the low monetary returns of the hide compared with the total animal value

Nevertheless, every possible effort in this field should be undertaken bearing in mind that there is no hope for an immediate result.

1.2 The dispersion of the livestock within the archipelago associated with the high concentration of the leather tanning industry is an unfavorable factor for raw hide quality. One can expect poorer quality of raw hides and skins when sources of raw materials are physically far from the tannery centres.

Most particularly when the raw hides and skins trade is not handled by professional hides and skins traders, but by merchants who care more for immediate profit than hides quality e.g. they do not classify the

hides so the tanners can prepare uniform batches of hides of similar characteristics as it is done in countries with developed tanning industry.

1.3 An immediate improvement of raw hides quality could be achieved by the establishment of semi-processing plants near the sources of raw hides, e.g. in Southern islands through KKK fundings.

These semi-processing plants will collect the raw hides in the area and go through the more polluting leather tanning process before selling these materials to the tannery centres in Bulacan and Rizal provinces, for further processing up to finished leather.

The preparation of raw hides and skins up to wet blue (wet chrome tanned hides, unfinished) or vegetable crust (e.g. through the Mimosa cure process which fix only the minimum of vegetable tan needed to prevent hide deterioration), presents several advantages:

- the proximity of the sources of raw hides:
  - ° lower the freight costs and the risks of putrefaction
  - ° promote better flaying by direct communication between the hides producers and users
  - ° enduce a more complete collection of the hides and skins in the region
- the semi-processed leather are usually classified by their quality, size and thickness which permit tanners to prepare appropriate working batches for the type of leather to be produced
- most of the polluting processes have already been executed, thus, minimizing the tannery pollution problem in highly populated tanning centre like Meycauayan.

The untanned wastes of the semi-processing plants could be sun dried and sold to the Meycauayan glue factory.

Feasibility study, plant lay-out, installation and starting operations could be assisted by UNIDO expertise later on.

1.4 The shortage of raw hides and skins creates a demand for other sources, but the prospects seems limited as explained below:

- better and complete collection of hides, it is expected that an unknown percentage of hide will not reach the tannery
- almost 80% of goat skins are consumed as food; perhaps collection must be improved and prices increased as incentive
- recovery of pigskins seems highly improbable as regard to the high prices fetched by "chicharon" as finished product.
- horse hide and sheep skin production is very low with the horse hides badly damaged
- exploration of the availability of special skins: seasnake, fish, frogksins, etc., and installation of crocodile farms, which seems quite feasible in Mindanao.

2. Import costs of raw or semi-processed hides and skins chemicals

2.1 The shortage of local raw hides and skins coupled with a drastic reduction of the imports of raw hides needed for production of "full grain" quality leather which are convenient for the manufacture of exportable leather products (refer to Finding A 4 ) leads to a considerable underutilization of the production capacity of the Philippine leather tanning industry, probably less than 50% of the installed capacity.

The high import costs is an important factor in the reduction of raw hides imports by the industrial tanneries while the small tanners who are NACIDA registered, cannot afford direct import due to lack of working capital.

2.2 Another factor worth considering is the duty and tax exempt imports of finished leather by the NACIDA registered shoe and leathergoods manufacturers for exports which place the local tanners in an unfair position. It is impossible for the tanners to compete with the abovementioned leather since they have to pay

taxes and duties on raw hides and skins plus up to 90% duty on tanning chemicals

The point is not at all to modify the NACIDA privileges but for the Government to study how to restore a fair competitive position for the finished leather produced locally by reducing the import costs of the raw hides and skins and the tanning and finishing chemicals.

Nevertheless, the production by the Philippine tanning industry of finished full grain leather of comparable quality to the imported ones and at a competitive price would be an asset to the national economy. Not only it will bring work to a local industry but it will also facilitate the manufacture of fashion leather products in the required type and shade.

Here is an excerp of the UNIDO publication ID/179 entitled"Acceptable Quality Levels in Leathers". "Some developing countries actually hinder the production of good finished leather by imposing excessive import duties and import limitations on special chemicals and machines necessary for their production. The export revenue obtainable from finished goods far outweighs the revenue from import duties".

2.3 Most of the small tanners buy their chemicals at the retail price which can be up to 50% above the whole sale price. The Small Tanners' Association of the Philippines should organize a purchasing cooperative for bulk purchases of chemicals at whole sale prices.

## B. Technical know-how

### 1. Leather technology

The poor quality leather produced by most of the small tanners contribute to the bad reputation of the Philippine leather, harming the whole leather industry and downgrading

the limited possibility of local raw hides and skins.

The need for improving the empirical technical know-how of the small tanners is so obvious that the question is how to design a technical assistance as effectively as possible. The main points are:

- what means
- how long
- to whom

1.1 The technical assistance to be developed should be in-plant technical consultancy and practical training on the modern leather tanning methods, the control of the processes, the organization of the production flow, the plant lay-out, the machinery maintenance, effective effluent treatments.

1.2 The complexity of the leather tanning and the long duration of the process up to finished leather imposes a long term duration for a UNIDO technical assistance, for minimum of one year. The expert must also in-depth train a BSMI personnel, preferably a chemical engineer in Leather Tanning Technology.

1.3 The BSMI staff, chemical engineer should receive abroad a comprehensive training in leather tanning technology by following one of the intensive course specially designed for developing country participants, e.g. in Northampton, England or Madras, India.

As much as possible this training should be undertaken before the arrival of the proposed UNIDO expert, to be assigned to BSMI for 12 months. The counterpart should be able to take full advantage of the practical experience of the expert and take an active part in the in-plant works.

1.4 It has been mentioned early in this report that part of the smalltanners are quite eager to improve the quality of the leather they produce, while the other part is mainly concerned in making money by quick sales at low price of inferior quality leather. That goes without saying that the technical assistance should

be directed, in priority, to selected tanners of the first group.

2. Cost accounting

A technical assistance in cost accounting is also badly needed by the small tanning enterprises. The SBAC Region III activities in this field, initiated by the opportunity of the 29th April Leather Seminar in Meycauayan, has to be continued and developed.

3. Effluent treatment

The environmental impact of the highly polluting leather tanning industry is particularly acute in the town of Meycauayan where about 80% of the tanneries are located.

Most of the small and industrial tanners have superficial knowledge about correct tannery effluent treatment and the efficiency of the systems they use, when applied, is quite questionable.

The existing so called "effluent treatment" should be reviewed by specialist to increase their efficiency.

Consideration should be given to the possibility of establishing efficient communal effluent treatment facilities in determined Barangay where a high concentration of small tanneries exist e.g. Bancal Barangay in Meycauayan.

It is worth mentioning that the use of wet-blue or vegetable crust will reduce the pollution load of finished leather production by at least 80%. Thus, the use of semi-processed leather by Meycauayan tanneries could alleviate their crucial pollution problem.

## C. Quality control

1. In-plant quality control

To improve and ensure consistency of leather quality, a careful control of the various processes from the raw hide state to the finished leather is absolutely necessary.

Since most of the small Philippine tanners do not know how to correctly control the various phases of the

leather tanning, training in this field would be part of the duties of the proposed one year UNIDO technical assistance (refer to Conclusion B 1.2)

2. Finished leather quality control by establishing a leather testing laboratory

2.1 The absence of leather testing laboratory hinder the development of the leather industry towards the production of quality leather products.

The control of the quality of the finished leather is indispensable:

- to re-orient the local market which is not quality minded
- to open the export market of products manufactured with local leather
- to strengthen the position of Philippine leather products on the World market.

2.2 The establishment of a Government leather testing laboratory is a first necessity. It is already planned to be located within the building of the Footwear and Leathergoods Training and Demonstration Centre. The location is quite appropriate, provided an adequate air-conditioned room (relative humidity 65 $\pm$ 2%, temperature 20 $\pm$ 2°C) is built which is essential for physical tests, both to condition the leather before testing and to standardize the conditions during testing.

A short technical note on physical and analytical testing of leather (refer to annex no. 3 for contents and excerpts) gives information about leather testing methods, standards and equipment.

The basic equipment of a leather physical testing laboratory and its estimates are detailed in annex 3.

The estimates of the basic physical testing equipment is approximately US$35,000.

2.3 With regards to the establishment of the leather testing laboratory, a UNIDO expert will be needed for:

- equipment installation

- debugging of equipment
- interpretation of the test results
- technical mediator between tanners and end-users
- counterpart training, counterpart staff should be headed by Chemical engineer.

The UNIDO expert for the leather testing laboratory should not arrive at FLTDC before:

- the Government will have completed the building for the leather testing laboratory and equipped it with an appropriate air-conditioning system (relative humidity 65 $\pm$ 2%, temperature 20 $\pm$ 2°C)
- the UNIDO physical testing equipment will have have been avilable for installation.

## IV. RECOMMENDATIONS

1. Raw hide and skin improvement

Strengthening of the animal protection against insects damaging the hide grain (ticks) and promotion of correct post-mortem treatment of the hides and skins (flaying, curing) by the Ministry of Agriculture. (refer to Conclusion A 1.1)

2. Establishment of hide semi-processing plants

Feasibility study on establishment of hide semi-processing plants near, the sources of raw hides in the Southern Islands e.g. in Mindanao through KKK. (refer to Conclusion A 1.3)

3. Adjustment of import costs of raw materials and chemicals

Study by the Ministry of Finance on the modification of the present duty and tax system on imports of raw materials and chemicals in view of increasing the utilization of the production capacity and restoring the competitiveness on the export market of Philippine leather products using local finished leather. (refer to Conclusion A 2)

4. BSMI technical assistance to the small and medium tanneries

by:

- in-plant training on cost accounting by SBAC (refer to Conclusion B 2)
- feasibility study on the establishment of a cooperative among small tanners for the bulk purchase of chemicals at whole sale price.(refer to Conclusion A 2.3)
- study in collaboration with the Meycauayan Municipality of the possibility of establishing efficient communal effluent treatment for tanneries located in the same barangays (refer to Conclusion B 3)
- extension of the technical assistance in leather modern technology and in-plant quality control in collaboration with UNIDO (refe to Recommendation 6).

5. Establishment of a leather testing laboratory

In an appropriate air-conditioned room within the Footwear and Leathergoods Training and Demonstration Centre

building.

The cost estimates of the basic equipment for the leather physical, testing section amount to US$35,000. (refer to Conclusion C 2)

6. Extension of UNIDO technical assistance

a. BSMI technical assistance to the small tanners

- 12 man-month expert in leather technology, assigned to BSMI for:
  - ° improving the technical know-how of small tanners on modern leather tanning techniques, effluent treatment and in-plant quality control (refer to Conclusion B 1)
  - ° assisting in feasibility study, lay-out, equipment, effluent treatment and possible establishment of hide semi-processing plants. (refer to Recommendation 2 and Annex 4 A for proposed job description)

An international or bilateral fellowship for the BSMI counterpart (chemical engineer) to attend an intensive course on leather technology, as soon as possible before the arrival of the UNIDO expert. (refer to Conclusion B 1.3)

b. Leather testing laboratory installation and operation

- 12 man-month expert in leather testing (already forseen for next year within the FLTDC project) as soon as the appropriate air-conditioned laboratory will be ready and the equipment available for installation. (refer to Conclusion C 2.3)

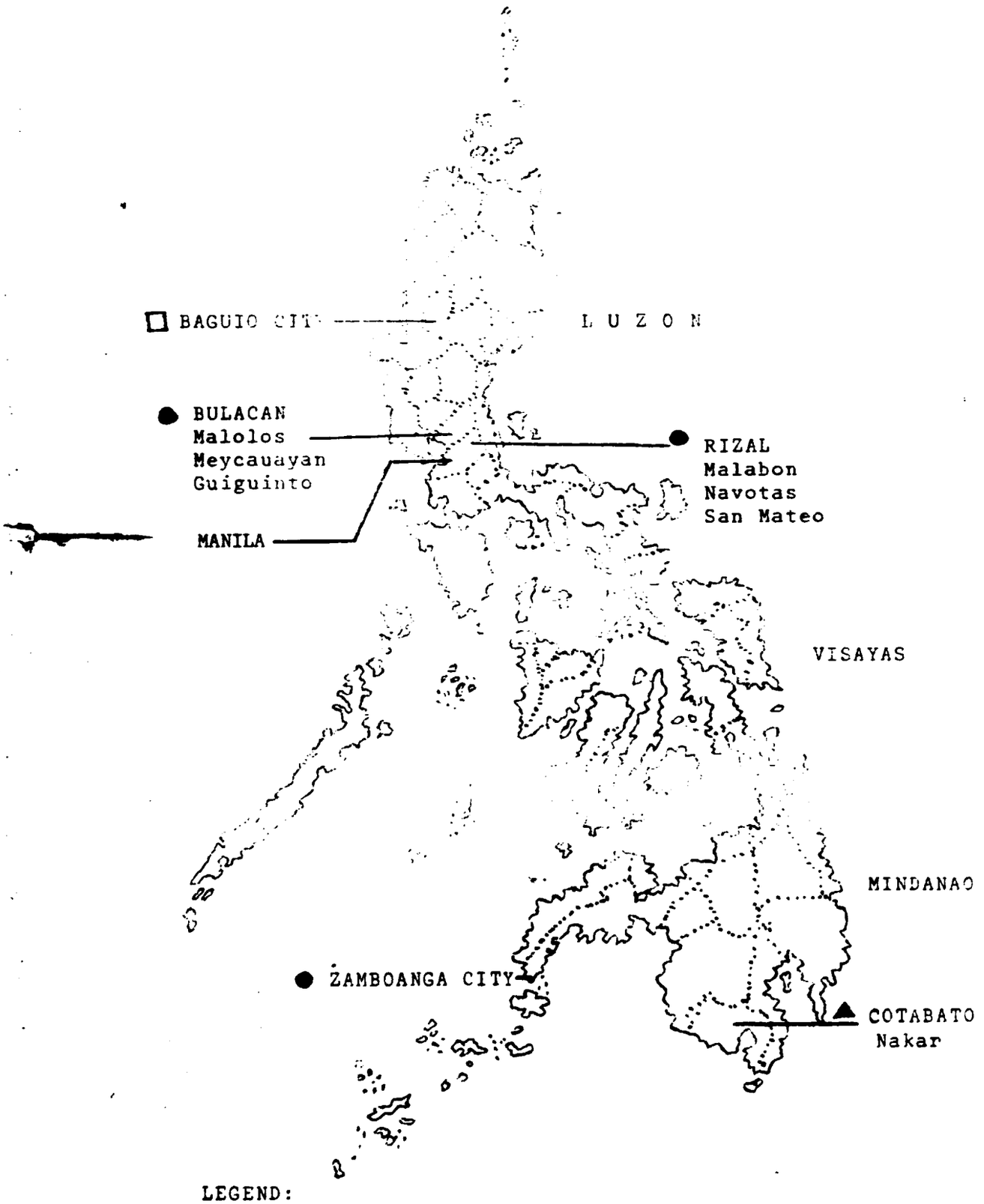
  The expert will:
  - ° assist in the establishment of the leather testing laboratory: equipment installation, debugging of equipment, interpretation of the test results,
  - ° act as technical mediator between the tanners and the leather product manufacturers, and
  - ° train counterparts

  (refer to Annex 4 B for proposed job description)
- 3 man-month fellowship for the chemical engineer who will be in charge of the leather testing laboratory.

# ANNEXES

ANNEX NO. 1

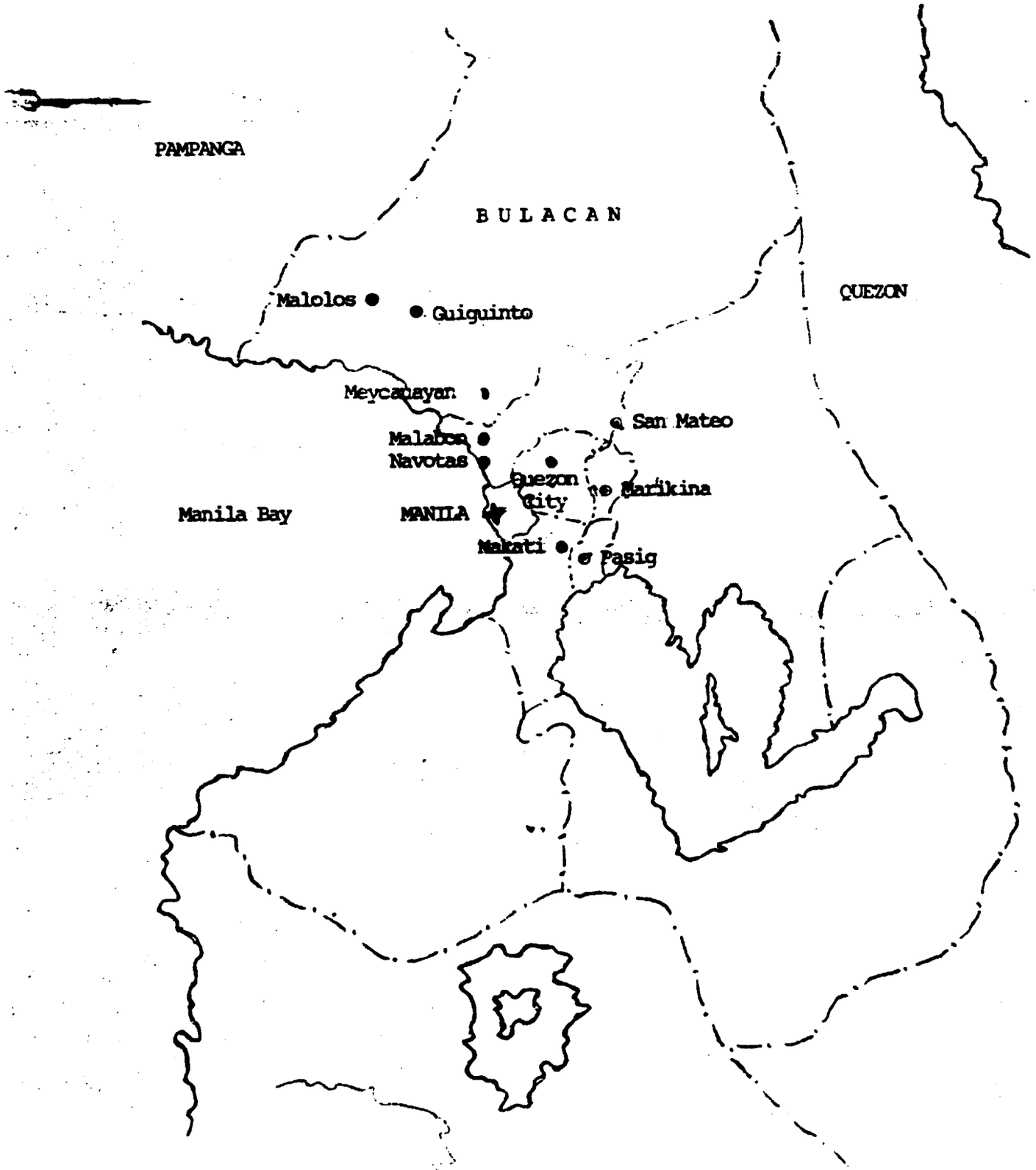
TANNERY SITES



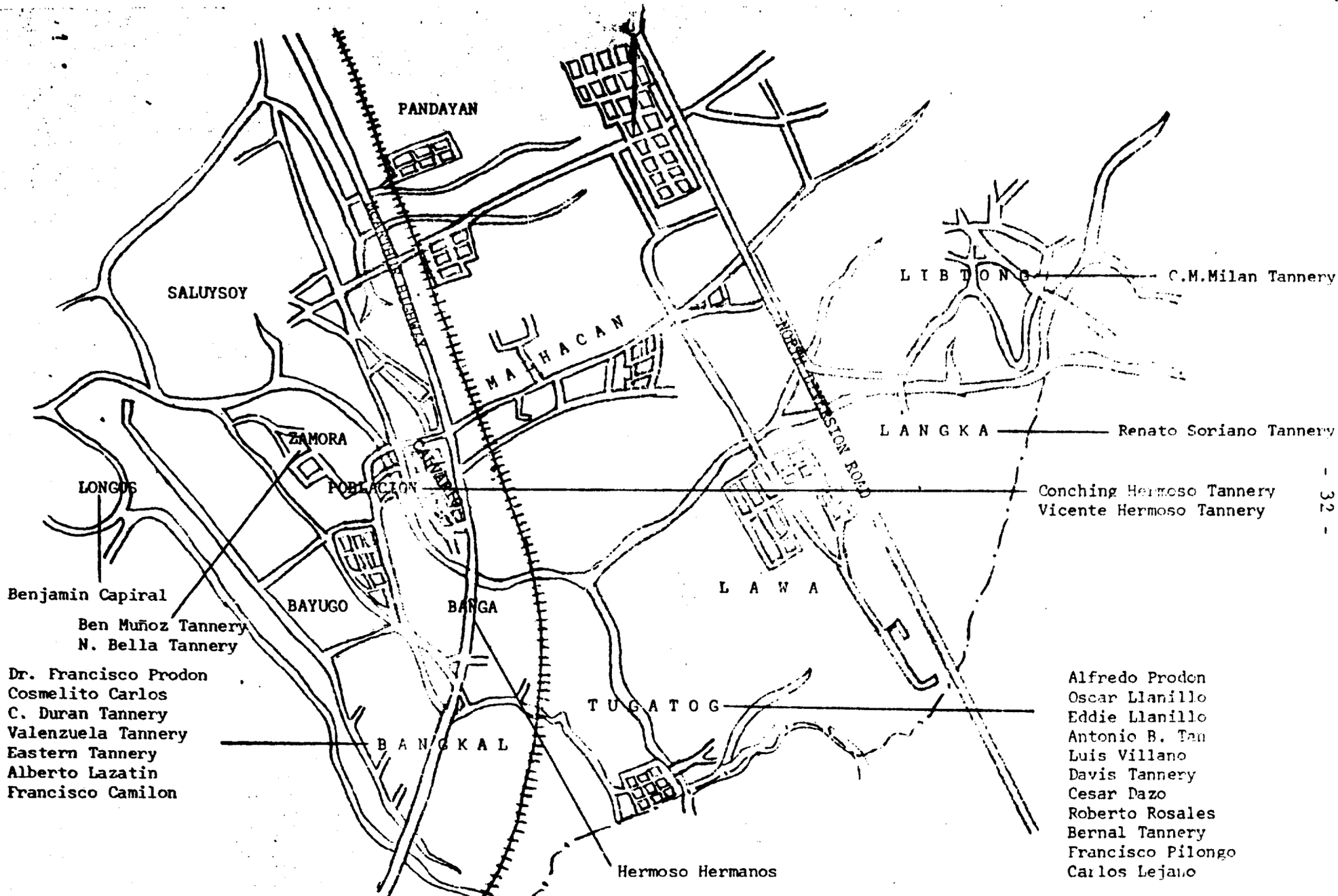

LEGEND:

- Suspended Operations
- Operational Sites
- Proposed Site

MAP I . REPUBLIC OF THE PHILIPPINES
Location of Leather Tanning Enterprises.




MAP II - • Main tanning areas.




MAP III - MEYCAUAYAN, BULACAN, the main Philippine Tanning Centre.

## ANNEX 2 STATISTICS

### A. LIVESTOCK POPULATION BY REGION

1977 - 1980

| R E G I O N | 1977 | | 1978 | | 1979 | | 1980 | |
|---|---|---|---|---|---|---|---|---|
| | CATTLE | CARABAO | CATTLE | CARABAO | CATTLE | CARABAO | CATTLE | CARABAO |
| PHILIPPINES | 1,723,360 | 2,897,390 | 1,820,210 | 2,958,720 | 1,833,210 | 2,803,260 | 1,882,860 | 2,870,270 |
| I l o c o s | 279,150 | 276,710 | 270,950 | 279,950 | 275,030 | 273,390 | 271,760 | 281,470 |
| Cagayan Valley | 166,760 | 477,390 | 172,140 | 458,580 | 189,620 | 425,820 | 161,150 | 432,400 |
| Central Luzon | 68,810 | 300,770 | 76,770 | 303,400 | 75,570 | 260,540 | 85,880 | 281,880 |
| Southern Tagalog | 305,230 | 267,380 | 299,010 | 275,610 | 287,360 | 278,590 | 293,700 | 276,110 |
| B i c o l | 116,180 | 240,280 | 150,850 | 212,730 | 112,400 | 238,140 | 131,810 | 251,620 |
| Western Visayas | 125,680 | 307,410 | 130,540 | 292,930 | 157,430 | 281,740 | 145,620 | 291,050 |
| Central Visayas | 227,120 | 176,540 | 237,010 | 181,420 | 243,140 | 173,410 | 232,480 | 173,390 |
| Eastern Visayas | 25,140 | 185,580 | 20,400 | 208,690 | 23,190 | 193,620 | 28,240 | 187,470 |
| Western Mindanao | 45,820 | 155,820 | 44,750 | 158,640 | 82,820 | 171,810 | 91,500 | 163,560 |
| Northern Mindanao | 183,580 | 159,640 | 185,000 | 151,460 | 183,270 | 157,200 | 235,320 | 180,510 |
| Southern Mindanao | 84,780 | 173,400 | 111,960 | 193,080 | 102,030 | 174,970 | 76,870 | 168,590 |
| Central Mindanao | 95,110 | 176,470 | 120,830 | 202,810 | 101,350 | 174,030 | 128,530 | 182,220 |

Source: BAECON/BAI Livestock and Poultry Survey

B. GOAT POPULATION BY REGION

1977 - 1978

| R E G I O N | 1 9 7 7 | 1 9 7 8 |
|---|---|---|
| PHILIPPINES | 1,103,670 | 1,289,850 |
| I l o c o s | 178,450 | 240,570 |
| Cagayan Valley | 22,980 | 26,780 |
| Central Luzon | 60,950 | 80,270 |
| Southern Tagalog | 122,690 | 105,950 |
| B i c o l | 40,190 | 51,380 |
| Western Visayas | 94,600 | 130,610 |
| Central Visayas | 211,830 | 248,400 |
| Eastern Visayas | 27,520 | 38,440 |
| Western Mindanao | 85,390 | 67,350 |
| Northern Mindanao | 82,900 | 82,940 |
| Southern Mindanao | 93,790 | 128,130 |
| Central Mindanao | 82,380 | 89,030 |

Source: BAI/BAECON Livestock and Poultry Survey

## C. NUMBER OF ANIMALS SLAUGHTERED BY KIND AND BY REGION

| R E G I O N | 1 9 7 0 | | | 1 9 7 5* | | | 1 9 8 0 | | |
|---|---|---|---|---|---|---|---|---|---|
| | CATTLE | CARABAO | GOAT | CATTLE | CARABAO | GOAT | CATTLE | CARABAO | GOAT |
| PHILIPPINES | 142,100 | 18,700 | 202,900 | 52,310 | 47,500 | - | 204.935 | 132,645 | 50,703 |
| I l o c o s | - | 1,400 | 31,300 | 4,020 | 2,900 | - | 23,023 | 8,588 | 1,456 |
| Cagayan Valley | 1,900 | 2,600 | 4,200 | 6,210 | 11,820 | - | 14,369 | 5,710 | 96 |
| Central Luzon | 8,400 | 3,700 | 1,500 | 950 | 750 | - | 22,424 | 49,002 | - |
| Southern Tagalog | 8,500 | 2,600 | 700 | 11,420 | 1,260 | - | 33,054 | 10,489 | - |
| B i c o l | 2,900 | 2,200 | 5,500 | 1,580 | 1,790 | - | 6,925 | 4,495 | 1,539 |
| Western Visayas | 13,500 | 1,000 | 32,300 | 1,720 | 1,220 | - | 19,525 | 9,834 | 40 |
| Central Visayas | - | - | - | 6,480 | 1,000 | - | 42,047 | 24,391 | 45,829 |
| Eastern Visayas | 52,800 | 3,200 | 200 | 2,680 | 10,120 | - | 4,861 | 12,044 | - |
| Western Mindanao | - | - | - | 870 | 1,050 | - | 9,124 | 381 | 633 |
| Northern Mindanao | 2,200 | 300 | 800 | 7,020 | 3,310 | - | 19,579 | 2,075 | 2,529 |
| Southern Mindanao | 51,900 | 1,700 | 126,400 | 2,660 | 3,070 | - | 4,712 | 3,361 | 239 |
| Central Mindanao | - | - | - | 6,700 | 9,210 | - | 5,352 | 2,273 | 342 |

*July - December only

** No data available by region

Source: National Meat Inspection Commission NMIC, BAI

## D. FAO STATISTICS OF LIVESTOCK PRODUCTION IN THE PHILIPPINES

1977 - 1980

| | 1977 | | | 1978 | | | 1979 | | | 1980 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CATTLE | CARABAO | GOAT | CATTLE | CARABAO | GOAT | CATTLE | CARABAO | GOAT | CATTLE | CARABAO | GOAT |
| Livestock Population 1000 head effective | 1,723 | 2,897 | 1,400* | 1,820 | 2,959 | 1,410* | 1,833 | 2,803 | 1,430* | 1,885* | 2,760* | 1,450* |
| Animal Slaughtered 1000 head effective | 540F | 325F | 490F | 570F | 310F | 495F | 560F | 300F | 500F | 570F | 310F | 510F |

* Unofficial Figures

F FAO estimates

Source: FAO Production Yearbook (Vol. 32-34)

E. IMPORTS - ANIMAL RAW HIDES, SKINS AND FURSKINS

1976 - 1980

| COMMODITY | 1976 Qty./Kg. | 1976 FOB VALUE $ | 1978 Qty.Kg. | 1978 FOB VALUE $ | 1979 Qty./Kg. | 1979 FOB VALUE $ | 1980 Qty./Kg. | 1980 FOB VALUE $ |
|---|---|---|---|---|---|---|---|---|
| Bovine and Equine Hides | 3,512,557 | 1,936,641 | 1,781,193 | 1,541,290 | 570,354 | 955,734 | 876,330 | 821,735 |
| Calf Skins | 124,066 | 92,862 | 104,994 | 103,419 | 71,910 | 58,439 | - | - |
| Other Hides and Skins | 32,124 | 19,510 | 34,957 | 34,345 | 42,538 | 30,867 | 1,186 | 11,104 |
| T O T A L | 3,668,747 | 2,049,013 | 1,921,144 | 1,679,054 | 684,802 | 1,045,040 | 877,516 | 832,839 |

F. EXPORTS - ANIMAL RAW HIDES, SKINS AND FURSKINS

1977 - 1980

| | 1977 Qty./Kg. | 1977 FOB VALUE $ | 1978 Qty./Kg. | 1978 FOB VALUE $ | 1979 Qty./Kg. | 1979 FOB VALUE $ | 1980 Qty./Kg. | 1980 FOB VALUE $ |
|---|---|---|---|---|---|---|---|---|
| Reptiles & Aquatic Animal Skins | 18,883 | 289,627 | 13,517 | 327,937 | 18,586 | 823,672 | 12,746 | 559,679 |
| Other Hides and Skins | - | - | 14 | 85 | 10,716 | 13,988 | 29,745 | 55,311 |
| T O T A L | 18,883 | 289,627 | 13,531 | 328,022 | 29,302 | 837,660 | 42,491 | 614,990 |

Source: Foreign Trade Statistics

## G. IMPORTS OF LEATHER AND LEATHER PRODUCTS

1977 - 1980

| COMMODITY | 1977 Qty./Kg. | 1977 FOB VALUE $ | 1978 Qty./Kg. | 1978 FOB VALUE $ | 1979 Qty./Kg. | 1979 FOB VALUE $ | 1980 Qty./Kg. | 1980 FOB VALUE $ |
|---|---|---|---|---|---|---|---|---|
| Sole Leather | 65,101 | 144,528 | 102,749 | 168,200 | 46,609 | 88,541 | 100,546 | 300,107 |
| Upper Leather | 878 | 9,750 | 34,189 | 115,036 | 19,821 | 87,461 | 40,042 | 187,580 |
| Belly Leather | 8,980 | 11,587 | 20,100 | 20,783 | 9,497 | 23,785 | 37,174 | 62,076 |
| Shoe Split Lining | 7,479 | 33,805 | 69,551 | 220,228 | 25,500 | 77,571 | 446,869 | 2,462,561 |
| Chrome-Wet Blue Hides | - | - | 20,770 | 29,587 | 35,375 | 28,356 | - | - |
| Tanned/Semi-Tanned Hides & Skins | 21,225 | 52,322 | 83,940 | 250,343 | 71,930 | 1,467,589 | 247,554 | 2,424,654 |
| Industrial Leather | 43,003 | 424,981 | 36,113 | 404,395 | 57,707 | 598,511 | 37,151 | 414,594 |
| Other Leathers | 1 | 94 | 7,660 | 52,826 | 3,767 | 215,342 | 10.042 | 47,580 |
| Leather Board From Leather Fibers | 116 | 127 | 5,770 | 24,739 | 145,786 | 283,952 | 146,717 | 356,690 |
| Leather Goods | 32,227 | 452,593 | 97,265 | 1,086,650 | 131,225 | 3.011.017 | 58,305 | 1,534,453 |
| Gloves | 3,281 | 4,061 | 6,636 | 9,633 | 4,097 | 15,150 | 12,047 | 24,253 |
| Parts of Footwear | 44,016 | 168,603 | 583,917 | 1,745,672 | 761,369 | 2,251,603 | 2,068,257 | 6,072,556 |
| Footwear Wholly or Mainly of Leather | 5,504 | 44,942 | 2,481 | 16,009 | 6,123 | 20,496 | 8,842 | 42,137 |
| Footwear Leather With Synthetics | 1,473 | 8,116 | 11,351 | 23,797 | 5,196 | 36,394 | 48,261 | 44,455 |
| Leather Clothing Articles | 1,509,007 | 83,318 | 709,157 | 54,476 | 897,807 | 295,293 | 1,785,246 | 222,706 |
| T O T A L | 1,742,291 | 1,438,827 | 1,791,559 | 4,222,374 | 2,221,809 | 8,501,061 | 5,047,053 | 14,196,402 |

Source: Foreign Trade Statistics

## H. EXPORTS OF LEATHER AND LEATHER PRODUCTS

1977 - 1980

| COMMODITY | 1977 Qty./Kg. | 1977 FOB VALUE $ | 1978 Qty./Kg. | 1978 FOB VALUE $ | 1979 Qty./Kg. | 1979 FOB VALUE $ | 1980 Qty./Kg. | 1980 FOB VALUE $ |
|---|---|---|---|---|---|---|---|---|
| Upper Leather | - | - | - | - | - | - | - | - |
| Belly Leather | - | - | - | - | - | - | - | - |
| Shoe Split Lining Leather | - | - | - | - | 3,012 | 13,500 | 3,883 | 22,350 |
| Tanned/Semi-Tanned Hides & Skins | - | - | - | - | 1,350 | 4,955 | 1,960 | 12,937 |
| Reptiles & Aquatic Animal Skins | - | - | 10 | 1,000 | 347 | 36,831 | 940 | 90,525 |
| Industrial Leather | 3,101 | 36,890 | 1,275 | 9,836 | 1,117 | 13,446 | 1,983 | 29,490 |
| Other Leathers | - | - | - | - | 18,407 | 106,459 | - | - |
| Leather Board From Leather Fibers | - | - | 50 | 485 | 10,810 | 65,112 | 22,648 | 179,071 |
| Leather Goods | 220,913 | 752,903 | 493,387 | 1,840,034 | 369,965 | 2,096,239 | 448,085 | 2,610,960 |
| Leather Gloves | 1,572 | 3,358 | 8,554 | 7,014 | 66,032 | 258,801 | 1,151,330 | 1,539,378 |
| Parts of Footwear | 72,674 | 140,457 | 63,985 | 257,677 | 15,026 | 79,966 | 748 | 7,680 |
| Footwear Wholly or Mainly of Leather | 662,931 | 3,299,293 | 1,545,428 | 8,127,448 | 895,005 | 1,192,228 | 428,100 | 4,095,362 |
| Footwear Leather and Synthetics | 299,299 | 1,712,700 | 2,375,991 | 7,902,045 | 3,119,025 | 12,025,029 | 5,206,132 | 20,345,581 |
| Leather Clothing Articles | - | - | 5,965 | 9,869 | 6,367 | 20,824 | 9,649 | 25,037 |
| T O T A L | 1,260,490 | 5,945,601 | 4,494,645 | 18,155,408 | 4,506,463 | 21,913,390 | 7,275,458 | 28,967,371 |

Source: Foreign Trade Statistics

ANNEX NO. 3

# TECHNICAL NOTES ON PHYSICAL AND ANALYTICAL TESTING OF LEATHER

CONTENTS



## Laboratory equipment

From the numerous proposed tests for leather, only a few are mandatory which considerably limit the equipment needed for a practical leather testing laboratory.

A leather testing laboratory should include the following:

- a physical testing laboratory which requires an air-conditioned room (relative humidity 65 ± 2%, temperature 20 ± 2 °C) and specific, usually expensive equipment
- a small chemical laboratory with the standard chemical equipment

4.1 The compulsary equipment needed in a physical testing laboratory are:

- a tensile strength machine with accessories to measure:
  - ° tensile strength (IUP/6)
  - ° elongation (IUP/6)
  - ° tearing load (IUP/8)
  - ° adhesion of finish to leather (IUF 470)
  - ° [illegible] tests on footwear
- [illegible] gauge
- an analytical electric scale for both physical and chemical sections
- a lastometer (SATRA) to measure the distension and strength of grain by the ball burst test (IUP/9)
- a flexometer (BALLY) with 12 posts to measure the flexing endurance of light leather and their surface finishes in dry and wet conditions (IUP/20)
- [illegible] apparatus (VESLIC) to measure the [illegible] finish to the leather in wet and [illegible]

4.2 [illegible] laboratory, the complementary equipment comprises:

- a flexometer to measure the light fastness (IUF 401 and 402)
- a planimeter to control the surface of the leather locally sold in square feet
- a [illegible] meter (BALLY) to measure the dynamic water [illegible] of [illegible] upper leather (IUP/13)

4.3 The equipment of the chemical section includes standard chemical laboratory equipment

- an analytical scale 0-200g, accuracy 0.0002g.
- a drying stove with air circulation
- an oven up to 1,000°C
- a pH meter to measure the pH and difference value of aqueous leather extract (IUC/11)
- a mill (WILEY type) to prepare the leather according to IUC/3 .
- glass and porcelain equipment to determine:
  - chromium content (IUC/8)
  - extractable fatty matters, Soxhlet apparatus (IUC/4)
  - moisture (IUC/5), ash (IUC/7), washing matters (IUC/6), etc.

5. Physical testing equipment estimates

5.1 Basic equipment

| | US$ Estimates |
|---|---|
| - Tensile strength machine from US$10,000 (NENE) to 20,000 (INSTRON) | 20,000 |
| - Thickness gauge Wallace ST 4 | 600 |
| - Analytical electric scale | 1,000 |
| - Lactometer SATRA STD 104 | 2,500 |
| - Flexometer 12 posts | 5,500 |
| - Rub-testing apparatus Veslic | 5,000 |
| T O T A L | $34,600 |

5.2 Complementary equipment estimates

- Penetrometer
  BALLY US$5,000
- Water-vapor permeability apparatus
  Wallace W2 US$ 4,000

UNIDO can be of assistance in obtaining the correct specifications for the equipments referred to.

ANNEX NO. 4

## PROPOSED JOB DESCRIPTIONS

### A. BSMI technical assistance to the small tanners

Post title : Leather Tanning Expert

Duration : twelve months

Duty station : Manila, with travel within the country.

Duties : The expert will be attached to the Bureau of Small and Medium-scale Industries (BSMI) of the Ministry of Trade and Industry.

Specially he will be expected to:

1. Provide in-plant technical consultancy services in modern leather technology to selected small-scale tanning firms.
2. Train the small tanners in practical control of the chemical processes of leather tanning.
3. Advise on production organization and plant lay-out of the small tanneries.
4. Assist in developing efficient effluent treatment schemes.
5. Assist in feasibility study, plant lay-out, equipment installation and operation of envisaged semi-processing plants.
6. Provide recommendations on the implementation of technical and managerial assistance programme that may be implemented as follow-up projects by the BSMI.

The expert will also be expected to prepare a final report, setting out the findings of his mission and his recommendations to the government for further action which might be taken.

Qualifications : Tanning expert with broad experience in all aspects of leather production and the tanning industry, with special regards to small-scale industries.

Language : English

B. FLTDC leather testing laboratory

Post title : leather and leather-product testing expert

Duration : twelve months

Duty station : Manila, with travel within the country

Duties : Within the Footwear and Leathergoods Training and Demonstration Centre (FLTDC), assist in the establishment of a leather testing laboratory in view of improving the quality of leather and leather products produced in the Philippines for local as well as export markets.

Specially, he will be expected to:

- install and operate the FLTDC laboratory equipment.
- carry-out tests and interpret the results with regard to the quality of leather and leather products.
- acts as technical mediator between the tanners and the leather-product manufacturers.
- assist the tanners in improving the quality of the leather they produced to meet the requirements of the leather-product manufacturers.
- train the qualified counterpart personnel in testing of leather and leather products.

The expert will also be expected to prepare a final report, setting out the findings of his mission and his recommendations for further action which might be taken.

Qualifications : Leather technologists with broad experience in all aspects of leather testing and tanning.

ANNEX NO. 5

## LIST OF PERSONS & FIRMS CONTACTED

### Ministry of Trade and Industry

| N A M E S | DESIGNATIONS |
|---|---|
| Mr. Quintin G. Tan | Director, Bureau of Small and Medium Industries |
| Mr. Raul E. Bandera | Quality Control Project Coordinator |
| Mr. Ernesto S. Payoyo | Quality Control Project Coordinator |
| Mr. Darcy McGaurr | Principal Consultant |
| Mr. Ramon S. Yazon | UNIDO Tanning Expert Counterpart |
| Mr. Reynaldo C. Alampay | UNIDO Tanning Expert Counterpart |
| Ms. Segundina T. Chio | UNIDO Tanning Expert Counterpart |
| Mr. Nazrullah B. Manzur | Officer-in-Charge Small Business Assistance Center Zamboanga, City |
| Mr. Arman Galimba | Asst. Officer-in-Charge Small Business Assistance Center San Fernando, La Union |

### United Nations Development Program

| | |
|---|---|
| Mr. Ivan E. Pluhar | UNIDO/SIDFA |
| Mr. Edu Hassing | UNIDO/Asst. SIDFA |
| Ms. Bethel Tessau | UNIDO/Asst. SIDFA |
| Mr. Juhani Berg | UNIDO Industrial Development |
| Mr. Hans Meliczek | Acting FAO Representative |

### Footwear and Leathergoods Training and Demonstration Center

| | |
|---|---|
| Mr. Ercih C. Beyrodt | UNIDO Chief Technical Adviser |
| Mr. Mohamed Maher Abou El-Khair | UNIDO Senior Leathergoods Expert |
| Mr. Roland Steyns | UNIDO Shoe Designer |
| Mr. Leo Horna | UNIDO Shoemaking Expert |

### Ministry of Agriculture, Bureau of Animal Industry

| | |
|---|---|
| Mrs. Pura L. Madlangsacay | Supervising Animal Products Technologists |
| Mrs. Corazon C. Maza | Officer, Tannery Pilot Plant |

| NAMES | DESIGNATIONS |
|---|---|
| **Associations of Tanners** | |
| Mr. Ricardo P. Hermoso | Vice-President, Tanners' Association |
| Dr. Francisco D. Prodon | Vice-President Small Tanners' Association |
| **Economic Development Foundation** | |
| Mr. Wilfredo Pormento | Research Project Team Leader |
| **Enterprises Visited-Slaughterhouse** | |
| Mr. Andy Castro | Food Terminal Inc. Slaughterhouse |
| **Industrial Tanneries** | |
| Mr. Ricardo Hermoso | Hermoso Hermanos Inc. Tannery |
| Ms. Ester Mirafuente | Meycauayan |
| Ms. May H. Cruz | Managing Director, Conching Hermoso Tannery Inc. Meycauayan |
| Mr. Alberto A. Hermoso | Vicente Hermoso Tannery Meycauayan |
| Mr. Vicente Lee (Chua) | President, Uni-Leather Country Corporation, Guigiunto |
| Ms. Zita Miranda Tan | Leather Technologists, Plant Manager, Uni-Leather Country Corporation, Guigiunto |
| Mr. Vibiano Tañada | Valenzuela Tannery, Meycauayan |
| Mr. Telesfero Gana | Tannery Company, Philippines Navotas |
| Mr. Jose Gana | Managing Director, Tannery Company, Philippines, Navotas |
| Mr. Ching Lien Hong | Manager, Philippines Leather Manufacturing Co., Navotas |
| **Small Tanneries** | |
| Dr. Francisco D. Prodon | Tannery, Bancal, Meycauayan |
| C.M. Duran Tannery | Bancal, Meycauayan |
| C.M. Milan Tannery | Libtong, Meycauayan |
| Mr. Luis S. Villano | Leather Industries, Tugatog Meycauayan |
| Mr. Benjamin Capiral | Tannery, Saluysoy, Meycauayan |
| Mrs. Gloria Villar | Tannery, Guiguinto, Bulacan |
| Mr. Alfredo Bulaong | Bullfrog Skin Processor Malolos, Bulacan |
| Rector Sicuatan | Rabbit Furskins Processor Baguio City |
| Mr. Jimmy Angway | Rabbit Furskins Processor Baguio City |

| | |
|---|---|
| Mr. Cosmelito Carlos | Tannery, Bancal, Meycauayan |
| Mr. Reynaldo E. Chua | General Manager, Reptile Skin Tannery, Zamboanga City |
| Mr. Renato Soriano | Tannery, Langca, Meycauayan |
| Mr. Alfredo Lazatin | Tannery, Bancal, Meycauayan |
| Mr. Carlos Lejano | Tannery, Tugatog, Meycauayan |
| Mr. Salvador D. Pamplona | Vice-President, Bullfrog Ind., Inc. Montalban |
| Mr. Francisco Pilongo, Jr. | Tannery, Tugatog, Meycuaayan |

Chemicals Suppliers of the Leather Tanning Industry

| | |
|---|---|
| Mr. Ricardo C. Concepcion | BASF Philippines Inc. |
| Mr. Alfred Gotz | BASF Philippines Inc. |
| Mrs. Ligaya Yushida Concepcion | EMPRESS Chemical Traders |
| Mr. Archibald A. Guzman | EMPRESS Chemical Traders |
| Ms. Cris. A. Aquino | H E N K E L |
| Mr. Hermann R. Saffran | H O E C H S T |
| Mr. Artemio Cornista | S A N D O Z |

Leather Dealer

| | |
|---|---|
| J.C. Shoe Supply | Marikina |

Leathergoods Manufacturers

| | |
|---|---|
| Sexon Leather House | Marikina |
| Manel's Leathergoods | Metro-Manila |

Shoe Manufacturers

| | |
|---|---|
| Mrs. Elisa Santos | Market Shoe Corporation |
| Mr. Jose P. Sta. Ana | Philippine Shoe Co., Inc. Metro-Manila |

ANNEX NO. 6

MID TERM REPORT

C O N T E N T S

ANNEX NO. 7

# TECHNICAL NOTES ON REPTILE SKINS TANNING

## C O N T E N T S

ANNEX NO. 8

SEMINAR ON LEATHER TANNING TECHNOLOGY

Meycauayan Bulacan, 29th April 1982

The lectures prepared by the UNIDO Leather Tanning Expert have been edited in the form of a manual which contains the following:

Lecture 1 : BASIC SCIENTIFIC NOTIONS OF LEATHER TANNING TECHNOLOGY

INTRODUCTION

1. Neutrality, Acidity, Alkalinity

   1.1 Neutrality
   1.2 Acidity
   1.3 Alkalinity or Basicity
   1.4 Neutralization, Deacidification, Basification

2. Measurement of the Degree of Acidity or Alkalinity

   2.1 The pH Scale
   2.2 pH variations during the leather tanning process
   2.3 pH measurement by colored indicators

3. Hides and Skins

   3.1 Composition of hides and skins
   3.2 Structure of hides and skins
      3.2.1 cross-section of a cow hides
      3.2.2 microscopic cross-section of a cow hide
   3.3 Heterogenity of the hides and skins

4. Swelling of the Hide

   4.1 Swelling Curve
   4.2 Control of the Swelling

5. Behavior of the Chemicals versus the Hide

   5.1 Binding of the chemical with the hide
   5.2 Electrical charge of the chemicals
   5.3 Iso-electric point of the hide
   5.4 Penetration and fixation of the chemicals into the hide

Lecture 2 : PREPARATION FOR TANNAGE (Beamhouse Processes)

INTRODUCTION

1. Beamhouse Processes

2. Soaking

   2.1 Purpose
   2.2 Process
   2.3 Cautions

3. Liming

   3.1 Purpose
   3.2 Liming Agents
   3.3 Methods
   3.4 Cautions
   3.5 Reliming

4. Mechanical Operations

   4.1 Fleshing
   4.2 Splitting
   4.3 Trimming
   4.4 Depilation/Unhairing
   4.5 Scudding
   4.6 Cautions

5. Deliming-Bating

   5.1 Purposes

      5.1.1 deliming
      5.1.2 Bating

   5.2 Deliming Agents
   5.3 Bating Agents
   5.4 Standard Method
   5.5 Cautions

6. Pickling

   6.1 Purpose
   6.2 Pickling Agents
   6.3 Standard method for chrome tanning
   6.4 Cautions

Lecture 3 : VEGETABLE TANNING MATERIALS

INTRODUCTION

1. Vegetable Tanning Materials

   1.1 Mimosa Extracts
   1.2 Quebracho Extracts
   1.3 Chestnut Extracts

2. Synthetics Tanning or Syntans

   2.1 White leather syntans
   2.2 Replacement and combinations syntans
   2.3 Pretannage syntans
   2.4 Auxiliary syntans

3. Traditional Vegetable Tanning

   3.1 Principle
   3.2 Basic elements

      3.2.1 equilibrum between the delimed hide and the first tanning liquors
      3.2.2 penetration and fixation of vegetable tannin into the hide

   3.3 Practical consequences
   3.4 Preparation of mimosa tanning liquors to a determined density

4. Preparation of the Delimed Pelt to Modern Methods of Vegetable Tanning

   4.1 Conditioning with sodium sulphate
   4.2 Chrome pretannage
   4.3 Syntan pretannage
   4.4 Phosphate polymer pretannage

5. Vegetable Tanning of Sole Leather

   5.1 Traditional tanning in pits and drums
   5.2 Rapid tanning in pits and drums after pretannage
   5.3 Drum tanning without or in short float with spray dried powder extracts

6. Vegetable Tanning of Light Leather

   6.1 General principles
   6.2 Processes

7. Finishing of Sole Leather

   7.1 Complete sequence of finishing operations
   7.2 Example of simplified finishing process
   7.3 Example of formula for bleaching-retanning-fatliquoring
   7.4 Simplified formula for bleaching, retanning, fatliquoring

Lecture 4 : CHROME TANNING

INTRODUCTION

1. Chrome Salts

   1.1 Basicity of chrome salts
   1.2 Tanning concentration of chrome salts
   1.3 Tanning chrome salts

1.3.1 chrome alum
1.3.2 common concentration of chrome salts
1.3.3 commercial self-basifying chrome tanning salts

2. Standard Method of Chrome Tanning

2.1 Principle
2.2 Standard method
2.3 Remarks

3. Standard Sequence of Operations after Chrome Tanning for Shoe Upper Leather

3.1 Hrosing up or piling
3.2 Sammying
3.3 Selection
3.4 Splitting
3.5 Shaving
3.6 Weighing
3.7 Washing
3.8 Deacidification or Neutralization
3.9 Retanning
3.10 Dyeing
3.11 Fatliquoring
3.12 Horsing Up
3.13 Setting Out
3.14 Drying
3.15 Conditioning
3.16 Staking
3.17 Complementary drying after staking
3.18 Buffing
3.19 Dust Removal
3.20 Finishing

4. Deacidification or Nuetralization

4.1 Purpose
4.2 Neutralizing agents
4.3 Standard method
4.4 Remarks

5. Retanning-Dyeing-Fatliquoring

5.1 Purposes
5.2 Chemicals
5.3 Standard method
5.4 Compact retanning technique

Lecture 6 : PRACTICAL CONTROL OF THE TANNERY PROCESSES

INTRODUCTION

1. Common Testing Applied in the Small Tanneries

1.1 Weighing
1.2 Processing time
1.3 Appearance of the hide
1.4 Measure of the hide thickness
1.5 Temperature
1.6 Chemical testing
1.7 Recommendations

2. Testing of the Strength of the Liquors

   2.1 Density
   2.2 Baume Scale
   2.3 Areometer Baume
   2.4 Use of the areometer baume in leather tanning
   2.5 Ways to adjust the degree baume of a liquor
   2.6 Conversion table of density and baume degrees

3. pH Measurement of a Liquor

   3.1 pH scale
   3.2 pH measurement of a liquor

4. pH Measurement of a Hide Cross Section

5. Quality Control of the Various Processes in Small Tanneries

   5.1 Soaking
   5.2 Liming
   5.3 Deliming
   5.4 Pickling
   5.5 Vegetable Tanning
   5.6 Chrome Tanning
   5.7 Shaving
   5.8 Deacidification or Neutralization
   5.9 Retanning-dyeing-fatliquoring
   5.10 Staking

Annex A : Quantity of water and Mimosa extract to prepare tanning liquor of 1,000 liters with th desired density

Annex B : Conversion table of density and Baume degrees