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**Environmental Impacts of Tanning
and Leather Products Manufacturing
Industry in NWFP (Pakistan)**

Mahmood A. Khwaja

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Environmental Impacts of Tanning and Leather Products Manufacturing Industry in NWFP (Pakistan)

Mahmood A. Khwaja

Introduction

North West Frontier Province (NWFP) is the smallest of all the provinces of Pakistan, accounting for 9% of area (100,200 sq.km) and 13% of population (15 million). The northern parts of NWFP are well known for their natural beauty, old civilization and high mountains and every year a number of tourists visit NWFP from all parts of the world¹.

Pakistan leather products industry is one of the major foreign exchange earner amongst the manufactured goods sector and is basically export oriented. Ninety percent leather is exported in finished form. During 1994-95, the export earning from leather and leather goods amounted to US \$ 648 million². In the same period about 40 million skins and hides were processed. There are over 600 tanneries in the formal sector and an equally large number of tanneries exists in the informal sector. In NWFP, the tanning industry made rapid development in late 1970s during which period five large size industrial units were established around Peshawar, Charsadda, Jandola and Jehanghira³. In the past, a number of small size units have been engaged in the production of sole leather by indigenous processes. Since tanning industry contributes significantly towards foreign exchange earnings, the number of tanneries is on the increase in Pakistan as well as in NWFP.

The existing environmental and resource management laws, at the national and provincial levels in the recent past did not adequately cover the subject areas and several were outdated⁴. Because of lack or ineffective implementation of legislative control, no pollution control measures are being adopted by the tanning units and the hazards to the environment caused by the effluents and emissions from tanneries is an acute problem. High illiteracy among tanners and general public, unrefined conventional leather processing methods and poor processing practices have further aggravated the pollution problem caused by the tanneries in NWFP.

A few reports on characterization and pollution load of tannery effluents, sludge, solid waste from tanneries in Punjab and Sindh provinces and quality of well water around tanneries areas in Karachi (Sindh) have also been published^{2,10-12}. However, despite a number of tanneries/leather industries in and around Peshawar, Nowshera and Charsadda, which are in operation for over ten years, no such studies have been initiated in NWFP. In the present paper, the environmental legislation, the studies carried out on effluents from tanneries around Charsadda-Peshawar areas, the resulting environmental and health impacts, quality of underground water in/around the tanneries area and the findings from a survey of tannery and leather products manufacturing units in NWFP, are described and discussed.

Environmental Legislation, Enforcement and Control

Management of wastes and preventing/abating pollution are two of the 14 core programs areas of the "National Conservation Strategy (NCS) of Pakistan". NCS is an explicit national policy document for a sustainable future and is a plan of action that will conserve our environment in perpetuity. Sarhad

Provincial Conservation Strategy (SPCS) formulated for NWFP in 1993 further refines the NCS priority core areas, to fulfill the needs and requirements for environmental protection and management in the province. SPCS consists of ten program components, including strategies for abatement and prevention of environmental pollution due to solid wastes, liquid wastes (industrial effluent) and special (hazardous) wastes⁴.

Pakistan Environmental Protection Act, 1997 provides for the protection, conservation, rehabilitation and improvement of the environment, for the protection and control of pollution and promotion of sustainable development. The Act covers air, water, soil and noise pollution, also including hazardous waste disposal and motor vehicular pollution. Discharge of any emissions in excess of National Environmental Quality Standards (NEQS) has been strictly prohibited as is stated in the following clauses under section 11 of the Act:¹³

- (a) No person shall discharge or emit or allow the discharge or emission of any effluent or waste or air pollutant or noise in an amount, concentration or level which is in excess of the National Environmental Quality Standards or, where applicable, the standards established under sub-clause (i) of clause (g) of sub-section 1 of section 6.
- (b) The Federal Government levy a pollution charge on any person who contravenes or fails to comply with the provisions of sub-section (I), to be calculated at such rate, and collected in accordance with such procedure as may be prescribed.

National Environmental Quality Standards (NEQS) for industries (including tanning Annex 1) have been established and notified by Federal Environmental Protection Agency (Pak-EPA) as well as NWFP, EPA for strict adherence by all industrial units operating in the country. As part of the process for the implementation of NEQS, guidelines for “Self-monitoring and Reporting by the Industry” and “Pollution Charge” have been approved and accordingly, regulations enforced with effect from January 2000¹⁴. Tanning industry has been placed in category A (most hazardous) and monitoring frequency both for the normal plant operating conditions (NPOC) and start-up and up-set conditions (PSUC) have been recommended. Priority parameters for NPOC to be reported to EPA on monthly basis are effluent flow, temperature, pH, biological oxygen demand (BOD₅), chemical oxygen demand (COD), total suspended solids (TSS), Oil and grease, sulfide, chromium (III), chromium (VI), total dissolved solids (TDS) and phenolic compounds. During PSUC, the priority parameters to be recorded on hourly basis are effluent flow, pH, temperature and TSS.

Studies on Effluents from Tanneries

Analytical data¹⁶ for pollutant levels in the tanneries effluents from some tanning industries in NWFP and Pakistan National Environmental Quality Standards (NEQS) for liquid industrial effluents discharged are described in Annex 1. A comparison of the pollutant levels in effluents from drums with main drains of tanneries have shown that the values for drum samples were higher than those of drains for most of the pollutants studied. This is typical of industrial effluents, whereas the intermittently discharged effluents (10%) are more polluted than the continuously discharged (90%)¹⁷. The overall pH of the main drain effluent samples was found to be within desirable limits of 6-9. However, the amount of total suspended solids (TSS) and total dissolved solids (TDS) were found to be very high compared to NEQS. All the effluent samples under examined for the present study also had higher chemical oxygen demand (COD) values, indicating high pollution load carried by these effluents.

The use of excessive amounts of sulphide and chromium in tanning processes give rise to high concentrations in the effluents. Sulphide, chromium and phenols are the most hazardous among pollutants

from the tanneries. Sulphides are toxic to stream/river organisms and also emit foul-smelling toxic hydrogen sulphide in a low pH environment. Chlorinated phenols are reported to be carcinogenic. Higher phenol concentration could be harmful to aquatic life as well as to the animals drinking polluted river water. In the tannery effluents under investigations, the concentrations of sulphide, chromium and phenols were found to be higher than the permissible limits.

In view of the above, it is evident that the indiscriminate discharge into the Kabul River or on open land of tanneries effluents with high pollution load deteriorate the quality of the river water as well as the underground water. This has been reported in a recent study on “Kabul River Pollution” in which high concentration of chromium, sulphide, chloride and BOD were observed in river water samples taken at Jehangira (tanneries and other industries area)¹⁴.

Studies on Quality of Underground Water in and Around Tanneries

The quality of underground water within 2 km of tanneries around Peshawar – Charsadda areas has been examined¹⁹. Results of the physico-chemical analyses, sampling sites and sources of water samples I-IV (in and around tanneries) and water samples V-VIII (away from tanneries) are given in Annex 2 A and 2B, respectively.

A comparison of the analytical data described in Annex 2 A and 2 B indicated that water samples collected in the near vicinity of tanneries were polluted. Total solid content in sample I-IV (tanneries areas) was found in the range 649-1087 mg/l compared to 338-527 mg/L in water samples V-VIII (away from tanneries areas). The average values of chloride and sulphate for water samples I-IV were 77.75 and 273 mg/L compared to 13.10 and 41.5 mg/L for water samples V-VIII. Whereas chromium and phenol were not detected in water samples from outside the tanneries area, in samples II and III, phenol content was found to be 74.2 and 92.6 µg/L, respectively. Chromium concentration of 0.03 mg/L was observed in water samples I and III and 0.05 mg/L in water sample II. Higher concentrations of phenols (> the permissible limit 0.001 mg/L) and chromium (> the permissible limit 0.05 mg/L) render water unsuitable for domestic and drinking purposes²⁰.

It is obvious from the earlier report on Kabul river⁶ and analytical data described and discussed above that the present free-style indiscriminate discharge of tanneries effluents, if continued, will seriously contaminate surface as well as underground water.

Environmental Impacts

The major environmental issues of tanneries are solid wastes and wastewater. In the course of processing of hides into leather about 20% of the material results as solid wastes, consisting of leather scraps, hair, soluble proteins, curing salts and fleshing (animal fats, collagen fibers, meat etc.). The effluents discharged from tanneries are large in volume, are highly colored and contain heavy sediment load, toxic metallic compounds, chemicals, biologically oxidizable materials and large quantities of putrefying suspended matter. Solid wastes of tanneries are usually dumped improperly inside and around the factory area^{16,21-22}. The highly colored effluents (Annex I) not only give an unaesthetic appearance but by cutting off sun light also affect the purification capacity of a water body like Kabul river, into which these are being discharged. Low pH of tannery effluents cause corrosion of water-carrying system. Large pH fluctuation and high BOD value caused by tannery effluents, can kill all natural life in an affected water-

body. Hydrogen sulphide formed due to the presence of sulphide in the effluent is highly toxic to many forms of life. Some workers died in Karachi (Pakistan) in 1980, while clearing monsoon ditches filled with tannery sludges²³. Another toxic pollutant, of great concern present in tannery effluents is chromium which is known to cause perforations and bronchiogenic carcinoma to continuously exposed humans. Chicken feeds prepared from chromium containing proteins rich tanneries solid wastes is likely to cause direct chromium entry into food chain²⁴. Tanneries and leather products manufacturing units are generating large amounts of solid waste in the form of leather shavings/cuttings which, being used as cheap fuel in the brick-kilns, is causing air pollution along with the release of chromium into the environment. In Punjab, tanneries are directly contaminating prime agriculture land and the quality as well as crop-yield from the contaminated soil have been found to be affected^{10,25}. It has also been reported that most of the tanneries in Punjab are located in residential neighbor hoods, causing direct threats to human health people²⁶.

Aquatic pollution is on the increase in NWFP which is partly due to indiscriminate discharge of industrial effluents into water bodies directly or on open land around the factory area. From a study of industrial activities of thirty-nine industrial units (including tanneries) operating in the province, Karns⁵ first reported the deteriorating water quality of Kabul river, Kheshki lake, Shah Alam river and Kalpani Nullah. In a recent study on Kabul River pollution, jointly carried out by IUCN and SPCS (Sarhad Provincial Conservation Strategy) unit, the concentrations of BOD, chromium, sulfide and chloride were found to be higher at Jehangira (tanneries area) compared to Warsak and Khairabad area which are away from the industrial units⁶. Studies on deteriorating quality of underground water in some areas of NWFP have also been reported⁷⁻⁹.

According to an IUCN report, the villagers living on the banks of the Kabul river have been complaining of prevalence of skin diseases in human, maladies in livestock, reduced crops yields in areas irrigated by polluted river water, decline in fish catches and periodic death of fish due to toxic effluents discharge from the nearby industries. In December 1998, the national daily newspapers reported the death of a huge number of fish and other aquatic organisms in Shah Alam river due to heavy discharge of hot hazardous effluents from a sugar mill^{6,15}.

Survey of Tanneries and Leather Products Manufacturing Units

In a workshop organized by EPA-NWFP, for awareness raising among the owners of tanneries in NWFP, the research findings of studies on tanneries effluents and water quality and the resulting environmental and health impacts, described above were presented and discussed. As a follow-up of the recommendations of the workshop EPA, NWFP organized a survey of tanneries and leather products manufacturing units in NWFP. The observations, impressions and findings made by the survey team are summarized below:

The main aims and objectives of the survey was to get up to date information and data with regard to existing tanneries / leather manufacturing units in operation, type of tanning processes and chemicals employed, storage of raw materials, volume, type and points of discharge, condition of waste-receiving bodies, willingness of tanneries owners for cost-sharing towards designing/installation of a joint pre-treatment and recycling plant, based on processes developed locally¹⁹ and other aspects of environmental pollution and its control.

With the above aims and objectives in mind, a survey proforma comprising of over forty questions was developed (Annex 1) . It was completed for every industrial unit visited by the survey team, through on-site observations and interviews of the owners/directors or overall incharge of the unit. Altogether, 22 industrial units were visited at Peshawar, Charsadda, Nowshara, Jehangira, Mardan, Hattar (Haripur), Mansehra and Abborrabad in NWFP. A complete list of the visited industrial units is given in Annex 2

Observations and Findings

- ◆ Either of chrome tanning ,vegetable tanning and loading processes are employed by tanneries in NWFP.
- ◆ Buffaloes and cows hides/skins as well as split (2nd-grade leather) are used as raw-materials by tanneries in NWFP. Hides/skins are purchased locally, whereas split is supplied from tanneries in Punjab (Qasoor, Sialkot).
- ◆ Effluents from chrome-tanning and vegetable-tanning processes are discharged indiscriminately on the open-land around factory area or into nearby water-bodies (Budhni, Shah Alam) which ultimately join river Kabul/Indus. Total daily discharge amounts to about 3000-5000 liters/day as reported by the owners of tanneries.
- ◆ Tanneries employing loading process only (to produce blue leather) are discharging negligible liquid wastes.
- ◆ Most of the tanneries are situated 2-5 km from the populated area. However, some tanneries were found to be operating in populated areas with most un-hygienic practices with regard to waste discharge/disposal and were rendering the environment (both within the factory and outside) unsuitable for healthy living.
- ◆ Waste fleshing, a substantial and continuous by-product of both chrome and vegetable tanning processes, are causing serious threat to healthy environment, when not utilized or disposed off in time.
- ◆ None of the visited tanneries in NWFP is employing skin cancer causing preservative,PCP (pentachlorophenyl) sold in market under the trade-name, preventol or Mysotox-B.
- ◆ Tanneries and leather products manufacturing units are generating large amount of solid waste in the form of leather shavings/cuttings which are improperly dumped inside and around the factory area.

The members of the survey team were pleasantly surprised by the cooperative attitude of the owners/directors of the visited industrial units, who appreciated the EPA survey work as well EPA offer of technical assistance for monitoring of effluents/waste and in adopting pollution control measures.

Recommendations

Monitoring Studies

- (a) Effluents: The effluents from the chrome and vegetable tanning processes may be characterized and studied for their pollution load. Based on the results obtained from this study a realistic decision with regard to setting-up of a pre-treatment/recycling plant for tanneries in NWFP may be taken.
- (b) Water-bodies (Surface Water): Monitoring of the effluents receiving water-bodies i.e. Budhani, and Shah Alam streams is necessary as their water is being used by the nearby population for drinking, domestic, agricultural and recreational purposes. These streams, with all their pollution loads ultimately join Kabul river.

- (c) **Underground Water:** Examination of the quality of bore-well and tube-well water within 5 Km area of the tanneries is desirable as the effluents are discharged on the open land thus affecting the underground water which is the main source of drinking water for the inhabitants of the area.
- (d) **Soils:** Crops are grown around tannery effluent ponds. The chemical examination of the soil in the nearby area is desirable to assess its quality and the possible uptake of pollutants by the food crops.

Setting-up of Glue-Manufacturing Unit for Utilization of Fleshing Waste

Quick disposal and use of fleshing waste from the tanneries is most essential for keeping a healthy and cleaner environment within and around tanneries in NWFP. The delay in disposing it off is due to the lack of local consumption in glue manufacturing. Setting-up of a glue-manufacturing unit nearby the tanneries is a dire need and strongly recommended to free the environment from unbearable and lasting bad odor caused by fleshing waste.

Advice/Warning to Tanneries Operating in Populated Areas

Necessary advice, followed by warning, for complying with NEQS and to stop the un-hygienic practices at the earliest, may be given to the two tanneries operating in the populated areas. Government may also consider of taking necessary measures, including incentives to the tanners, for move and re-locating these units away from the populated areas.

Meeting with Tanneries owners/directors

A meeting of the owners/directors of the tanning and leather products manufacturing units in NWFP may be called to discuss the recommended follow-up/line of action.

Based on the approved formulae for pollution charge calculation and the base fee/pollution unit (Rs. 50), as proposed by Federation of Pakistan Chambers of Commerce and Industry (FPCCI) and approved by Pakistan Environmental Protection Council (PEPC)²⁷, the amount of payable pollution charge for two polluting tanning industries (discharging effluents with chromium, total suspended solids (TSS) & chemical oxygen demand (COD) levels above NEQS) in NWFP have been estimated. For a tannery with effluents discharge 500 m³/day and in operation for 150 days, the payable pollution charge for the year amounts to Rs. 28,5,084. Similarly, also based on analytical data (chromium, COD & TSS only) in annex 1 for the second tannery with effluent discharge 1000 m³/day and in operation for 180 days, the payable pollution charge amounts to Rs.18,4,169 for the year. However, to motivate the industrialists to turn their polluting industries to green industries by adopting pollution control measures (i.e. good-housekeeping practices for waste control at source, combined effluent treatment plants etc.) instead of paying full pollution charge in one year, its payment schedule has been graduated over a five years period^{14,27}.

At Pakistan Council for Scientific and Industrial Research laboratories Peshawar, studies based on methods development for pre-treatment of tanneries effluents with pH control have been carried out¹⁹. However, these preliminary investigations need to be financially supported for pilot-plant scale studies to develop a simple low-cost tanneries effluents treatment plant. Based on investigations by ETPI²¹, the net cost of mitigation through a locally manufactured primary treatment-chrome recovery plant, for treating one million m³ of tannery waste water, has been estimated to be Rs.six million²⁸. Whereas, for a cluster of tanneries within a short distance from each other, a combined effluents treatment plant is always considered a preferred option, a reliable information regarding the total volume of the

daily effluents discharge from the tanneries cluster is most important for the economic viability and the plant operation to its full capacity.

From the report of a recent case-study, by Khan et al on environmental impacts and mitigation costs associated with leather and cloth exports from Pakistan²⁸, it is evident that the cost of establishing and operating clean technology in the South are not necessarily very high on an aggregate level. The reported data on leather production and exports indicates 0.04% and 0.0048 % of GDP as benefit and cost, respectively. Even if the reported estimates may be considered very crude, the benefits far exceed the costs and therefore, stakeholders must encourage the adaptation of measures for industrial pollution control at all levels.

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Annex 1**Chemical Parameters of Tannery Effluents**

Source	Parameter (mg/L)					NEQS
	Drain	Pond	Drum	Drain	Pond	
Sample No	1.2	1.3	2.1	2.2	2.3	
Dissolved Solids	15,242	4,028	22,441	4,934	8,757	3500
Suspended solids	1,189	300	4,186	610	1,629	200
COD	2,900	376	14,267	713	1,258	150
Sulfides	11.2	8.8	128.5	8.5	64.96	1.0
Sulphates	1,118	1,090	4,088	730	705	600
Calcium	133	47.8	165.6	166	165.6	-
Magnesium	396	116	364.7	36.55	45	-
Chromium	13.12	0.6	Nil	1.16	2.32	1.0
Phenols	0.296	0.444	0.407	0.481	1.37	0.1
Dissolved Oxygen	8.5	7.5	6.4	Nil	0.4	-
PH	8.5	6.0	2.0	9.50	9.0	6-9
Temperature (C°)	21.5	19.5	19.0	17.50	17.2	40
Colour	Deal violet	Green	Violet	-	Dirty Green	-

Source: Nasreen, Khwaja & Awan, Pak. J. Sci. Ind. Res., (1995)

Annex 2 (A)**Physico-chemical Analysis (mg/L) of Underground Water in and around Tanneries Area.**

Parameters	Sample I	Sample II	Sample III	Sample IV
Location	Within Tannery Area	Within 1Km Ternaries area	Within 2 Km Tanneries area	Within Tannery Area
Source	Tube-well	Dug-Well	Dug-well	Tube-well
Color	Colorless	Colorless	Colorless	Colorless
Temperature (oC)	21	20	19	37
PH	7.5	7.0	7.0	6.8
Dissolved Solids	649	1087	1049	391
COD	Nil	Nil	Nil	0.7
Calcium	28	46	40	27
Magnesium	63	84	84	19
Sodium	89	59	67	186
Potassium	30	25	21	10
Chromium	0.03	0.05	0.03	Nil
Chloride	89	68	48	106
Sulfate	319	389	309	78
Phenol (æg/1)	Not detected	74.2	92.6	Not detected

Annex 2 (B)**Physico-chemical Analysis (mg/L) of Underground Water away from Tanneries Area.**

Parameters	Sample No V	Sample No VI	Sample No VII	Sample No VIII
Location	Sardaryab Village	Bazdeen Village	Naki Daudzai Village	GULBALA Village
Source	Dug-well	Dug-well	Dug-well	Tube-well
Color	Colorless	Colorless	Colorless	Colorless
Temperature	24	24	23	23
PH	6.5	7.0	6.5	6.5
Dissolved Solids	276	264	327	235
COD	Nil	Nil	Nil	Nil
Calcium	38	23	35	49
Magnesium	19	24	22	32
Sodium	78	92	92	14
Potassium	10	30	10	20
Chromium	Nil	Nil	Nil	Nil
Chloride	15	32	36	48
Sulfate	75	36	42	13
Phenol	Nil	Nil	Nil	Nil

Source: Nasreen & Khwaja, J.Chem. Soc.Pak (1999)

Annex 3

Survey Proforma for Tannery Industry Units in NWFP

Date of visit:

Name of the person answering the questionnaire

Designation

Qualification

Period of employment with this Tannery/Industrial Unit.

Address / Tel No

Complete Name & Address of the Tannery Unit:

Product / Type

Type of Industry:

Year of Establishment:

Ownership,

(a) Individual (b) Partnership (c) Semi govt. (d) government

Surrounding (how far off from population residence)

Organizational structure

Type of machinery used:

(a) heavy (b) medium (c) light.

Total area of the unit

Total number of persons employed

Total capacity of the unit:

(a) input (hydres) kg/shift (b) output (leather) kg/shift.

Present rate of production

No. of shifts

Raw materials used

Raw materials brought in from.

Source of water for the process/washings

Chemicals employed

(a) acids (sulphuric acid, formic acid etc.) (b) sulphides (c) alkalies (lime etc) (d) chromium salts (e) dyes/pigments (f) tannin (natural/synthetic) (g) oils (h) detergent (i) others

By-products obtained

Process type

Brief description of the manufacturing process of the main product

(a) soaking (b) liming (c) fleshing (cutting etc) (d) tanning (e) dying (f) drying (g) others

Type of waste generated

(a) Solid (b) liquid/H₂O (c) gaseous

Points of generation of waste during the manufacturing process.

(a) solid (b) liquid/H₂O (c) gas

How and where are the wastes disposed.

How	Where	Amount
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(a) solid	(b) liquid/H ₂ O	(c) gas
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Distance of waste disposal point.

Condition of waste receiving body

Basic facilities like water, electricity Tel. available or not

Any system for safety/protection.

Brief description of the steps taken if any, to curb pollution.

(a) raw materials (b) process/operation (c) wastes (d) products storage

Name and number of equipment used for transport of material/men inside tannery area.

Quality of products

(a) very good (b) good (c) fair (d) poor

Is there a laboratory in your tannery.

Is there a safety committee/incharge in your tannery.

Is there a quality control section in your tannery.

Present No of workers Permanent Temporary
(a) skilled (b) unskilled (c) semi skilled

Highest qualifications of an employee in your tannery.

Minimum education the workers has to have to be employed in the lowest salary grade of the factory.

In case answer to the above question is “No Minimum Education”; Number of workers with education less than matriculation.

Reaction/attitude of the owner/administration

(a) towards the survey works (b) towards offer of technical assistance for process development/pollution control (c) towards cooperation and support for monitoring of tanneries effluents (d) willingness for cost-sharing towards designing/installation of a joint combined pre-treatment & recycling plant. (e) any other remarks/comments

Signatures/Names/Address of survey conducting team.

Dr Mahmood A Khwaja (Team Leader)

Dr Rasool Jan (Member)

Mr Irshad Ahmad (Member)

Annex 4**Tanneries and Leather Products Manufacturing Units in NWFP**

1. Jan Leather Complex, Charsadda road, Peshawar.
2. Hayyat Tannery, Charsadda road, Peshawar.
3. Akbar Tannery, Charsadda road, Peshawar.
4. Akhtar (Al-Tawakal) Tannery, Charsadda road, Peshawar
5. Ittefaq Tannery, Naughman, Charsadda road, Peshawar.
6. Sarhad Tannery Bakhshipul, Charsadda road, Peshawar
7. Setti Tanney, Bakhshipul, Charsadda road, Peshawar
8. Qayyum Tannery, Charsadda.
9. Totti Tanneries, Near Shah Alam Bridge, Charsadda road, Peshawar
10. G.M Leather Industry, Charsadda road, Peshawar.
11. Saleem Tannery, Swabi road, Jehangira.
12. Police Welfare Ent, SIE, Peshawar.
13. Pezar, SIE, Hayatabad, Peshawar
14. Pak-China Shoes (Family Shoes) SIE, Peshawar
15. Hattar Shoes, Haripur.
16. Awami Shoes and Leather Industries HIE, Haripur.
17. Afghan Shoes Industry, SIE Peshawar
18. Mall Leather, Azakhel, Nowshera,
19. F.A Leather, Nowshera
20. Continent Leather, SIE Mardan
21. Jasco Shoes (janjua and Co), SIE, Abbottabad
22. Kungton Shoes Industry, SIE Mansehera

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