

# Watch Your Step!

A Study on the Social and Environmental Impacts of Tanneries in Uttar Pradesh and Tamil Nadu, India





## Abbreviations

BCS	Basic Chromium(III) Sulphate	INR	Indian Rupee
BOD	Biological Oxygen Demand	MoEF	Ministry of Environment and Forests
CCRP	Common Chrome Recovery Plant	NCEUS	National Commission for Enterprises in Unorganised Sector
CETP	Common Effluent Treatment Plant	OBC	Other Backward Caste
CLE	Council for Leather Exports	PCB	Pollution Control Board
COD	Chemical Oxygen Demand	PETP	Primary Effluent Treatment Plant
COPR	Chromite Ore Processing Residue	PPE	Personal Protective Equipment
CPCB	Central Pollution Control Board	RSBY	Rashtriya Swasthya Bima Yojana / National Health Insurance Scheme
Cr(III)	Trivalent Chromium	SC	Scheduled Caste
Cr(VI)	Hexavalent Chromium	STP	Sewage Treatment Plant
CRP	Chromium Recovery Plants	TB	Tuberculosis
CRS	Chromium Recovery System	TCCL	Tamil Nadu Chromates and Chemicals Limited
EI	East India Tanning method	TDS	Total Dissolved Solids
EPA	Environmental Protection Agency (USA)	TNPCB	Tamil Nadu Pollution Control Board
EPF	Employees' Provident Fund	TSS	Total Suspended Solids
ESI	Employees' State Insurance	UNGPs	UN Guiding Principles for Business and Human Rights
ETP	Effluent Treatment Plant	WHO	World Health Organization
FAO	UN-Food and Agricultural Organisation	XRF	X-Ray Fluorescence
FAS	Ferrous Ammonium Sulphate	ZLD	Zero Liquid Discharge
IC	Ion Chromatography		
ICP-MS	Inductively Coupled Plasma Mass Spectrometry		
ILO	International Labour Organisation		



**Chromium contaminated water used for washing, bathing and as drinking water in times of water shortage, village of Khan Chandpur near COPR dumpsite**

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## Executive Summary

This study focuses on the impacts of Indian leather tanneries – on nearby communities, on the local environment and on tannery workers. Interviews with workers and other stakeholders were conducted and samples of soil and water around tanneries were collected to document environmental pollution and health hazards, particularly those connected to the toxic chemical hexavalent chromium. The research was carried out in the two Indian states of Uttar Pradesh (Kanpur and Agra) in the North and Tamil Nadu (Peranambut, Ambur and Chrompet) in the South. The main findings are summarized below.

Chrome tanning is the most common form of tanning in the research areas. It consumes considerable amounts of water and uses different chemicals during the process. It produces high amounts of wastewater and solid waste.

The study shows that large areas surrounding the tanneries suffer considerable lasting pollution and environmental damage, as effluents and solid wastes are often not treated according to legal and environmental requirements. This pollution causes severe threats to the health of local communities. Improper disposal of solid wastes and ineffective treatment of tannery effluents are a major risk to local soil and water resources. Almost all residents interviewed said that the quality of groundwater in their living areas had deteriorated since the tan-

neries had started operations. Residents reported that solid wastes such as leather and trimming scraps were frequently dumped on roadsides and were sometimes burnt in the open. Moreover, treated tannery wastewater is used for irrigation or is mixed with sewage sludge and applied on the fields as fertilizer. This may have adverse effects on crop growth and therefore affects the livelihood of the rural population in these areas.

Furthermore, the majority of workers employed in the leather sector in India work under precarious conditions. Low wages, lack of regular employment relationships (no contracts or salary slips), lack of Employee State Insurance (ESI) and Employee Provident Fund (EPF) coverage, as well as long working hours are among the main problems faced by tannery workers. For instance, almost all the workers interviewed are engaged at the tanneries on a temporary basis without any job security. They reported that temperature and noise levels within the tanneries were too high. In addition, workers experience a number of work-related health problems, such as cold and fever, pain in the muscles and joints, skin diseases, respiratory problems, and eye irritation. These occupational health hazards are directly linked to the lack or insufficiency of personal protective equipment. Finally, workers are exposed to a social stigma associated to tanneries, as traditionally only the socially most backward castes (Dalits or Scheduled Castes) and Muslims have been employed in this sector in India.

## 1. Introduction



*Finished leather from tannery in Kanpur destined for export*

Every one of us wears shoes every day. But do we ever ask ourselves where the leather comes from to make our shoes? How is the skin of an animal turned into a shoe? Who does this work and under what conditions?

This report takes us on a journey to the beginning of a leather shoe. The report looks at the leather industry in India and reveals the social and environmental impacts of tanneries. It provides a glimpse at the adverse conditions at tanneries in India, where people work with minimal or no protective gear, for payment below the minimum wage and no social security benefit. The workers themselves suffer from occupational diseases and the communities around the tanneries have to deal with polluted rivers and drinking water and the dumping of solid waste without regard to environmental standards and rules.

The process of making leather from animal skin is called tanning. Historically this was done with vegetable extracts



but it is now generally done with metal salts, mostly chromium salt. The leather industry in India is one of the most labour intensive sectors, and provides employment to 2.5 million people in India in formal and informal settings. The organized tannery sector alone provides employment to 100,000 persons.<sup>1</sup> There is no direct reference to how much leather contributes to Indian GDP, but the Ministry of Statistics and Programme Implementation (MoSPI) data released at the end of March 2017 reveals that textiles, apparel and leather products contribute 2.4 per cent of gross value added for 2013–2014.<sup>2</sup> Despite being a large-scale employer, the country's leather industry is known to have poor labour and environmental standards, characterized by lax enforcement of rules and regulations. The use of outdated technology, non-compliance with safety norms, ineffective handling of tannery effluents and solid wastes, and health hazards to workers and local communities are some of the major problems plaguing the leather industry in this country.

The vast majority of workers in the leather sector, especially those in the tanning industry, belong to socially and economically backward classes. Traditionally the Dalits or Scheduled Castes (SCs) were in charge of flaying the animals, curing and de-hairing the skins and turning them into leather that could be used for furniture and shoes. In Tamil Nadu, close to 80 per cent of workers in various leather-related industries belong to Dalit communities, while around 20 per cent are Muslims.<sup>3</sup> Social factors such as religion and caste continue to play a major role in perpetuating poor labour conditions in the sector. Low wages, casualization of labour, informal working conditions, health and occupational safety hazards, and the absence of trade unions are other major problems faced by tannery workers in India.

The leather industry is one of the most polluting industries because of its intensive use of toxic chemicals. In spite of vast technological advances, tanneries in India are still grappling with the problem of managing toxic effluents and solid wastes in a safe and sustainable manner. The process of leather tanning also requires large quantities of water, putting enormous stress on surface water and groundwater resources.

The industry as a whole has witnessed drastic change in the last three decades, shifting focus from the export

of raw materials to the export of value-added leather products. According to the Council for Leather Exports (CLE)<sup>4</sup>, India produces 3 billion square feet of raw leather annually. This is bigger than the surface of the entire city of Frankfurt. India is home to 20 per cent of the world's cattle (cow and buffalo) and 11 per cent of its sheep and goats, and is thus endowed with the natural resources to become a significant exporter of leather goods. Between April 2016 and March 2017, India had exported US\$ 5,665.91 million worth of leather products, ranging from finished leather to leather footwear and leather footwear components, making it the fourth largest exporter of leather goods in the world.<sup>5</sup>



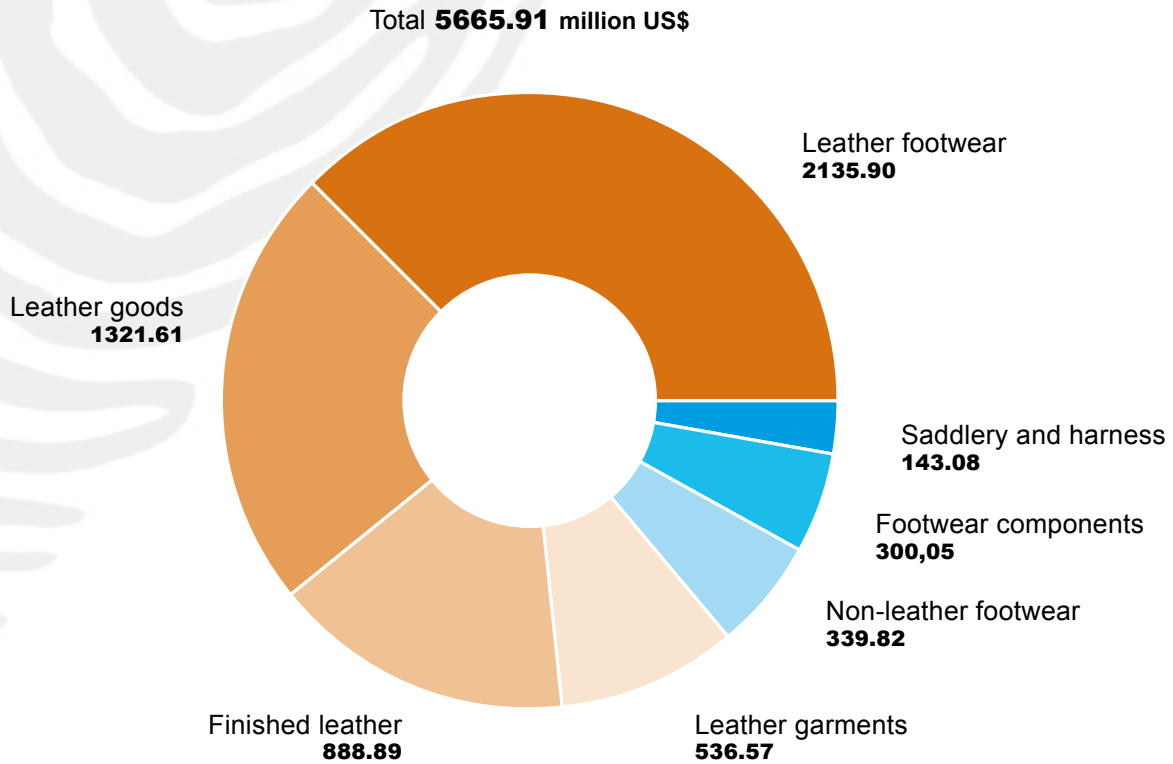
*Tannery worker in Kanpur treating wet-blues*



*Effluent from tanning area in Kanpur reaching a tributary of the Ganges*

- 1 Ministry of Commerce and Industry (2015). Development of Tannery/Leather Industry, accessed on 13 October 2017. <http://pib.nic.in/newsite/PrintRelease.aspx?relid=121413>
- 2 Statistics times (2017). Sector-wise contribution of GDP of India, accessed on 13 October 2017. <http://statisticstimes.com/economy/sector-wise-gdp-contribution-of-india.php>
- 3 India Committee of the Netherlands (2017). Do Leather Workers Matter? Violating Labour Rights and Environmental Norms in India's Leather Production. <http://www.indianet.nl/pdf/DoLeatherWorkersMatter.pdf>
- 4 Council for Leather Exports (CLE). Industry At a Glance, accessed on 13 October 2017. <http://leatherindia.org/industry-at-a-glance/>
- 5 Government of India. Ministry of Commerce and Industry (2017). Towards Sustainable and Lasting Growth. Annual Report 2016-2017. [http://commerce.gov.in/writereaddata/uploadedfile/MOC\\_636281140249481285\\_annual\\_report\\_16\\_17\\_eng.pdf](http://commerce.gov.in/writereaddata/uploadedfile/MOC_636281140249481285_annual_report_16_17_eng.pdf)

**Table 1** Export of leather products in million US\$ (2016 – 2017)



Source: Centre for Leather Exports and Directorate General of Commercial Intelligence & Statistics.

India exports finished leather to Hong Kong, Italy, China, Vietnam, South Korea, and the USA. Leather and hides attract high export taxes, so account for a smaller percentage of the business. The greater part – 81 per cent of exports – is finished leather products such as footwear and footwear components, leather articles (e.g. handbags, jewellery boxes, and travel goods), and leather garments (e.g. jackets, jerseys, gloves, and belts). These are mainly exported to USA, Germany, UK, Italy, Spain, France, Hong Kong, UAE, China, The Netherlands and Belgium. Those eleven countries together account for approximately 75 per cent of leather goods exports from India.

This report has been prepared by GLOBAL 2000 and INKOTA-netzwerk in collaboration with Cividep India, Society for Labour and Development and Eco Friends. The study was undertaken to get an insight into the labour and occupational health conditions of workers in tanneries in India and to understand the environmental impacts caused by the leather producing industry. By doing this, we shine a light on the lack of transparency in global supply chains related to leather shoe production. Chapter two gives an overview of the leather industry in

India and zooms in to two leather producing hubs in Uttar Pradesh and Tamil Nadu. The third chapter introduces the tanning process and environmental risks associated with it. Chapter four talks about working conditions and occupational health hazards in tanneries while chapter five looks at labour and environmental legislation governing this sector. Chapter six describes the results of field research in North and South India. This included interviews with tannery workers, the communities living around tanneries and other stakeholders, as well as water and soil sampling in North India to document environmental pollution and human and animal health hazards caused by tannery effluents and the disposal of solid waste in the open.

Finally, the report concludes with recommendations to state authorities in India, tanneries supplying leather to factories that manufacture shoes for international brands, as well as international brands that, according to the UN Guiding Principles for Business and Human Rights (UNGPs), have a responsibility to protect and respect human rights along their entire supply chain and to give access to remedy to victims of human rights abuses.



*Drying of wet-blue, Kanpur*

## 2. The Leather Industry in India

There are around 2,000 tanneries in India, of which 75 per cent are small-scale units, 20 per cent are medium sized and only five per cent are large-scale units. The size is based on the capacity per day to process wet salted hides/skins. Large units have a processing capacity of >5,000 kg, medium are those with a capacity of 2,000–5,000 kg and small are those with a capacity of processing <2,000 kg of wet salted hides/skins per day.<sup>6</sup> The major producers of leather in the country are Tamil Nadu, which has tanneries as well as export-oriented footwear production in Ambur and adjacent areas; Uttar Pradesh with Agra for leather footwear and Kanpur for tanneries and footwear production; and West Bengal, in and around Kolkata and Punjab. In North India, Kanpur has been the largest supplier of tanned leather and is the major source, especially of cow or buffalo leather for a cluster of footwear manufacturers in Agra and other regional manufacturing clusters.

The Jajmau area in Kanpur has been a major tanning centre for 140 years. It is strategically located between Kolkata and Delhi which are both important centres for garment and leather industries. According to Rakesh Jaiswal, director of Eco Friends, an NGO working on conservation and protection of the Ganges river in Kanpur, by the 1980s there were over 150 tanneries in the city.

Most of them used the vegetable tanning process, as it was the most suitable process for tanning buffalo leather, which this cluster specialised in. It is only in the last two decades that chrome tanning has become more popular. Until 1965 the local tanneries were mainly catering to defence requirements and the local market. From 1970 onwards, export of vegetable-tanned sole leather and chrome-tanned upper leather increased. There are an estimated 400 tanneries in Kanpur today and most of them do chrome tanning. The stretch of Ganges river along Kanpur is described as highly polluted due to the discharge of untreated domestic and industrial wastewaters. The tanneries located in the Jajmau area of the city of Kanpur on the south bank of river Ganges are major contributors of industrial waste discharged into the river. Based on production capacity and number of tanneries, the number of workers in Jajmau can be estimated to be around 50,000. The demand for leather has grown leading from a production capacity of 250 tonnes per day in the 1980s to 1,000 tonnes per day now.<sup>7</sup>

The state of Tamil Nadu is one of the major centres of leather production in India, contributing over 40 per cent of leather goods exported from the country. The state also accounts for 60 per cent of the total leather tanning capacity in the country, with Vellore district alone

6 Gupta, S. et al. (2014). Tannery Clusters in India and waste management practices in tannery intensive states – inventory and status. In: IOSR Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT) Volume 8, Issue 4 Ver. II, 88-96.

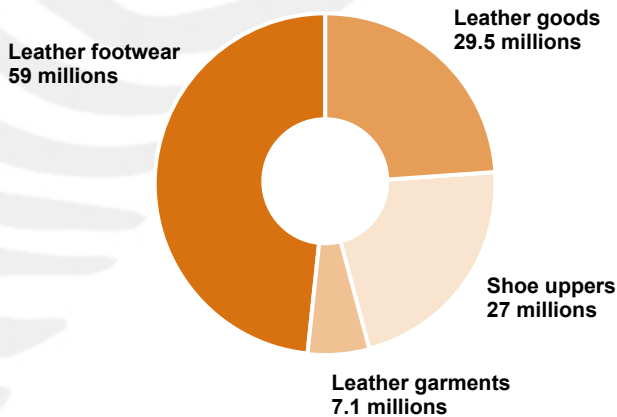
7 Information given by Rakesh Jaiswal from Eco Friends in written form and in interviews during a field visit to Kanpur conducted by GLOBAL 2000 and Südwind in April 2017.





contributing 36 per cent.<sup>8</sup> There are over 700 tanneries operating in Tamil Nadu, most of which are concentrated in nine small towns. With 497 units manufacturing shoe uppers and complete shoes, and 698 units manufacturing leather garments and other goods, Tamil Nadu is a major hub for the manufacturing of export-oriented leather products.<sup>9</sup>

**Table 2** Leather goods produced in Tamil Nadu



With more than 400 units, Vellore district has the highest number of tanneries in Tamil Nadu, spread over five small towns - Ranipet, Melvisharam, Ambur, Vaniyambadi and Peranambut.<sup>10</sup> Chrompet, near Chennai (the capital city of Tamil Nadu) is another big leather cluster with a large number of small and medium sized tanneries. Erode, Dindigul and Trichirapalli are the other towns in the state with a sizeable number of leather tanneries.

The tanneries and leather footwear industry of Vellore employ over 100,000 people directly, and another 250,000 workers indirectly<sup>11</sup> as informal workers or

daily wage labourers who are engaged in loading and unloading of leather and transporting hides, wet-blues (semi-finished chrome-tanned leather) and finished leather from the tanneries to factories. Although women are employed in large numbers in the footwear and leather goods manufacturing units, they have a smaller presence in the tanneries segment. Altogether, women



*Shoe upper produced by homeworkers in Agra*

constitute 25 to 35 per cent of the total workforce in the leather sector in Tamil Nadu.

Chrome tanning is predominant in tanneries in Tamil Nadu, where only 30 per cent of all tanned leather is processed through the vegetable tanning or East India (EI) tanning method, which does not use chromium. Erode is the largest center for wet-blue production in the state. While tanneries in Vaniyambadi, Ambur, Trichy and Dindigul process goat or sheep skins, tanneries concentrated in Ranipet, Peranambut, Erode and Pallavaram mostly use cattle hides.<sup>12</sup>

### 3. Leather Tanning and its Environmental Impacts

Tanning is the process where the raw hide of the cattle and livestock is converted into semi-finished or finished leather. The skin of cattle (cow and buffalo) is called hide and that of sheep and goat is called skin. The first stage includes curing the raw hides and skins. This

includes storage of the skin so that it does not decompose, de-hairing and removal of flesh. Afterwards, the cured hide or skin is treated with vegetable extracts or chemicals. Chromium sulphate is mostly used for chrome tanning. It takes only a few hours for the tanned

8 The All India Skin and Hide Tanners and Merchants Association (AISHTMA). Tamil Nadu in Leather Map of World, accessed on 13 October 2017. <http://www.aishtma.com/leathermap.html>

9 Government of Tamil Nadu. Leather Industry at a Glance, accessed in September 2017. [http://www.investingintamilnadu.com/tamilnadu/sector\\_presentation/presentation\\_tamilnadu.php?mode=11](http://www.investingintamilnadu.com/tamilnadu/sector_presentation/presentation_tamilnadu.php?mode=11)

10 Frontline (2017). No skin in the game, Print edition - July 7, 2017. <http://www.frontline.in/cover-story/no-skin-in-the-game/article9731110.ece>

11 Frontline (2017). No skin in the game, Print edition - July 7, 2017. <http://www.frontline.in/cover-story/no-skin-in-the-game/article9731110.ece>

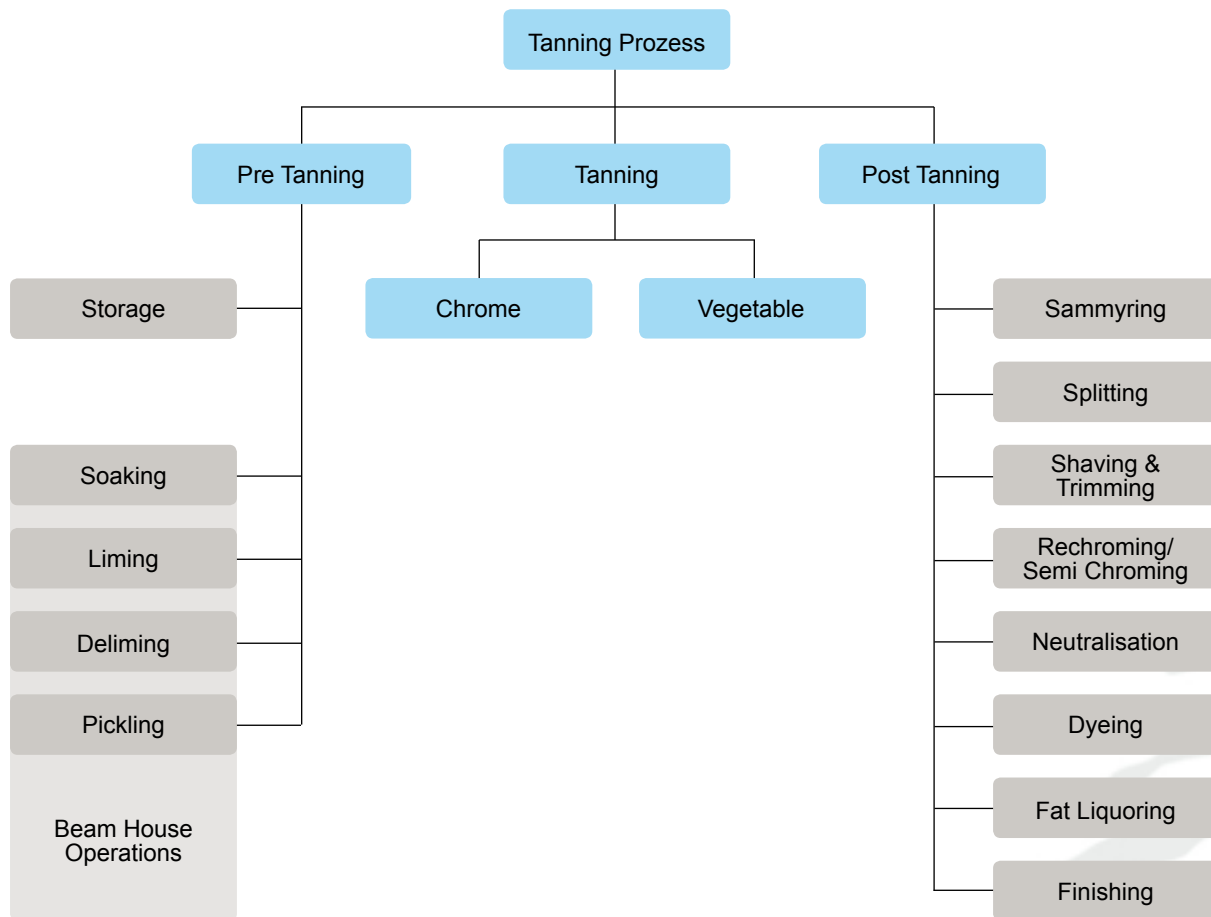
12 Gupta, S. et al. (2014). Tannery Clusters in India and waste management practices in tannery intensive states – inventory and status, In: IOSR Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT). <http://iosrjournals.org/iosr-jestft/papers/vol8-issue4/Version-2/N08428896.pdf>



leather to be ready when it is treated with chromium as compared to a few days when treated with vegetable extracts. Various studies have indicated the contamination of soil and water by chemicals and waste generated in the tanning industry. Hazardous chemicals such as sulfuric acid, formic acid, ammonia and other salts and

chemical-based dyes are used extensively in the tanning industry. Processing 1,000 kg of raw hide requires 500 kg of chemical substances, and leaves approximately 600 kg of solids and 15 to 50 cubic metres of effluents as residue as residue, depending on the type of leather being produced.<sup>13</sup>

**Table 3** The Tanning Process<sup>14</sup>



**Municipal sewage and effluents from tanneries running through poor living district near tanning area Jajmau, Kanpur**



**Drying of tanned leather, Kanpur**

13 European Commission (2013). Best Available Techniques (BAT). Reference Document for the Tanning of Hides and Skins. [http://eippcb.jrc.ec.europa.eu/reference/BREF/TAN\\_Adopted552013.pdf](http://eippcb.jrc.ec.europa.eu/reference/BREF/TAN_Adopted552013.pdf)

14 IL&FS EcoSmart for the Ministry of Environment and Forests, Government of India (2010). Technical EIA Guidance Manual for Leather/Skin/Hide Processing Industry.

In this report we focus on environmental pollution in India linked to chrome tanning in the states of Uttar Pradesh in the North and Tamil Nadu in the South of India. This link to chrome tanning is why we look mainly at chromium as a source of pollution. Chromium contaminates water bodies through poorly treated or untreated industrial wastewater as well as the leaching of chromium from solid tannery wastes dumped on open land. Chromium also reaches surface water and groundwater through the application of toxic sewage sludge and irrigation water on fields. From soil it slowly trickles to lower ground layers and to deep aquifers, thus posing a risk to drinking water in vast areas around tanning industries.



*Solid waste from tanning discarded along river bank in Kanpur*

### 3.1 Chrome Tanning – The Difference between Trivalent and Hexavalent Chromium

Chromium commonly occurs in two forms. Trivalent chromium or chromium III (Cr(III)), a naturally occurring element that is relatively stable and does not cause health problems in general, and hexavalent chromium or chromium VI (Cr(VI)). Cr(VI) has a different path of cellular uptake than Cr(III). Cr(VI) is known to be highly toxic, mutagenic and carcinogenic to humans and animals. Its negative health effects depend on the route of exposure. For example, inhaling Cr(VI) can cause damage to the respiratory system, whereas dermal exposure generally does not, but can cause severe skin irritation. The de-

gree of its toxicity depends on the type of exposure, e.g. whether the substance is taken orally, via the skin, or inhaled. Usually, Cr(III) is used for the tanning of leather. Cr(VI) is not intentionally used in the process, but may be formed under certain conditions during the process and in ageing leather. Such conditions can develop by an indirect oxidation route, through the use of an intermediate chemical, or UV irritation.

### 3.2 Water Consumption and Contamination

Leather tanning requires large quantities of water. A study shows that 40 to 45 litres of water are required to process 1 kg of raw hide or skin.<sup>15</sup> Therefore, many tanneries are located on riverbanks. Groundwater reserves have been exploited extensively by industrial activities such as the leather industry, posing a grave challenge to farmers and other residents in the surrounding areas.<sup>16</sup> In addition to the exploitation of surface water and groundwater sources, river basins are affected by illegal discharge of tannery effluents into their systems.

The tanning processes contribute significantly to chemical oxygen demand (COD), total dissolved solids (TDS), chlorides, sulfates and heavy metal pollution in water bodies. The salt used for preserving the skin or raw hide discharges a huge amount of pollution load in terms of TDS and chlorides. Other major polluting chemicals used in the tanning industry are lime, sodium sulphide, ammonium salts, sulphuric acid, chromium salts, dyes, phenolics and vegetable tanning materials.<sup>17</sup>



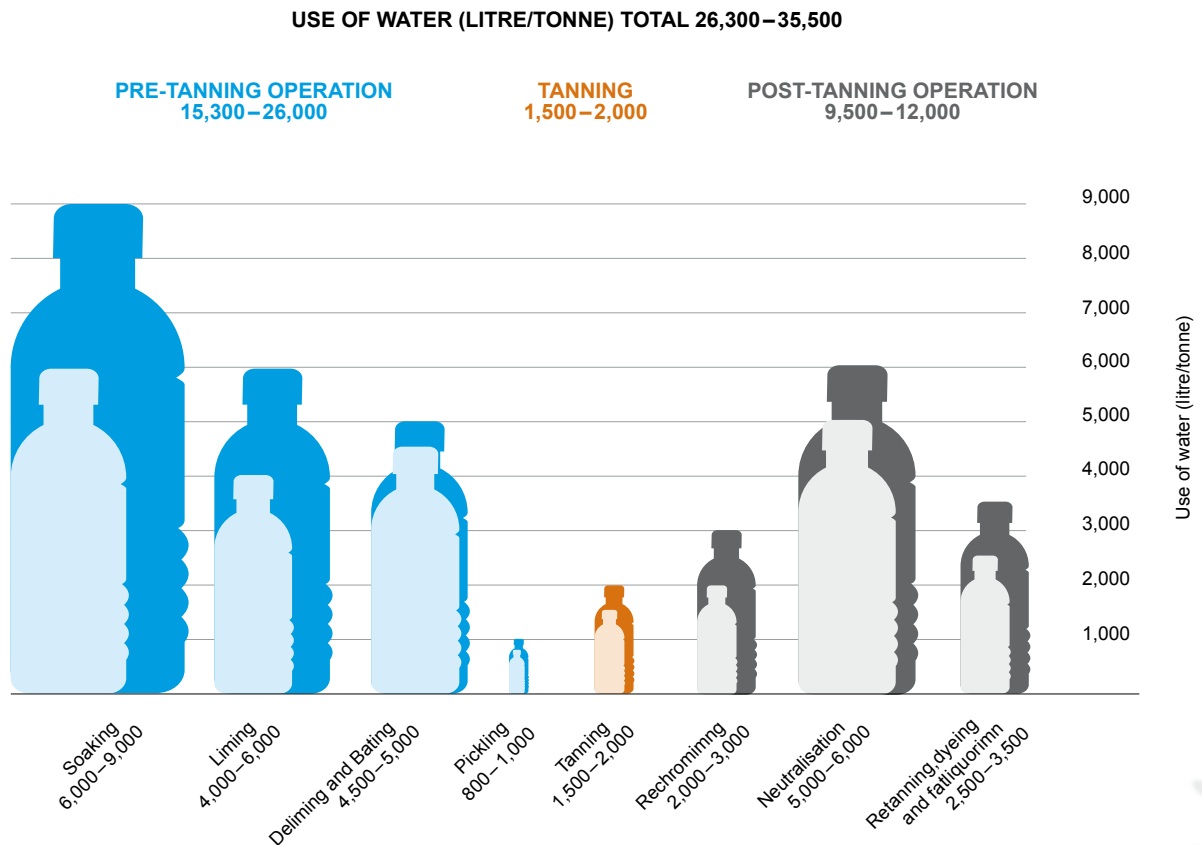
*Water sample from Ganges downstream of tanning area Jajmau*

15 Sundar, V. J. et al. (2001). Water Management in Leather Industry, In: Journal of Scientific & Industrial Research, Vol.60, 443-450. [http://nopr.niscair.res.in/bitstream/123456789/26498/1/JSIR%2060\(6\)%20443-450.pdf](http://nopr.niscair.res.in/bitstream/123456789/26498/1/JSIR%2060(6)%20443-450.pdf)

16 Tamil Nadu Technology Development and Promotion Centre (2007). Case Study Of The Leather Industry In Tamil Nadu, accessed in September, 2017. <http://www.tntdpc.com/technoblaze/may/casestudy.pdf>

17 World Bank Group (2007). Environmental, Health, and Safety Guidelines for Tanning and Leather Finishing. <http://www.ifc.org/wps/wcm/connect/de6c3d00488556f2bb14fb6a6515bb18/Final+-+Tanning+and+Leather+Finishing.pdf?MOD=AJPERES>

**Table 4** Water requirement for tanning process<sup>18</sup>



According to the World Health Organization (WHO) chromium concentrations in groundwater are generally low: less than one microgramme per litre (hereinafter µg/l).<sup>19</sup> Generally speaking, the chromium content of water reflects the extent of industrial activity. Therefore, over time, industrial activities and weak environmental laws have led to the pollution of groundwater with heavy metals like chromium around the world. This contamination is especially high in industrialized areas in the Global South: “Apart from the generation of large volumes of Cr(VI) dissolved in industrial wastewater, indiscriminate disposal of Cr-rich wastewater to land has resulted in contamination of groundwater with Cr(VI).”<sup>20</sup> Another agent is the disposal of chromium-containing solid waste and sewage sludge from tanneries on land and fields, also adding to the contamination of groundwater with chromium (see BOX 1).

**BOX 1** Heavy Metals Putting Agricultural Production at Risk

One of the most worrying ecological problems worldwide is the pollution of agricultural soils with heavy metals. One of them is chromium, which naturally occurs in soils, but is on the rise due to external sources in relation to increased industrial activities.<sup>21</sup> Such sources of chromium in agricultural soils are above all contaminated irrigation water and sewage sludge used as fertilizer. Besides the contamination of groundwater, elevated levels of chromium in soil are possibly toxic for certain plants – they severely affect the mitotic process and reduce seed germination. Studies report on a drastic reduction of crop yields (25 to 40 per cent) over the years in highly polluted areas. Furthermore, chromium is assumed to enter the human food chain by the eating of affected crops.<sup>22</sup>

18 Sundar, V. J. et al. (2001). Water Management in Leather Industry, In: Journal of Scientific & Industrial Research, Vol.60, 443-450. [http://nopr.niscair.res.in/bitstream/123456789/26498/1/JISR%2060\(6\)%20443-450.pdf](http://nopr.niscair.res.in/bitstream/123456789/26498/1/JISR%2060(6)%20443-450.pdf)

19 World Health Organization (1996). Guidelines for drinking-water quality. Health criteria and other supporting information, 2nd ed. Vol. 2., Geneva.

20 Avudainayagam, S. et al. (2003). Chemistry of Chromium in Soils with Emphasis on Tannery Waste Sites, 81f. [https://www.researchgate.net/publication/10655130\\_Chemistry\\_of\\_Chromium\\_in\\_Soils\\_with\\_Emphasis\\_on\\_Tannery\\_Waste\\_Sites](https://www.researchgate.net/publication/10655130_Chemistry_of_Chromium_in_Soils_with_Emphasis_on_Tannery_Waste_Sites)

21 Ludwig, Axel (1996). Chrom(III) und Chrom(VI) in einer mit Gerbereischlamm belasteten Ackerfläche bei Weinheim. Diplomarbeit, Universität Heidelberg.

22 Rangasamy, S. et al. (2015). Chromium contamination in soil and groundwater due to tannery wastes disposals at Vellore district of Tamil Nadu, In: INTERNATIONAL JOURNAL OF ENVIRONMENTAL SCIENCES, Vol. 6, N.1, 114-124.





*Common Effluent Treatment Plant (CETP) in Kanpur treating tannery wastewater*

### 3.3 Wastewater Treatment

Wastewater should not be released into the environment untreated because it is highly contaminated and can be harmful to nature and humans. Effective treatment of effluents from the tanneries is one of the biggest challenges faced by the leather industry in India. Despite state laws which regulate the tanneries and oblige them to adopt anti-pollution measures, there have been numerous instances when the norms were grossly violated. In most cases judiciary interventions were required to make the tanneries accountable and to force government agencies such as the State Pollution Control Boards to take action. The following section highlights the situation and challenges of wastewater management by tanneries in Uttar Pradesh and Tamil Nadu.

#### 3.3.1 Uttar Pradesh

Primary treatment of the tannery wastewater in a Primary Effluent Treatment Plant (PETP) and chrome recovery is the responsibility of the tanneries while secondary treatment is the responsibility of the government-owned Common Effluent Treatment Plant (CETP). The medium and large sized tanneries are required to have their own chrome recovery system while for smaller tanneries a Common Chrome Recovery Plant (CCRP) is owned and operated by the government. CCRP is responsible for collection of chrome laden wastewater from each small tannery.

Although all the tanneries in Uttar Pradesh were required to install PETP before the commissioning of CETP in 1994, 127 out of roughly 250 tanneries in Kanpur area

only installed PETP after 1998. Through the primary treatment process suspended particles (all kinds of solids) are settled and removed. The wastewater after primary treatment should not have more than 600 mg/l of total suspended solids (TSS) and chromium concentration should not exceed 2 mg/l (revised standard 2000). In 2016, the TSS (ranges between 1,500–3,500 mg/l) and chromium (40–140 mg/l) contents of the wastewater reaching the CETP were very high.

The wastewater of the Kanpur tanning area Jajmau is conveyed to open drains connected to the pumping stations. However, due to the increase in the number of tanneries, those drains are now overflowing into storm water drains, allowing wastewater to reach the Ganges river without any treatment. The pumping stations which were designed for 9 million litres per day capacity are not able to cope with the increased flow of effluents and this leads to the failure of the entire collection network.

All the chrome tanning units should have installed Chrome Recovery Plants (CRP) before the commissioning of the CETP in 1994 but most tanneries in Uttar Pradesh only installed CRPs between 2000 and 2005. This would have trapped the toxic chromium at source. Now all the medium and large sized tanneries (those processing more than 50 hides a day) have a CRP, and a Common Chrome Recovery Plant (CCRP) was introduced for the small tanneries with government support. The CCRP runs under capacity – it runs regularly with chrome liquor reaching the plant ranging between 3,000 litres to 10,000 litres against an installed capacity of

70,000 litres. A large number of tanneries have yet to set up the chrome-laden wastewater segregation and collection system. Currently all the tanneries have constructed Chrome Recovery System (CRS) but very few tanneries are using it for recovery and reuse of chromium. Furthermore, the presence of very high levels of chromium (100–200 mg/l) in the tannery effluent reaching the CETP hampers the rate of activity of microorganisms in the biological processes to stabilize the organic matter. This obviously has a negative effect on the treatment process, and the quality of the post-treated effluent which is being supplied for irrigation.

### 3.3.2 Tamil Nadu

The leather industry in Tamil Nadu responded to the judicial intervention in 1995 by opening Central Effluent Treatment Plants (CETPs) in all the major leather clusters (13 CETPs are currently in operation). Despite the setting up of CETPs as well as individual ETPs by tanneries, pollution caused by tannery effluent continues unabated. According to a performance audit carried out by the Central Pollution Control Board (CPCB) in 2005, only a few CETPs were meeting the norms prescribed by the Tamil Nadu Pollution Control Board (TNPCB) at the time, and none of the CETPs had been issued Consent Orders by the Board. The audit also confirmed that chromium-bearing wastes were being handled in an unscientific manner.<sup>23</sup>

In 2013 the TNPCB ordered the closure of a CETP in Ambur along with 56 tanneries connected with it for failing to adhere to the safety norms prescribed by the Board and for discharging untreated effluents into the open.<sup>24</sup> Though the TNPCB has enforced zero liquid discharge (ZLD) norms in CETPs and ETPs at tanneries, doubts have been raised about the tanneries' ability to adhere to the norms. The infamous incident at a Ranipet CETP in 2015, in which a wall collapsed at a safety landfill (SLF) and killed ten workers in a nearby tannery, is a case in point.

The report<sup>25</sup> of a Multi-Disciplinary Group (MDG) setup on the orders of the National Green Tribunal in 2016 identifies serious lapses in the functioning of seven CETPs in Vellore district. It confirmed operational defi-

ciencies, such as the spillage of chemicals, discharge or overflow of untreated effluents and cracks in the walls of safety landfills (SLF). The report also confirmed the presence of Total Dissolved Solids (TDS) beyond permissible levels in the groundwater samples tested near the CETPs.

### 3.4 Solid Waste

In addition to the risks associated with effluents, tanneries also produce large amounts of solid waste. In India, it is estimated that 50,000 tonnes of solid waste are generated from chromium-mediated tanning by the industry every year.<sup>26</sup> Solid waste left over from the tanning process contains raw hide trimmings, wet blue trimmings, flesh and other animal remains and chrome buffing dust. Out of 1,000 kg of raw hide about 600 kg is generated as



*Sewage sludge from tannery wastewater*



*Processing of solid tannery waste into glue, chicken feed and manure*

- 23 Central Pollution Control Board. Performance Status of Common Effluent Treatment Plants in India, accessed in September 2017. [http://cpcb.nic.in/upload/Publications/Publication\\_24\\_PerformanceStatusOfCETPsInIndia.pdf](http://cpcb.nic.in/upload/Publications/Publication_24_PerformanceStatusOfCETPsInIndia.pdf)
- 24 The Hindu (2013). TNPCB closes CETP, 56 tanneries, Print edition - November 28, 2013. <http://www.thehindu.com/todays-paper/tp-national/tp-tamilnadu/tnpcb-closes-cetp-56-tanneries/article5400095.ece>
- 25 National Green Tribunal. Application No.41 of 2015 (SZ), accessed in September 2017. [http://www.greentribunal.gov.in/Writereaddata/Downloads/41-2015\(SZ\)OA-JUG-7-4-2016.pdf](http://www.greentribunal.gov.in/Writereaddata/Downloads/41-2015(SZ)OA-JUG-7-4-2016.pdf)
- 26 Avudainayagam, S. et al. (2003). Chemistry of Chromium in Soils with Emphasis on Tannery Waste Sites. [https://www.researchgate.net/publication/10655130\\_Chemistry\\_of\\_Chromium\\_in\\_Soils\\_with\\_Emphasis\\_on\\_Tannery\\_Waste\\_Sites](https://www.researchgate.net/publication/10655130_Chemistry_of_Chromium_in_Soils_with_Emphasis_on_Tannery_Waste_Sites)



solid waste in leather processing.<sup>27</sup> Only 150 kg of raw material is converted into leather.<sup>28</sup> In addition to this, dry sludge of about 150 kg is generated from the pre-treatment plant PTP & CETP per tonne of raw material processed.

In the Jajmau area, most of this solid waste is either disposed off along the river bank or crudely processed on open land into glue, chicken feed and manure by around 50 illegal units.<sup>29</sup>

## 4. Working Conditions and Occupational Hazards in Tanneries

The majority of workers employed in the leather sector in India work under precarious conditions. Low wages, casualization of labour, lack of Employee State Insurance (ESI) and Employee Provident Fund (EPF) cover, and long working hours are some of the main problems faced by the workers in the leather sector.

The leather sector's established minimum wage of INR 126,48 per day (INR 3,794 or Euro 49 per month), set by the Government of Tamil Nadu, is one of the lowest in the country. In Uttar Pradesh the minimum wage is INR

directly proportional to their daily productivity. This leads to very long working hours. A lack of formal employment contracts and the casualization of labour in the leather industry as a whole have resulted in the exclusion of workers from social security benefits such as ESI and EPF.<sup>31</sup> A lack of labour organization in tanneries is another reason for the prevalence of poor working conditions. Workers who engage in union activities face severe consequences, including suspension or even dismissal.<sup>32</sup>

A large number of migrant workers from Bihar, West Bengal and other North Indian states are employed in leather clusters in South India like Ranipet and Chrompet. The working conditions of these migrants, who are usually accommodated within tannery premises, are even more precarious.<sup>33</sup>

Tannery workers are prone to a variety of occupational health and safety hazards associated with toxic chemicals, dangerous machinery and equipment. Due to lax enforcement of regulations, tanneries adopt a callous attitude towards training workers on occupational safety measures, leaving them unaware of the risks associated with their work. They experience health problems such as intermittent fever, coughing, eye irritation, severe headaches, acute pain in the bones, joints or muscles, and nausea.<sup>34</sup> In addition to this, workers at tanneries are prone to occupational injuries such as cuts and burns, because they lack adequate personal safety equipment.<sup>35</sup> In 2015, a major accident at a Common Effluent Treatment Plant (CETP) in Ranipet led to the death of ten tannery workers.<sup>36</sup>



*Tannery worker in Kanpur*

7,250 per month (Euro 94,2). Workers in the sector, especially those in tanneries, are often paid even less than the legal minimum wage.<sup>30</sup> Most workers in the tanneries work on piece rate basis, and workers' incomes are

- 27 European Commission (2013). Best Available Techniques (BAT). Reference Document for the Tanning of Hides and Skins. [http://eippcb.jrc.ec.europa.eu/reference/BREF/TAN\\_Adopted552013.pdf](http://eippcb.jrc.ec.europa.eu/reference/BREF/TAN_Adopted552013.pdf)
- 28 Kanagaraj, J. et al. (2006). Solid wastes generation in the leather industry and its utilization for cleaner environment - A review, In: Journal of Scientific & Industrial Research, Vol. 65, 541-548. [http://nopr.niscair.res.in/bitstream/123456789/4856/1/JSIR%2065\(7\)%20541-548.pdf](http://nopr.niscair.res.in/bitstream/123456789/4856/1/JSIR%2065(7)%20541-548.pdf)
- 29 Reported by Rakesh Jaiswal from Eco Friends.
- 30 India Committee of the Netherlands(2017). Do leather workers matter? <http://www.indianet.nl/pdf/DoLeatherWorkersMatter.pdf>
- 31 Change Your Shoes (2016). Walk a Mile in their Shoes. [http://labourbehindthelabel.net/wp-content/uploads/2016/10/Walk-a-Mile-in-Their-Shoes\\_India-report-Oct-2016.pdf](http://labourbehindthelabel.net/wp-content/uploads/2016/10/Walk-a-Mile-in-Their-Shoes_India-report-Oct-2016.pdf)
- 32 India Committee of the Netherlands (2017). Do leather workers matter? <http://www.indianet.nl/pdf/DoLeatherWorkersMatter.pdf>
- 33 The Future in Our Hands and Cividep (2015). Tougher than Leather. <http://cividep.org/wp-content/uploads/2017/04/FIVH-CIVIDEP-Tougher-than-Leather-2015-2-15.pdf>
- 34 The Future in Our Hands and Cividep (2015). Tougher than Leather. <http://cividep.org/wp-content/uploads/2017/04/FIVH-CIVIDEP-Tougher-than-Leather-2015-2-15.pdf>
- 35 Change Your Shoes (2016). Walk a Mile in their Shoes. [http://labourbehindthelabel.net/wp-content/uploads/2016/10/Walk-a-Mile-in-Their-Shoes\\_India-report-Oct-2016.pdf](http://labourbehindthelabel.net/wp-content/uploads/2016/10/Walk-a-Mile-in-Their-Shoes_India-report-Oct-2016.pdf)
- 36 Cividep (2015). An inquiry into the Death of Ten Tannery Workers at the Common Effluent Treatment Plant in Ranipet Tamil Nadu on January 31, 2015. <http://cividep.org/wp-content/uploads/2017/04/Ranipet-Tanneries-CETP-Mishap-Report-compressed.pdf>



## 5. Legislative Situation in the Indian Tanning Sector

There have been several attempts at classifying labourers according to different kinds of occupation. In 1991, the Government of India<sup>37</sup> classified unorganised sector workers in terms of any of the four parameters: occupation, nature of employment, specially distressed categories and service categories. While leather workers are categorized as unorganised sector workers as per their occupation, tannery workers fall even outside this classification. Thus, they are workers who do not have the benefit of pension, provident fund, gratuity, maternity leave and work mostly on daily or hourly wages.

Given that 93 per cent of the Indian workforce works in the unorganised sector with minimal or no social security<sup>38</sup>, this is not a new insight into the world of unorganised sector workers. To cater to varied kinds of labourers, India has passed several labour laws. Under the Indian Constitution, both the Central and State governments can enact laws related to labourers, with a provision that on certain matters the Centre will formulate the laws and States will prepare the rules for their operation. The laws mentioned in section 5.1 are all Central laws<sup>39</sup> with States having defined the rules for implementation in their jurisdiction.

### 5.1. Labour Laws

The Factories Act, 1948 is one of the most important statutory provisions regulating the safety, health and welfare of factory workers in India. The Act defines working hours, overtime, holidays and paid leave. It also regulates terms and conditions of employment specific to women workers and children. Most provisions of the Act are applicable to workers in the tanning industry. The Act also acknowledges leather tanning as a hazardous process, and lists the sector under Hazardous Industries in Schedule I. Industries classified by the Act as hazardous are assigned additional responsibilities to ensure the health and safety of the workers.

The Minimum Wages Act, 1948 sets the legal minimum wages that should be paid to workers in different employment categories, including leather product manufacturing and tanning industries. It is applicable to employees directly employed by the company, as well as those employed through contractors.

The Contract Labour (Regulation and Abolition) Act, 1970 covers all factories in which 20 or more workers

have been employed as contract labour in the preceding 12 months. It provides for the regulation of contract labour, and delineates legal requirements for contractors and factories in order to safeguard workers' interests.

The Employees' State Insurance Act, 1948 and the Employees' Provident Funds Act, 1952 are the most important laws regulating social security for workers in the organized sector. While the ESI Act is applicable to factories employing more than 10 workers, the EPF Act is applicable to all factories employing more than 20 workers.

The Government of India has proposed a Draft Code on Social Security which it made public for comments in March 2017. It intends to bring together under a single umbrella several social security measures currently scattered under various laws and schemes. Under this code on Social Security, the government is planning to provide a unique registration number to all unorganised sector workers and thereby enable them to access social security.

The Unorganised Sector Worker Social Security Act (2008) provides for the constitution of a National and State Social Security Board at the central and state level to recommend social security schemes such as life and disability cover, health and maternity benefits, and old age protection for unorganised workers.

As unorganised sector workers, tannery workers are not covered by the government's medical provision of Employees' State Insurance Corporation. However, the Act provides for ten social security schemes, one of them Rashtriya Swasthya Bima Yojana (RSBY or National Health Insurance Scheme). This can be accessed if the workers are part of social security boards and have an identity card which enables them to benefit from the scheme.

### 5.2. Environmental Regulations

Tanneries are subject to statutory guidelines from the Central and State Pollution Control Boards owing to their air, water and soil polluting nature. The Central Pollution Control Board (CPCB) has classified tanneries as a 'red category' industry. The Ministry of Environment and Forests classifies tanneries as highly polluting industries,

37 Government of India (2001) An overview of the unorganised labour. <http://pib.nic.in/archieve/lreng/lyr2001/rsep2001/18092001/r1809200113.html>

38 National Commission for Enterprises in the Unorganised Sector (2007). Report on conditions of work and promotion of livelihoods in the unorganised sector.

39 Government of India, Ministry of Labour and Employment. Industrial Relations, accessed in September 2017. <http://labour.gov.in/industrial-relations>

along with 16 other industries. Accordingly, the ministry has issued orders banning the setting up of tanneries within one kilometre of water bodies such as rivers, streams, dams, etc..<sup>40</sup>

All chrome tanning units in the country should have an individual or common Chrome Recovery Plant and should use the recovered chrome in the tanning process. All tanneries should install water meters and flow meters to measure actual consumption and wastewater discharge. Water consumption rates should be reduced to 28 cubic metres per tonne of hides.

The State Pollution Control Boards set the standards for use of water and generation of wastewater in tanneries. Tanneries in Tamil Nadu cannot use more than 30 cubic metres of water for processing a tonne of raw hides, and cannot generate more than 28 cubic metres of wastewater per tonne of raw hides processed.<sup>41</sup> TNPCB also sets the parameters for analyzing different trade efflu-

ents, including tannery wastes. In addition to the core parameters (pH, total suspended solids, total dissolved solids, chlorides, sulfates, biochemical oxygen demand, chemical oxygen demand, oil and grease), the TNP-CB has mandated the analysis of ammonical nitrogen, sulfide, total and hexavalent chromium, per cent sodium and phenolic compounds found in tannery effluents.<sup>42</sup> According to our informant in Kanpur, Uttar Pradesh Pollution Control Board would also be required to set the standards for tannery effluents from the Jajmau district in Kanpur, but has failed to meet this requirement so far. Therefore, at the moment Jajmau tanneries are following the standards set under the Environmental (Protection) Act from 1986.<sup>43</sup>

Indian environmental regulations for the tanning industry do generally meet international standards but their implementation in practice by the tanneries falls far short of what is required.

## 6. Methodology and Findings from Field Research

For this report, in North India 17 people (six women and eleven men) were interviewed in both Kanpur and Agra in April 2017. Among them tannery workers, shoe manufacturing workers and homeworkers, a tannery manager in Kanpur, a doctor, four shoe manufacturer, and a politician in Agra. Interviews with tannery workers

were planned to understand the health hazards that they face and the environmental effects of tanneries. However, access to tanneries was difficult due to the delicate political situation with a new state government in Uttar Pradesh that had banned slaughterhouses a few weeks before the visit. As a result, it was almost impossible to find workers who wanted to be interviewed even off the record.

In addition to interviews, soil and water samples were taken in North India to test them for presence of total and hexavalent chromium. Water and soil samples were collected from various locations in Kanpur and Agra. The samples taken are not statistically representative but are spot samples, randomly chosen at sites identified as critical by local experts. All samples were analysed at the Indian Institute of Technology Kanpur.

In South India 20 workers from tanneries in Ambur (ten), Peranambut (six) and Chrompet (four) were interviewed. The interviews were conducted between April and June 2017. Most of the respondents are employed as helpers carrying out trimming and shaving tasks, while a



*Water sampling from tanning effluent*

- 40 Tamil Nadu Pollution Control Board . Government Order, Environment and Forests Department, accessed in September 2017.  
 41 Tamil Nadu Pollution Control Board. TNPCB & You (A Ready Reckoner for Entrepreneurs), accessed in September 2017. [http://www.tnpcb.gov.in/pdf/tnpcb\\_you2013.pdf](http://www.tnpcb.gov.in/pdf/tnpcb_you2013.pdf)  
 42 Tamil Nadu Pollution Control Board. Tolerance Limits for Trade Effluents, accessed in September 2017. <http://www.tnpcb.gov.in/enforcement.asp?src=tolerance.html>  
 43 Indian Government, Ministry of Environment & Forests (1986). The Environment (Protection) Act. [http://www.envfor.nic.in/legis/env/eprotect\\_act\\_1986.pdf](http://www.envfor.nic.in/legis/env/eprotect_act_1986.pdf)



Community affected by worrying levels of chromium contamination in water of Khan Chandpur

few work as drum and machine operators. The method of convenience sampling was adopted, and the most accessible workers who were willing to speak were interviewed for the study. The study sample is constrained by the lack of representation from permanent workers at the larger tanneries. The research team approached a few permanent workers, but they feared punitive actions by tannery management for participating in the study. The team interviewed the workers at their homes and public spaces such as bus stops.

In order to assess the impact of tanneries on local communities, the research team interviewed local residents, resident welfare association members, and farmers living in the areas around the tanneries, namely in Peranambut, Ambur and Chrompet. Doctors from ESI dispensaries and a private clinic were interviewed to gain insight into health issues faced by tannery workers. Extensive secondary research was carried out to analyse the extent of violation of legal, labour and environmental norms by the tanneries. Furthermore, several visits to the affected areas were conducted to collect evidence of environmental damage caused by waste from tanneries.

### 6.1 Tanneries in North India – Uttar Pradesh

In the leather producing hub Kanpur, the entire tanning area of Jajmau and downstream villages are in the tight grip of pollution. Tanneries have damaged the local

environment and threatened the health of people and animals. Toxic effluents and waste as well as residues from the production of tanning agent have strongly contaminated groundwater and rivers and made agricultural fields unfit for cultivation.

Tannery workers are subject to long hours of work; they are allowed no leave apart from one day off per week, and they usually do not even earn a minimum wage. Since tanning is considered an 'impure' job, only the socially most backward castes (Dalits or Scheduled Castes) and Muslims have been traditionally employed in these roles. Their lack of education leads to a lack of awareness of their rights as workers. Thus, the repressive social structure aids the employers to get away with failing to provide decent work conditions. More information on the work conditions is present in the interviews section.

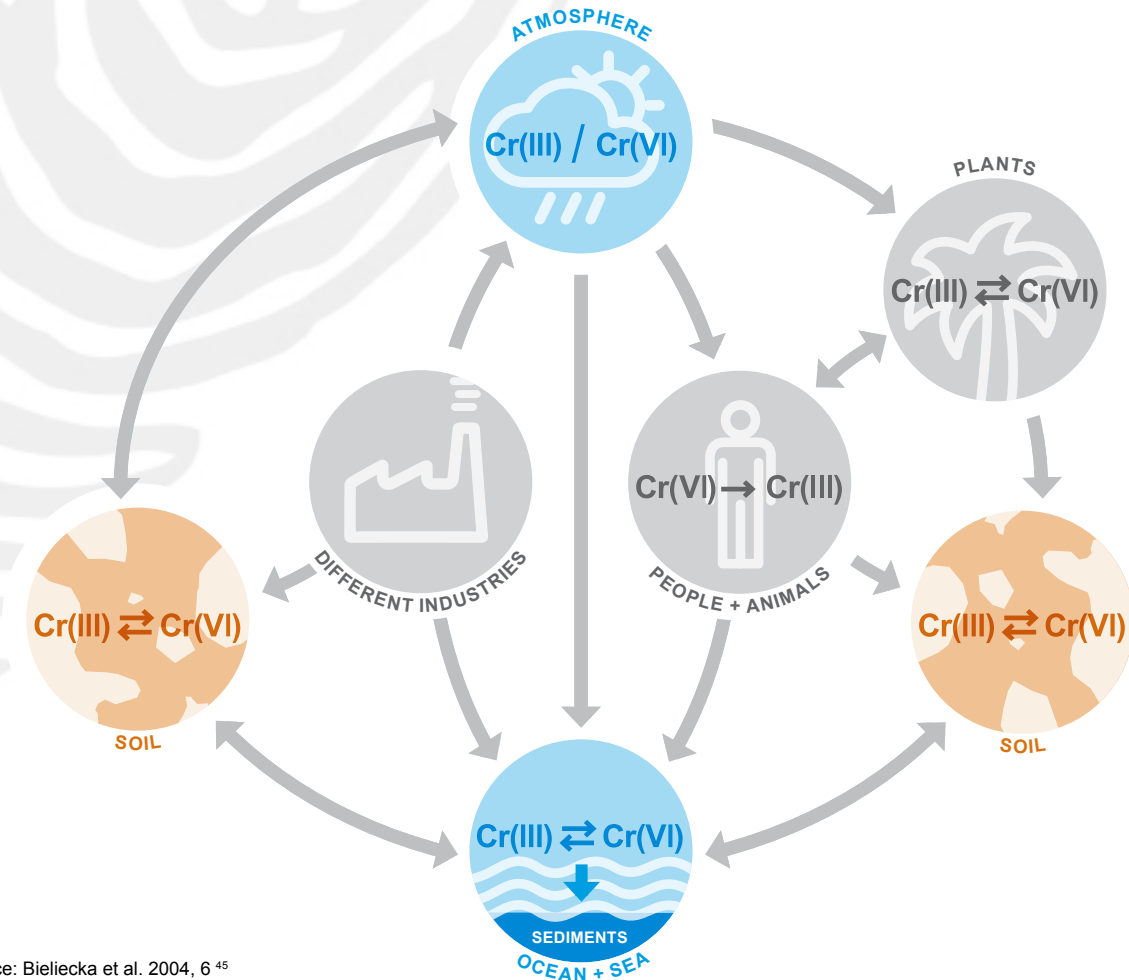
#### 6.1.1 Contamination of Water and Soil

A recent study explored water quality parameters in two industrial areas of Kanpur – Jajmau and Noraiya Kheda – with systematic water samples from 160–220 foot deep bore wells. It showed that chromium was widespread in groundwater. In 24 out of 30 samples total chromium was higher than the permissible threshold value. The two industrial areas are both highly contaminated by different heavy metals, posing a threat to human health and nature.<sup>44</sup>

44 Dwivedi, A. K. et al. (2015). Geochemical trends of heavy metal in aquifer system of Kanpur Industrial Zone, Uttar Pradesh (India): A Case Study, In: Environmental Earth Science 73, 7287–7296, Berlin/Heidelberg.



**Fig. 1** Chromium circulation in the polluted environment



Source: Biellecka et al. 2004, 6<sup>45</sup>



**Community bore well near tannery area, Kanpur**

A study in Kanpur on the health effects of hexavalent chromium in groundwater on the communities exposed to this water showed that local residents “had more self-reports of digestive and dermatological disorders and haematological abnormalities”.<sup>46</sup> Nevertheless, occasional government health checks have been stopped. In fact, there is a complete absence of government medical facilities in the area, thus hitting the villagers twice as hard, says a local expert.

In our interviews, local communities report that drinking water from the hand pumps has become yellowish in colour and emits a foul smell. Due to frequent droughts in this region, people and animals have to drink this water in times of water shortage. People often complain of losing their appetite on drinking the hand pump water and infants vomit after consuming it. Communities who do not drink the “yellow” water anymore often use it for washing. This results in various skin conditions such as rashes, lesions, decolouring and darkening.

45 Biellecka, A. et al. (2005). Two Faces of Chromium - Pollutant and Bioelement, In: Polish Journal of Environmental Studies, Vol. 14, 5-10. <http://www.pjoes.com/pdf/14.1/5-10.pdf>

46 Sharma, P. et al. (2012). Groundwater Contaminated with Hexavalent Chromium [Cr (VI)]: A Health Survey and Clinical Examination of Community Inhabitants (Kanpur, India). PLoS ONE7(10): e47877. <https://doi.org/10.1371/journal.pone.0047877>

For this study concerning groundwater, in all but one sample total chromium concentrations were within the international and Indian drinking water limit of 50 µg/l.<sup>47</sup> But extremely high levels of chromium were observed in the groundwater of Khan Chandpur village (13,000 µg/l) of Kanpur Dehat district near a COPR dumpsite. The water itself was greenish yellow in colour and this water should not even be used for washing or bathing (see BOX 2).

The number of our spot samples was not high enough to deduce any general assumptions on the water quality in the communities visited. The results cannot be seen as representative. Nevertheless, the groundwater near the cluster of tanneries cannot be classified as safe.

In Kanpur, treated tannery wastewater is mixed with treated sewage and is used for irrigation on 2,500 hectares of farmland. The same procedure is applied in other tanning clusters, including in Agra. The UN-Food and Agricultural Organisation (FAO) recommends a maximum concentration of total chromium in irrigation water of 100 µg/l.<sup>48</sup> Water analysis undertaken for this study confirms contamination: our samples showed that water used for irrigation had chromium concentrations over the FAO recommended maximum concentration. Although the water coming from the Common Effluent Treatment Plant (CETP) and reaching the irrigation channel showed no alarming concentrations of Cr(VI) at that specific moment (20 µg/l), in Shekpur, a small village about five kilometres from Jajmau, Cr(VI) in irrigation water from that same channel showed a concentration of 729 µg/l. This is more than seven times the recommended maximum concentration for irrigation water. In the city of Agra, the treated water coming from the water treatment plant and being used for irrigation purposes also showed levels above the recommended limit, with 209 µg/l. In the village of Khan Chandpur mentioned above, the situation was highly alarming as the total chromium exceeded the threshold by more than 100-fold. This water was used mainly for irrigation and as drinking water for animals.

In interviews, the local population reported a decline in agricultural productivity of all crops in the villages near Jajmau. This could be due to chromium contamination or an excessive salinity in soils, which can both be harmful for crops. Studies showed that 100,000 acres of irrigated land in tannery areas each year are no longer productive because of the salinity problem.<sup>49</sup> Residents and farmers



*Yellowish water from bore well near COPR dumpsite, highly contaminated with hexavalent chromium*



*Beetroot from chromium contaminated agricultural field, irrigated with treated tannery wastewater*



*Water from CETP in Kanpur after treatment being used for irrigating the surrounding fields*

47 Bureau of Indian Standards (2012). Indian Standard, DRINKING WATER — SPECIFICATION (Second Revision), New Dehli. <http://cgwb.gov.in/Documents/WQ-standards.pdf>

48 FAO Food and Agriculture Organization of the United Nations (1985). Water quality for agriculture. Chapter 4: Toxicity Problems, Rome. <http://www.fao.org/docrep/003/T0234E/T0234E00.html>

49 Dwivedi, A. K. et al. (2015). Geochemical trends of heavy metal in aquifer system of Kanpur Industrial Zone, Uttar Pradesh (India): A Case Study, In: Environmental Earth Science 73, 7287–7296, Berlin/Heidelberg.



we spoke to told us that crops watered with tannery wastewater do not yield grains or flowers and just wither away. Only rain-watered crops survive. Standing crops are destroyed by hazardous irrigation water. The tree plantations of the region, including mango, jamun and eucalyptus, have all disappeared. The Jajmau agricultural belt, once famous for rose cultivation, now hardly produces roses anymore. Livestock too has been reported by locals to be affected by the consumption of irrigation water. Premature birth and increased cattle mortality rates are reported in the region, and the quality of milk is said to have suffered.

Furthermore, fishermen in the area report swarms of dead fish floating in the Ganges wherever the wastewater from the tanning area joins the river. They also reported that due to the overflowing of sewage irrigation water, especially during the monsoon season, small fish breeding ponds are exposed to contamination.

In the water samples taken during our research trip, total chromium concentration of all the surface water bodies carrying tannery effluents did not exceed the Indian discharge limit of 2,000 µg/l.<sup>50</sup> Nevertheless, one sample of a tributary of Ganges river showed levels of Cr(VI) alarming for aquatic life.<sup>51</sup>

### 6.1.2 Impact of Solid Waste and Sludge from Tanning Process

In Kanpur, a total of about 500 tonnes per day of solid waste is generated in Jajmau area, in addition to the solid waste from the pre-treatment system and CETP. The sludge generated by 200 chrome tanning units, the CETP and by Sewage Treatment Plants is hazardous in nature and is being dumped indiscriminately on an area adjacent to the treatment plant. The illegal and uncontrolled disposal of solid wastes from leather tanning can result in leaching of Cr(III) from the residues and may also result in a conversion of Cr(III) to the harmful Cr(VI). This poses a severe risk of contamination to soils and consequently to groundwater.<sup>52</sup> Chromite Ore Processing Residue (COPR) particularly is a major environmental concern due to its potential to pollute huge areas and groundwater bodies around the dumping sites (BOX 2).

One of the major emerging environmental problems in the tanning industry is the disposal of chromium contaminated sludge produced as a by-product of wastewater treatment.<sup>53</sup> In Germany, the Sewage Sludge Ordinance sets a limit for chromium in sewage sludge and prohibits the application of sewage sludge on soils with a chromium content of 100 mg/kg and more. It is also assumed that agricultural soils with a chromium concentration of 500 mg/kg pose an acute risk to human health.<sup>54</sup>

During our field research, two soil samples were taken from agricultural fields near Kanpur, situated next to the water channel that contains the treated wastewater from Kanpur's Common Effluent Treatment Plant. The soil samples showed very high chromium concentrations of 9,110 mg/kg and 5,650 mg/kg and therefore pose a risk to human health. These fields are unfit for cultivation and no further toxic water or sewage sludge should be applied to these soils. In Agra, one soil sample taken next to the drain coming from the tanning area also showed a high amount of chromium (321 mg/kg). This indicates that the chromium contained in the wastewater accumulates in the soil due to frequent events of inundation or irrigation.



*COPR on dumpsite in Rania*

- 50 Central Pollution Control Board (1986). The Environment (Protection) Rules, (Schedule VI). <http://cpcb.nic.in/GeneralStandards.pdf>
- 51 According to the US-Environmental Protection Agency (EPA), the aquatic life criteria recommends the acute chromium content in freshwater not to surpass 570 µg/l for Cr(III) and 16 µg/l for Cr(VI). EPA bases aquatic life criteria on how much of a chemical can be present in surface water before it is likely to harm plant and animal life. See: US EPA (1995). National Recommended Water Quality Criteria - Aquatic Life Criteria Table. <https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table>
- 52 Avudainayagam, S. et al. (2003) Chemistry of Chromium in Soils with Emphasis on Tannery Waste Sites (PDF Download Available). Available from: [https://www.researchgate.net/publication/10655130\\_Chemistry\\_of\\_Chromium\\_in\\_Soils\\_with\\_Emphasis\\_on\\_Tannery\\_Waste\\_Sites](https://www.researchgate.net/publication/10655130_Chemistry_of_Chromium_in_Soils_with_Emphasis_on_Tannery_Waste_Sites) [accessed Jun 19, 2017].
- 53 Rangasamy, S. et al. (2015). Chromium contamination in soil and groundwater due to tannery waste disposal at Vellore district of Tamil Nadu, In: INTERNATIONAL JOURNAL OF ENVIRONMENTAL SCIENCES, Vol. 6, N.1, 114-124. <http://www.ipublishing.co.in/ijesarticles/fourteen/articles/volsix/EIJES6013.pdf>
- 54 Ludwig, Axel (1996). Chrom(III) und Chrom(VI) in einer mit Gerbereischlamm belasteten Ackerfläche bei Weinheim. Diplomarbeit, Universität Heidelberg



## BOX 2 COPR – Poisoning the Environment and Harming Communities

Chromite Ore Processing Residue (COPR) is waste from the production of the tanning agent Basic Chromium(III) Sulfate (BCS) which is used for chrome tanning. In India, COPR is often dumped illegally in the countryside. This is the case in the village of Rania, 30 kilometres to the West of Kanpur, where an open area of approximately 1 km<sup>2</sup> contains about 30,000–40,000 tonnes of this toxic waste. COPR is contaminating soil and groundwater in the vicinity of this disposal site through the leaching of carcinogenic Cr(VI).<sup>55</sup> Our own soil sample results underline the catastrophic situation in and around this area. Two samples of COPR waste contained 45,161 and 52,860 mg/kg of chromium, which is extremely high. Another sample of the ground 50 metres away from the contaminated site still contained 3,648 mg/kg soil. Toxic waste has been dumped on the site for more than 10 years. It contains extremely high amounts of chromium and therefore poses a severe long-term risk to the surrounding water bodies and affects people using this water for their everyday life and agriculture. An extensive study showed that almost 50 per cent of the wells examined in this area were either moderately or highly contaminated, exceeding the safe drinking water limits of 50 µg/l for total chromium assigned by the World Health Organization (WHO 2011).<sup>56</sup>

In the village Khan Chandpur, approximately 2 kilometres from the dumpsite in Rania, our research team took a water sample from a well, which showed chromium contamination levels of 13,295 µg/l, exceeding the WHO guideline value for drinking water by more than 200-fold. The high concentration of chromium in groundwater a few kilometres away from the COPR dumping site indicates the extent of chromium contamination in groundwater in this area. This is particularly alarming since the local population uses the groundwater not only to water livestock and for irrigation but also as drinking water in times of water shortage. Continued consumption poses great health risks to both humans and animals living near Rania. Twelve villages or about 15,000 people in this region are and continue to be strongly affected by the contamination of their groundwater as long as Cr(VI) keeps leaching from the dumpsite in Rania.<sup>57</sup>

One soil sample we took from an agricultural field in Khan Chandpur was not elevated (130 mg/kg), but villagers reported that they face the problem of dying of roots and the subsequent drying-out of crops on fields which are irrigated with highly chromium contaminated water.

### 6.1.3 Working Conditions in Tanneries in Uttar Pradesh

Most of the tannery workers interviewed in Kanpur and Agra were daily wage earners although they had worked at the tanneries for a long time and therefore qualified to become regular employees. Employers do not provide regular employment in order to avoid having to pay social security benefits. Thus, these workers are deprived of any kind of work-related entitlements such as leave, overtime remuneration, and social security.

Work hours range between eight and twelve hours per day with a one hour break, six days a week. A typical tannery worker earns about INR 8,000–9,000 per month (Euro 100–120).

In Kanpur, respondents reported that all the workers in tanneries have skin allergies, many have pustules, melanosis, and some also have asthma and tuberculosis (TB).

One interviewee had worked for three years at a tannery more than a decade ago and then shifted to work in the Common Effluent Treatment Plant because of his deteriorating health. He reported his earnings at the tannery were about INR 6,000 (Euro 80). Currently, he earns INR 10,000 (Euro 130) in the CETP. Neither job gave him medical insurance.

The tannery worker interviewed in Agra was 18 years old. He was employed through a contractor and was involved in dyeing and colouring of hides but was never told which chemicals he worked with. He received gloves and basic instructions, but no face mask. He earned a salary of INR 10,000 per month. He also complains of skin rashes and allergies. After suffering from TB, he spent over INR 70,000 (Euro 900) on treatment in a private hospital and quit his job.

A female shoe manufacturing worker in Kanpur worked

55 Matern, K. and Mansfeldt, T. (2016). Chromium Release from a COPR-Contaminated Soil at Varying Water Content and Redox Conditions, In: *Journal of Environmental Quality*; 45(4), 1259-1267.

56 WHO (2011). *Guideline for Drinking-Water Quality*, Fourth edn. Vol. 1, Recommendations, Geneva.

57 Matern, K., Weigand, H., Sing, A., Mansfeldt, T. (2017). Environmental status of groundwater affected by chromite ore processing residue (COPR) dumpsites during pre-monsoon and monsoon seasons, In: *Environmental Science and Pollution Research*, Vol. 24/ 4, 3582–3592.

for ten to twelve hours a day with a one hour break. She was a daily wage earner receiving INR 140–150 (Euro 1.80–1.90) per day, which she said was not enough to meet her basic needs. She claimed that the factory does not pay workers the wage promised to them. She also reported that factories do not directly employ workers, in order to circumvent compliance. At times of high demand, workers had to work seven days a week irrespective of their health, or risk losing their job. At other times, there was no work for them and thus, no wage.



*Homeworkers in Agra producing shoe uppers*



*Sample of drinking water near tannery area, Kanpur*

In Agra, a cutter from a local shoe factory was concerned that a shoe manufacturing worker spent his whole life working and was still unable to build a house for his family or give his children a decent education. Orders had declined tremendously, so he was employed for only three to six months a year. He reported that due to the hazardous nature of the work and long working hours, workers develop health problems. A family of homeworkers making shoe uppers told us

that the entire family (an average family consists of 5 members – 2 adults and 3 children) together earned INR 10,000 a month from the work during only four to six months a year. The rest of the time, they would live off loans with an annual interest rate of 60–120 per cent. Although this amount is higher than the minimum wage of INR 7,250 (Euro 95) for UP, what should be noted is that the entire family is engaged in the work. Children also contribute to it after school hours. Thus, it affects their study time and play time, not to talk of potential school drop-out if they need to earn more. The minimum wage is a lower limit for an individual worker. That an entire family needs to work to make only 30 per cent more than the monthly minimum wage meant for one individual worker indicates their desperation to make ends meet.

A former member of legislative assembly from the BJP party claimed that there were no longer any tanneries in Agra since all polluting industries were closed or moved in the 1990s following a Supreme Court judgment. The judgment declared Agra as part of the 'Taj Trapezium Zone' ordering over 250 industries in the city, among them two tanneries, to relocate, shut down or comply with environmental norms. He admitted that smaller illegal tanneries may still be functioning in the city but after stronger implementation of existing laws and regulations, the crackdown on slaughterhouses has left these tanneries without access to raw material.

Most of the tannery workers' families lived near the tanneries and were affected by the quality of water. Four women interviewed reported that they faced problems in accessing clean drinking water. Two of them said that in their areas, water is polluted and they sometimes had to go inside the tannery to collect clean water. The tannery management would not listen to them if they complained about water pollution and the foul smell emanating from the tanneries. They also reported that the number of tanneries has increased, resulting in a decreased availability of clean water. They were convinced that the drinking water lines were contaminated by the tannery effluents. Two of the four women said that they buy water from neighbours who have handpumps and use this water for cleaning, cooking, washing, and sometimes also drinking. Otherwise they buy water for drinking and cooking purposes which costs INR 200–300 (Euro 2.60–4) per month.

Tannery workers not only suffer from occupational health hazards but their family members also suffer from health problems due to the contamination of drinking water. Polluted water consumption leads to skin rashes, pustules and melanosis. The implementation of rules and



regulations regarding the working conditions or effluent treatment in tanneries is poor or absent.

## 6.2 Tanneries in South India – Tamil Nadu

The state of Tamil Nadu in South India has a large number of tanneries and leather factories. The leather industry also employs a large number of people both directly and indirectly. Thus the social and environmental impacts of the industry on the state are very high. Studies conducted in the past by various research and civil society agencies have highlighted serious problems related to pollution and poor working conditions in the leather industry in Tamil Nadu. The findings of a recent study by Cividep India in the leather clusters of Ambur, Peranambut and Chrompet in Tamil Nadu is presented in this section. The study covers the impact of the tanneries on the environment as well as the working conditions prevailing in the tanneries in the region.

### 6.2.1 Contamination of Water and Soil

The tanning industry in India has a long history of polluting and contaminating surface water and groundwater resources and farmland. Following the orders of the Supreme Court of India in 1995, 400 tanneries in Tamil Nadu were closed for non-compliance with norms prescribed by the Tamil Nadu Pollution Control Board.<sup>58</sup> Present wastewater generation is estimated to be about 50 million litres per day. It was roughly 6 million litres per day in 1989.

Tamil Nadu Chromates and Chemicals Limited (TCCL) used to produce chromium for tanneries in Ranipet in Vellore district. The factory opened in 1976 and was closed down in 1995. However, it left behind a large quantity of chromium-bearing solid waste, which was illegally dumped on open land in the abandoned factory's premises. According to a report by the Geological Survey of India, hexavalent chromium contamination has spread to a distance of 2 to 2.5 kilometres from the dumpsite.<sup>59</sup> More than two decades after the factory's closure, the irreparable damage caused to soil and water continues to affect the lives and livelihoods of local residents and farmers.<sup>60</sup>

People living near the drains carrying tannery wastewater are constantly exposed to a cocktail of toxic chemi-



*The channel carrying tannery effluents joining the river Adyar near Chrompet*



*A view of river Adyar carrying foamy tannery effluents*



*Effluents being taken to ETP through an open drain at a tannery in Peranambut*



*The channel carrying tannery effluents passing through paddy fields near Chrompet*

58 Tapas Nandy, S. et al. (1999). Wastewater management in Cluster of Tanneries in Tamil Nadu through Implementation of Common Effluent Treatment Plants, In: Journal of Scientific and Industrial Research, Vol. 58., 475-516. <http://noopr.niscair.res.in/bitstream/123456789/17844/1/JSIR%2058%287%29%20475-516.pdf>

59 Central Pollution Control Board. Revised Action Plan for Critically Polluted Area, accessed in September 2017. <http://cpcb.nic.in/divisionsofheadoffice/ess/Ranipet.pdf>

60 The Hindu (2017). The Ground Water beneath their Feet, Print edition - 18 February, 2017. <http://www.thehindu.com/news/national/the-groundwater-beneath-their-feet/article17321183.ece>



cals and their drinking water is being polluted. Moreover, they are exposed to the malodour emerging from the wastewater. People are afflicted with various kinds of skin problems and respiratory ailments.

It was found that the groundwater is not potable. Water quality has declined, and increased salinity has made it unfit for drinking. Residents reported that the quality of groundwater had deteriorated after the tanneries started operations in these localities. According to residents of



*Remains of cattle body parts were seen dumped near Tannery 1 in Peranambut*



*Leather scraps dumped on the roadside in front of a job work unit in Chrompet*

Chrompet, a flood water channel in the area was being used to divert treated wastewater from the CETP. They had grave doubts about whether it was being treated effectively, as the water flowing in the channel was tepid and gave off a bad odour. The channel carrying tannery effluents eventually joins the Adyar river system. It acts as the first major source for discharge of polluting matter into the river. Local communities continue to wash and bathe in the river, just 30 metres upstream from the

channel outlet. The tannery effluent has changed the colour and smell of the river water, and rendered it unsuitable for domestic use.

Before joining the river Adyar, the channel passes through a small area of cultivated land near Chrompet. The farmers interviewed in this area said that they were dependent on the water from a nearby lake for irrigation, as the groundwater was too polluted for agricultural use. According to them, tannery effluents also pollute the water in the lake to an extent, affecting crop yield. The quality of the rice they cultivate is so bad that they do not even use it for their domestic consumption. Local residents and farmers said that they had petitioned the authorities several times, but there had been no action to stop the pollution.

Residents in Ambur spoke of four tanneries in the area. The salinity of the groundwater had increased, and it had taken on a yellowish hue over a period of ten years. Farmers in the region said that they were not able to use the groundwater for irrigation, and were now entirely dependent on the rains. In the past, three crops were cultivated in a year, but now it had become a challenge to cultivate even a single crop.

Most small tanneries and job work units that were part of this research do not follow established norms for handling their solid waste. Trimming wastes and leather scraps were dumped on the roadside, posing a serious threat to public health.

A resident of Chrompet said that leather scraps from job work units were frequently burnt in the open, producing a foul smell in the neighbourhood. Another local resident from the same area said that leather scraps were carried in open trucks without any cover, and motorists suffered fits of coughing and respiratory problems upon inhaling the dust rising from trucks loaded with scraps.

The research team observed that the remains of cattle, including tails, hair and uncured hides, had been dumped in the open near the tannery premises. There were a number of homes nearby, and children were found playing close to the heap of exposed waste.

Both in Peranambut and Chrompet, it is a common sight to see wet blues and dyed leather pieces drying on open ground in residential areas without any form of cover. Plastic cans used by tanneries to store chemicals find their way to local second-hand markets in Chrompet and Ambur. Residents of these neighbourhoods buy the discarded cans and use them to store drinking water. They are largely unaware of the health risks associated with this practice.

### 6.2.2 Working Conditions in Tanneries in Tamil Nadu

The small units located in Peranambut and Ambur employ mostly male workers with an average of 22 workers per unit. These units operate on a job-work basis, leading to uneven availability of employment throughout the year. Bottlenecks in sourcing hides and the rising cost of raw materials are the major reasons for the irregular work.

The tannery in Peranambut (tannery 1) uses the traditional vegetable tanning process (East India Method). However, chemicals such as ammonium, lime, sulphuric acid and formic acid are used extensively in the pre-tanning process. It processes raw buffalo hide into semi-finished leather, which is used for making shoe soles. Peranambut is the only region in the country to produce leather for shoe soles, and has 52 tanning units, which predominantly follow the vegetable tanning method.<sup>61</sup> This is a labour intensive process and requires manual work at every stage.

The tannery in Ambur (tannery 2) uses chrome powder and various salts and chemicals such as lime, sodium, soap oil, acetic acid, and formic acid in the pre-tanning process. Salt-cured rawhides are brought from Ambur to be processed here into wet-blues. The final leather finishing is done in a larger unit located in Erode district. Tannery 1 has its own Effluent Treatment Plant (ETP), and only the sludge is taken to the Common Effluent Treatment Plant (CETP) whereas Tannery 2 is directly connected to a CETP.

All six respondents were Hindus, and belonged to the Scheduled Caste (SC) community. Workers were in the age group of 45 to 65 years. All respondents at the two tanneries had over 30 years' experience of working in various tanneries. Six of the workers interviewed had no formal school education, while four had dropped out from school before completing primary education. Almost all workers interviewed at these tanneries were employed on a temporary basis. Despite long years of work, their jobs have not been regularized. The employment relationships at both tanneries are informal, and workers said that they do not have any proof of employment such as appointment letters or contracts, salary slips, or identity cards.

The workers work only on 15 to 20 days in a month, and the tanneries sometimes remain closed for an entire month at a stretch, obliging workers to seek work at other small tanneries during this time.

Both tanneries have no fixed work time, and working

hours vary between 5 and 7 hours in a day, depending on the workload. There is no shift system at either tannery. None of those interviewed were members of trade unions.

All the workers are paid on a daily basis. Workers at tannery 1 are paid INR 250–350 per day. Helpers are paid only INR 250 (Euro 3,30), while drum and machine operators are paid up to INR 350 (Euro 4,50). Due to a limited number of working days in a month, their wages often fall short of the monthly minimum wage prescribed by the government. Those at tannery 1 are provided with free lunch every day. Workers at both tanneries have no access to social security schemes like Employee State Insurance and Employee Provident Fund. Workers at



*Dyed leather being dried on open ground in Chrompet*



*A view of Tannery 1 located in Peranambut*

tannery 1 receive a bonus every year of INR 15,000 to INR 20,000 (Euro 200 -250). Respondents said they do not get any paid leave. The weekly day off is on Friday.

61 Frontline (2017). No skin in the game, Print edition - July 7, 2017. <http://www.frontline.in/cover-story/no-skin-in-the-game/article9731110.ece>



There is no overtime payment when they work extra hours.

A larger unit located in Ambur (tannery 3) processes semi-finished leather into finished leather, and supplies it to the company's footwear making division. It employs 300 workers, the majority of whom are male. There are only 20 female workers at the tannery. Unlike Peranambur, tanneries in Ambur are larger in size and are mostly run by groups with their own footwear manufacturing

mostly carried out by machines. Both male and female workers operate the machines, but only male workers are allowed to work in chemical processing. Re-chroming, shaving, trimming, dyeing and finishing are the operations undertaken at the tannery. The workers interviewed said that various chemicals, such as acids, dyes, salts and powders are used. They also said that large machines are used to carry out shaving, dyeing and finishing processes like setting. However, the chemical processing of wet-blues is carried out in drums located in a separate section of the tannery.

Four of the respondents were male and two female and except for one worker, a Christian from the Other Backward Class (OBC)<sup>62</sup> category, all workers belonged to Scheduled Caste (SC) communities. Of the six interviewed, one worker had never attended school, while three others had dropped out of school before completing their primary education. One worker had studied until 9<sup>th</sup> grade and another had passed the 10<sup>th</sup> grade exam. Respondents were in the age group of 48 to 62 years, except for one who was 32 years old.

Unlike workers at the other tanneries, those at Tannery 3 were very apprehensive of talking about their work. They feared that the management would dismiss them if they came to know about any interaction with unions or other organizations. Workers are not given permanent positions even after working at the tannery for a long time. Permanent workers have been forced by the management to resign and take settlements and join again as temporary workers.

The tannery operates in two shifts. Most of those interviewed said that they were working continuously for 14 hours a day, starting their work day at 6.00 am and ending at 8.00 pm. According to surveyed respondents, male workers are paid INR 130 (Euro 1,70) per shift, whereas female workers are paid only INR 90 (Euro 1,17) per shift. Owing to low wages, most workers in the tanneries work 12–14 hours per day, which is one and half to two shifts, but are not paid twice the ordinary rate, as stipulated by the Factories Act, 1948. One respondent said that a day's salary would be deducted from their wages if they took leave on a Monday. Another said that workers are harassed by supervisors even when they take leave for personal emergencies.

### 6.2.3 Occupational Health and Safety Hazards

According to the respondents, most work in the pre-tanning process is carried out manually and requires them



*A view of the lime pits in Tannery 1 where the hides are soaked*



*A view of Tannery 3 located near Ambur*

units. The tanneries supply leather for the production requirements of these manufacturing units.

Chromium tanned wet-blues (goat skin) sourced from places such as Vaniyambadi and Peranambur are brought to the tannery for finishing. After the various stages of chemical processing, the finishing work is

62 Government of India, Ministry of Social Justice and Empowerment. Welfare of Other Backward Classes, accessed in September 2017. <http://socialjustice.nic.in/UserView/index?mid=31548>



to stand throughout the day. This causes pain in the joints, back and shoulders.

For handling raw hides and chemicals, workers are given rubber gloves to protect their hands. However, they are not given proper boots or aprons for the protection of their body or legs. Instead, they use tubes from truck tires to protect their legs and feet when they enter lime pits, or handle chemicals. They are not provided with masks or protective glasses for their eyes, and are exposed to dust and fumes during the tanning process. Workers at Tannery 2 said that they are given gloves, shoes, aprons and masks.



**A worker in Tannery 1 with skin eczema**

50 per cent of respondents complained of health problems related to their work. One of the workers interviewed had a severe skin allergy, while another had a burn injury on his abdomen caused by harsh chemicals. They suffer from cold and fever very frequently, since they work in a damp environment without protection and handle wet leather at the tanneries. The worker with a severe skin allergy at Tannery 1 said that he cannot afford medical treatment.

Although there were no recent incidents of injury or accidents at the workplace, a worker interviewed at Tannery 1 said that one of his colleagues had had an accident two years before while handling a machine. The man

had lost his forearm in the accident. He had not been adequately compensated by the company.

One of the workers interviewed at Tannery 2 confirmed that the work is dangerous. He knew a worker who had lost his forearm while working on the setting machine, and another who had lost a finger while using a knife for shaving work. According to the workers, the management at Tannery 2 rushed the victims to private hospitals after the accidents, but did not take responsibility for follow-up treatment or provide compensation.

None of the workers interviewed had received formal safety training on handling chemicals and operating machinery. Both tanneries lack fire extinguishers. Only first aid boxes are provided at Tannery 2.

Respondents said that Tannery 1, like others in the area, does not operate in a stone building. The tannery resembles a shed which is open on all sides. The tiled roof causes temperatures to rise inside the workspace. There is no separate canteen facility and workers have to eat their food very close to the workplace. They also complained that the machines made a lot of noise throughout the day.

Workers at Tannery 2 said that they work in a solid stone building with good ventilation, as exhaust fans have been installed. However, workers said that there was a strong odour of chemicals and acids inside the tannery, and the noise generated by the machines was very high.

Many workers experienced problems while working because of the heat generated by the hot spray machine, including stomach aches and headaches. One respondent said that he experienced constant irritation in the eyes because of the dust in the tannery, and a female worker recalled experiencing respiratory problems during her initial days at the unit.

Respondents said that a temporary worker had lost his life after accidentally falling into the tank at the tannery's Effluent Treatment Plant. The tannery had paid the next of kin a sum of INR 700,000 (Euro 9000) as compensation and settlement. No police complaint was filed at the time, and the management had ensured that the issue was not reported in the media.

Male workers said that there are not enough lavatory units for them, leading to long queues during breaks. All respondents said that they are supplied with clean drinking water.

### 6.2.4 Job Work Units in Chrompet

Unlike the leather clusters in other districts Chrompet has a large number of small and medium sized enterprises, which mostly function as job work units. There are very few large tanneries in the area carrying out end-to-end tanning operations. The number of tanneries in the area has dwindled drastically in the last ten years, owing to stringent pollution control. However, there are a number of units functioning informally, carrying out at least one of the processes involved in tanning. For

companies. The majority of workers are migrants, who have been given accommodation within tannery premises. All units are guarded by private security personnel and workers were reluctant to talk to the research team near their work sites.

Respondents said that many job work units and small tanneries in Chrompet had closed down after the government introduced nationwide demonetization of higher-value currency notes in November 2016, and new cattle trade regulations in 2017. They noted that the supply of raw hides from places like Maharashtra and Kerala had stopped, putting pressure on local tanneries.

One worker involved in manual trimming at a job work unit stated that he barely gets ten days of work in a month, and is forced to take up work in other units to make ends meet. Each job work unit employs between 10 and 25 workers in a day, most of whom are migrant workers from North and East Indian states like West Bengal, Orissa, Bihar and Jharkhand. Local workers with experience are engaged as supervisors to oversee the work of migrants.

Those interviewed said that entry level workers are paid up to INR 6,500 (Euro 85), while those with experience are paid up to INR 8,000 (Euro 105). A worker engaged in trimming at multiple job work units said that he is paid on a piece rate basis. He receives INR 500 (Euro 6,50) for trimming 1000 goat skins. As a skilled worker, the supervisor earns a monthly salary of INR 15,000 (Euro 200). Migrant workers who are given accommodation within tannery premises are paid INR 300 (Euro 3,90) per week extra, as food allowance.

Respondents said that their work areas are dark or poorly lit, and not well ventilated. There are no exhaust fans, leading to high temperatures inside the units. According to those interviewed, many job work units have no lavatory facilities, forcing workers to urinate along the side of the road outside. Migrant workers are provided accommodation within the tannery premises, and are usually allotted space in the temporary sheds constructed on the unit's terrace.

Medical officers at the ESI dispensaries in Chrompet and Peranambut were interviewed along with a doctor from a private clinic who regularly handles cases of tannery workers who have sustained workplace injuries. The medical professionals observed that the majority of tannery workers are affected by respiratory disorders like bronchial asthma, dyspnoea and upper respiratory tract infections. Working without masks and other safety



*Trimming wastes dumped on the roadside near a job unit in Peranambut*



*A drum operator in a job work unit in Chrompet working without safety gears*

example, if trimming work is carried out at one job work unit, shaving is undertaken at another. Bullock carts are commonly used for transporting hides, wet-blues and semi-finished leather from one unit to the other. Another unique characteristic of the leather units in Chrompet is their location in a very small, densely populated residential area. While some units operate from independent plots or buildings, a few share space within defunct factories and warehouses that have been leased out to the

equipment in an environment saturated with dust and particulate matter was cited as the main cause of these conditions. They also noted that workers seek treatment for various skin diseases, including allergies, psoriasis, eczema and dry scalp, all of which are caused by the

direct handling of chemicals. Most tannery workers also complain of sinusitis, fever and cold. Myalgia (pain in the muscles), pain in the shoulders and in the knee joints are also common complaints because of long hours of standing and handling heavy, wet leather.

## 7. Conclusion & Recommendations

During two field visits in North and South India as part of the international “Change your Shoes” campaign, the research teams found that local tanneries do not handle effluents and solid wastes according to legal and environmental norms. Residents and farmers interviewed at all locations said that the quality of groundwater in these areas had deteriorated due to the tanneries. The researchers observed that solid wastes, such as shavings and wet-blue scraps, had been dumped on roadsides or burned out in the open.

The study also found that tanneries cause significant damage to the environment and to the health of local communities living around them. Improper disposal of solid wastes and ineffective treatment of tannery effluents have caused damage to soil and water resources. The quality of groundwater in all the researched areas has so far deteriorated as to force local communities to avoid it for drinking purposes.

The soil and water samples collected during our field trip to Kanpur and Agra helped to identify two main environmental problems strongly affecting the people living near the tanning industry. The first is the indiscriminate disposal of COPR to open land, contaminating water bodies in a wide radius around the dumpsites. Hazardous chromium VI keeps leaching out of the waste for decades, poisoning the environment and local communities. The second main problem witnessed was the pollution and destruction of agricultural soil by applying chromium-rich irrigation water and sewage sludge, making it unfit for cultivating the crops that ensure the rural population’s survival.

Only one of our groundwater samples taken from seven different wells showed elevated levels of chromium. This sample was retrieved near the COPR dumpsite and was highly contaminated with Cr(VI). Nevertheless, the absence of chromium in most of our groundwater samples during dry season does not mean that these wells are a safe source of drinking water, as chromium

is highly mobile in water. In fact, former studies have shown that people in and around Kanpur face the severe problem of chromium contaminated drinking water. In order to protect communities living near tanneries, an adequate assessment of the scale of chromium pollution of groundwater in this region related to the different stages of tanning needs to be carried out. This should be followed by an action plan to improve water quality. Meanwhile, drinking water should be provided by authorities to communities with polluted wells. Besides, it is of utmost urgency to tackle the effective treatment and safe disposal of toxic waste, to prevent further contamination of water and soil resources.

Even though the stringent Indian environmental regulations for the tanning industry meet international standards, there is a wide gap between the regulations and the reality as implemented by the tanneries. Few tanneries in Kanpur have the prescribed equipment to do primary treatment, and most of those fail to operate them properly or at all. Tannery owners complain that much of the reason for this is the problem of corruption. The poor financial position and the small size of many tanneries are also important factors.<sup>63</sup> As the situation in Kanpur exemplified, the pollution load coming from the tanneries is still heavy, and it is a problem both for people living nearby and for the river and groundwater.

This study further reveals that tannery workers in the leather clusters in Uttar Pradesh and Tamil Nadu – especially those in smaller job work units – work under poor conditions. Informal employment relationships, low wages, lack of access to social security, hazardous work environments, and occupational health and safety risks define the work environment at all tanneries surveyed. Workers are employed on a fluctuating temporary basis with no hope for regular employment. Although the Contract Labour Act stipulates that an employer must issue identity cards to their workers, none of those interviewed possessed identity cards or any other proof of employment. Moreover, none of the workers interviewed were

63 Reported by Rakesh Jaiswal from Eco Friends.



granted paid annual leave by their employer, and none of them were covered under the ESI and EPF social security schemes. Despite employing enough workers to qualify for mandatory registration under the ESI and EPF Acts, the tanneries have denied these benefits to their employees, which clearly violates national law. Collective bargaining and workplace grievance mechanisms were absent at all tanneries observed.

Finally, tannery workers were either provided with safety equipment of very low quality or none at all. None of the workers interviewed had received any training on occupational health and safety. This clearly violates national law, as the 1948 Factories Act stipulates that employers

should provide adequate safety equipment to workers. It further requires employers to arrange two annual medical check-ups for workers, which none of the tanneries observed adhered to. Most workers interviewed who handle chemicals, wet leather and hazardous machinery therefore suffered from various work-related medical conditions.

In light of the above findings, we recommend the following steps to be taken at the national state and supplier level, as well as the international company and political level <sup>64</sup>.

### State Authorities in India

1. Authorities at the state labour department in India must ensure that smaller tanneries operating with fewer workers are licensed, and follow all regulations prescribed by the 1948 Factories Act with regard to workers' health, safety and welfare.
2. The State Pollution Control Boards (PCB) must conduct periodic monitoring of the CETPs and ETPs, and ensure that tanneries comply with legal norms for discharge, treatment, storage and disposal of wastes. The PCB must develop a policy to address challenges related to the handling of solid wastes generated by tanneries.
3. The ministry of Environment, Forest and Climate Change (MoEF&CC) mandated with implementing environmental regulations must take into account and redress the adverse impacts of pollution from the industry on community livelihoods and health.
4. The institutional systems for stringent implementation of the labour laws in the leather and footwear industry of India must be strengthened through the following measures:
  - a) Promotion of labour rights among workers, employers, implementing authorities, consumers, investors and other stakeholders;
  - b) Hiring of sufficient personnel in the labour department to ensure regular inspection, monitoring and compliance by workplaces;
  - c) Providing free legal services to low-income workers in order to prevent their exclusion from accessing justice.
5. Minimum wages must be raised in order to guarantee decent work to all categories of workers.
6. Denial of ESI and PF, or withholding of employer contribution, must be closely monitored and retroactively implemented in cases of violation.
7. Proposed labour law reforms must be reconsidered to better guarantee the rights of workers and to ensure accountability of employers and global supply chains for any breaches.
8. The Indian government must ratify ILO Conventions 87, 98, and 131 at the earliest opportunity, with due consideration for the specific conditions of labour in India.

<sup>64</sup> Some of the recommendations are identical with a former Change your Shoes publication (Walk a Mile in Their Shoes: Workers' Rights Violations in the Indian Leather, Vaibhav Raaj, Shashi Kant Prasad, Anton Pieper, 2016) as they are still valid.

## Suppliers

1. Irrespective of their size and the scale of their operations, tanneries must adhere to legal norms on labour rights and environmental safeguards and regulations.
2. Workers must be free to participate in union activities without penalties or negative consequences, and management must facilitate the formation of democratically elected trade unions in keeping with the law.
3. Tanneries must ensure that workers are paid a living wage, which is usually above the minimum wage prescribed by the government.
4. Employers must make access to mandatory social security schemes like ESI and EPF available to all workers.
5. Occupational health and safety must be given utmost priority by the management for all workers. Workers in leather industry must be thoroughly trained to handle hazardous chemicals and processes with adequate safety gear. Health issues among workers resulting from hazardous working conditions should be actively monitored by the workplace management in order to install suitable protective systems. Management must bear the responsibility of the treatment of those affected. Healthy working conditions should be ensured, e.g. through proper ventilation, safety, hygiene and sanitation standards, access to primary medical care, and adequate waste management.
6. Multi-stakeholder initiatives for implementing better working conditions and protecting the environment should be established and supported.
7. In line with the UN Guiding Principles, suppliers and sustainability initiatives in the leather and footwear industry should have in place a due diligence strategy and system which analyses and prevents human rights risks along the supply chain. This includes supply chain mapping, so as to increase transparency within the supply chain and to identify human rights challenges. Furthermore, they should aim for long-term business relationships and collaborate with other suppliers and stakeholders to increase their leverage for effective due diligence activities. They should implement company-level grievance mechanisms and make use of collective bargaining processes. Unions and civil society should be involved in the implementation of companies' due diligence on an eye-level basis.

## Brands

1. Retailers and buyers (international brands) must ensure that transparency and traceability are maintained in their supply chains, and they must perform due diligence. Brands should map their supply chains, from tanneries to subcontractors. Any violation of labour rights and environment regulations must be thoroughly investigated and addressed.
2. International shoe companies must report on efforts to increase alternative tanning. If chromium tanning is used, companies must use state of the art technology.
3. Companies must take responsibility for the management of health and safety hazards at their worksites.
4. Companies must take responsibility of the environmental performance of their suppliers.
5. Multi-stakeholder initiatives for implementing better working conditions and protecting the environment on the ground should be established and supported.
6. In line with the UN Guiding Principles, brands and sustainability initiatives in the leather and footwear industry should have in place a due diligence strategy and system which analyses and prevents human rights risks along the supply chain. This includes supply chain mapping, so as to increase transparency within the supply chain and to identify human rights challenges. Furthermore, they should aim for long-term business relationships and collaborate with other brands and stakeholders to increase their leverage for effective due diligence activities. They should implement company-level grievance mechanisms and make use of collective bargaining processes. Unions and civil society should be involved in the implementation of companies' due diligence on an eye-level basis.

### EU level

1. EU Member States must implement the UN Guiding Principles on Business and Human Rights.
2. EU Member States should set a binding framework for the leather and footwear industry to strengthen the due diligence system orientated on the UN-Guiding Principles for Business and Human Rights “Protect, Respect and Remedy” framework. This includes a mapping of supply chains; encouraging transparency; fostering long-term business relationships; collaboration with other organisations to increase leverage for effective action; recognising the importance of unions, collective bargaining, company-level grievance mechanisms and participation in civil society.
3. EU Member States must create national action plans obliging governments and businesses to protect human rights.
4. EU Member States must reform their OECD national contact points for multinational enterprises to meet human rights standards.
5. EU Member States must create or improve grievances and complaints procedures for the victims of labour and human rights violations.
6. EU Member States must create a legal framework to take action against illegal business practices as well as infringements of corporate criminal law by multinational corporations.
7. EU Member States must take the initiative in creating multi-stakeholder initiatives focused on leather and footwear production.
8. The EU should operate a standardised shipping database at an EU level which stores records for all exports and imports of cargo entering European ports, noting the class of cargo, the trading names of the companies involved, the point of origin, the value as an FOB price and quantity, and the ultimate destination and recipient, and make this available by access request.
9. Directive 94/11/EC should be revised to include the type of tanning (chromium or other) on shoe labels, so that consumers can make an informed choice when buying shoes.
10. EU policies, instruments and actions must be consistent and create synergies among existing and new policies. We insist on the need for a binding framework and implementation which address all aspects of sustainable production.

Only if such matters are addressed in an urgent manner, will it be possible to effectively improve working conditions in order to ensure that the immense profits of this industry do not come at the cost of those furthest down in the supply chain. This is also true for environmental

pollution. Furthermore, in order combat environmental pollution, a clean up of toxic wastes (like the COPR dumpsites) and a remediation of affected soils and water bodies is urgently needed.



## Annexes

### Annex 1 Tannery Effluent Standard (After Primary Treatment)

#### Disposal Channel/Conduit Carrying Wastewater to Secondary Treatment Plant

Type of Tanneries	Parameter	Concentration limit not exceed, mg/l (except pH)
Chrome tanneries/ Combined chrome and vegetable tanneries	PH	6.5 – 9.0
	SS	Not to exceed 600
	Cr concentration after treatment in the chrome wastewater stream	45
Vegetable tanneries	PH	6.5 – 9.0
	SS	Not to exceed 600

**NOTE:** The above standards will apply to those tannery units, which have made full contribution to a CETP comprising secondary treatment. Those who have not contributed will be governed by earlier Notification No. S.O. 64 (E) dated January 18, 1988.

### Annex 2 Tannery Effluent Standards

Pollutant	Maximum Concentration (in mg/l, except pH)	Quantum per raw
hide processed	6.5–9.0	-
BOD (at 27oC, 3 days) *	100	-
Suspended Solids	100	-
Sulphides (as S)	1	-
Total Cr (as Cr)	2	-
Oil and Grease	10	-

\* for effluent discharged into inland surface waters BOD limit shall be made stricter to 30 mg/l by the concerned SPCB

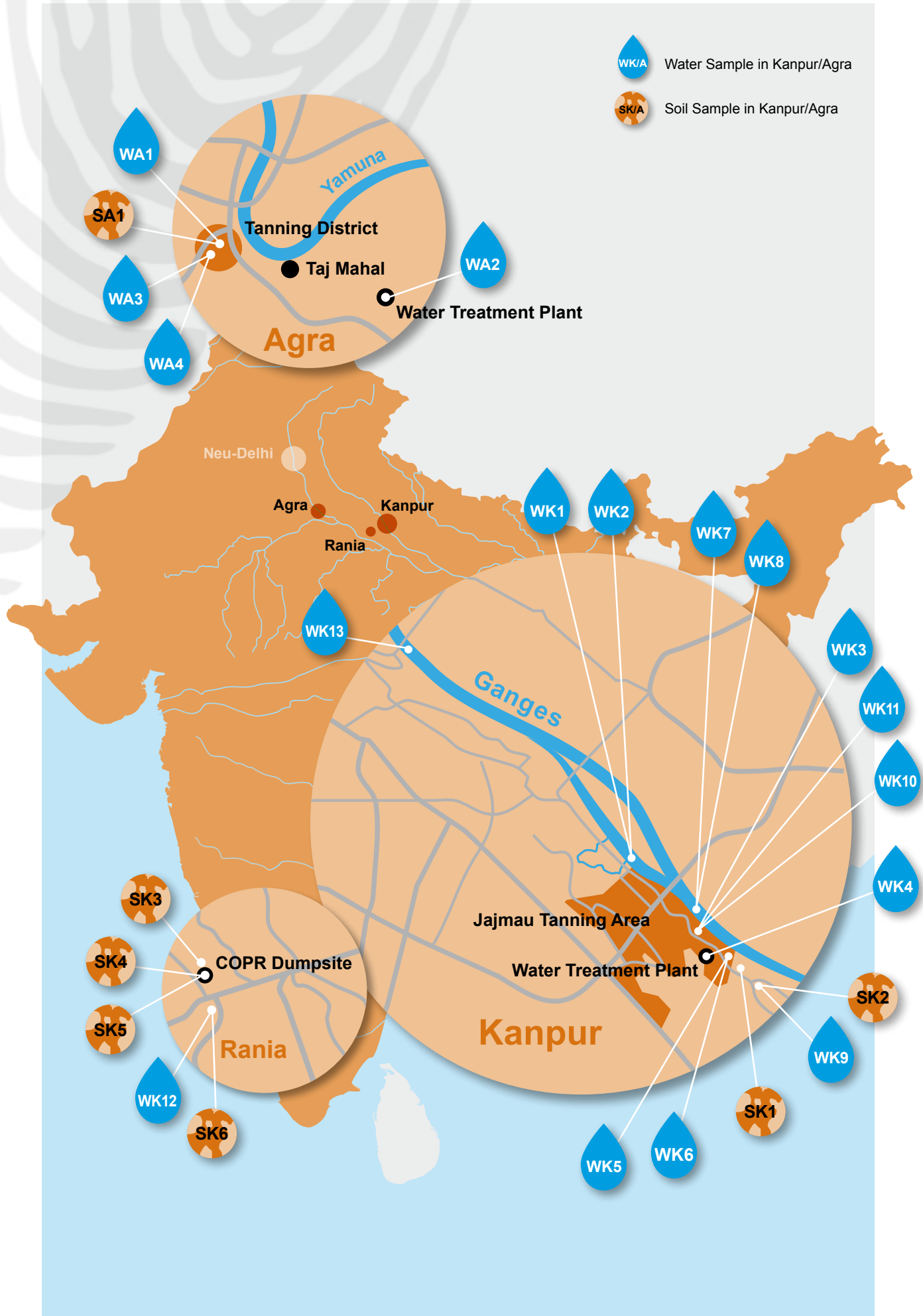
### Annex 3 Soil Samples

#### 3 a) Methodology for Testing of Soil Samples

All the soil samples were collected in clean and unused plastic bags after discarding few centimetres of soil from the top. Agate mortar and pestle were used to grind the soil samples in the lab. Sieving was done afterwards with 63 µm sieve. Finally, the soil samples were freeze-dried before being analyzed for elemental composition by X-Ray Fluorescence (XRF).

#### 3 b) Results of Water Samples

City	Sample ID	Spot description	Coordinates		Cr (mg/kg)	NOTE
Agricultural soil						
Kanpur	SK 1	Soil next to irrigation channel, pasture and plants	26°24'38.4"N	80°25'47.9"E	9,112	According to the German Sewage Sludge Ordinance these agricultural soils pose an acute risk to human health. They surpass the threshold more than tenfold.
Kanpur	SK 2	Soil irrigated with water from channel, beetroot plantation	26°24'22.7"N	80°26'12.7"E	5,650	
Kanpur	SK 6	Soil near to COPR dump, corn field in village Khan Chandpur, contaminated irrigation water	26°23'41.7"N	80°02'58.9"E	130	On this agricultural soil no further chromium containing sludge or water should be applied.
COPR dumpsite						
Kanpur	SK 3	Soil near to COPR dumpsite, currently unused	26°24'15.5"N	80°02'47.0"E	3,648	These soils are highly contaminated with chromium and pose a risk to nearby surface water and groundwater.
Kanpur	SK 4	COPR waste on dumpsite in Rania	26°24'14.8"N	80°02'48.5"E	45,161	
Kanpur	SK 5	COPR waste on dumpsite in Rania	26°24'14.9"N	80°02'48.4"E	52,860	
Other soil samples						
Agra	SA 1	Soil next to drain coming from tanning area	27°10'38.5"N	78°01'09.9"E	321	Elevated chromium level due to frequent exposure to contaminated water



**4 a) Methodology for Testing of Water Samples**

All the water samples were collected in 50 ml centrifuge tubes. For each location, two aliquots of ~15 ml each of these samples were filtered through 0.2 µm syringe filters and collected in two different centrifuge tubes. One of these aliquots was acidified by trace metal grade nitric acid (HNO<sub>3</sub>) to preserve them for analysis of the major and trace elements by Inductively Coupled Plasma Mass Spectrometry (ICP-MS). The other aliquot was kept unacidified for the determinations of hexavalent chromium, by following the di-phenyl carbazide method (US EPA 7196 A) that utilizes UV-Vis spectrophotometry, and of anions (fluoride, chloride, bromide, nitrite, nitrate, phosphate, sulfate) by Ion Chromatography (IC). Samples were preserved cold inside an ice box and immediately refrigerated at 4°C after transporting them to the laboratory. Fluoride was also measured using a fluoride probe for more accurate result. 1 per cent trace metal grade HNO<sub>3</sub> was used for standard preparation and dilution purposes in ICP-MS.

**4 b) Results of Water Samples**

City	Sample ID	Spot description	Coordinates		Total Cr (µg/l)	Cr(VI) (µg/l)	Cr(III) (µg/l)	NOTE
Effluents								
Kanpur	WK 1	Effluents of tanneries going to the river without treatment	26°26'41.0"N	80°23'39.5"E	951	0	951	Within the Indian discharge limit for effluents of 2,000 µg/l for total chromium
Kanpur	WK 4	Water at CETP	26°25'04.8"N	80°25'12.8"E	0	0	0	
Agra	WA 1	Effluents before treatment coming from tanning area	27°10'39.3"N	78°01'09.2"E	200	115	85	
River								
Kanpur	WK 2	River downstream of inflow of effluents WK1	26°26'40.5"N	80°23'41.7"E	579	35	544	Exceeding the Aquatic Life Index for acute concentration of Cr(VI)
Kanpur	WK 7	Ganges River downstream I	26°25'38.1"N	80°24'53.5"E	0	0	0	
Kanpur	WK 8	Ganges River downstream II	26°25'37.3"N	80°24'54.2"E	0	0	0	
Kanpur	WK 13	Ganges River upstream	26°30'23.9"N	80°19'05.3"E	0	0	0	
Wells and drinking water								
Kanpur	WK 3	Well next to area of tanneries	26°25'18.3"N	80°25'02.9"E	0	0	0	
Kanpur	WK 5	Drinking water from tube well	26°24'50.7"N	80°25'34.1"E	0	0	0	
Kanpur	WK 10	Well next to area of tanneries	26°25'15.7"N	80°25'04.7"E	0	0	0	
Kanpur	WK 11	Drinking water from tube well next to area of tanneries	26°25'16.7"N	80°25'04.7"E	0	0	0	
Kanpur	WK 12	Well in village near COPR dumpsite	26°23'41.1"N	80°03'00.7"E	13295	13295	0	Significantly above the drinking water limit of 50 µg/l set by WHO
Agra	WA 3	Drinking water from tube well I	27°10'20.0"N	78°00'48.2"E	0	0	0	
Agra	WA 4	Drinking water from tube well II	27°10'20.0"N	78°00'48.2"E	0	0	0	
Irrigation water								
Kanpur	WK 6	Irrigation channel directly after purification	26°24'48.4"N	80°25'35.4"E	22	20	2	
Kanpur	WK 9	Irrigation channel in village Shekpur	26°24'22.4"N	80°26'12.2"E	729	729	0	Exceeding the maximum recommended concentration for irrigation water of 100 µg/l (FAO).
Agra	WA 2	Water from treatment plant after treatment used for irrigation	27°09'40.1"N	78°04'16.8"E	209	183	26	



## CHANGE YOUR SHOES

Change Your Shoes is a Europe-wide campaign which has been set up to demand better social and environmental conditions in the tanneries, factories, workshops and homes where leather shoe production takes place. This campaign is a partnership of 15 European and 3 Asian organisations. Change Your Shoes believes that workers in the global shoe supply chain have a right to a living wage and safe working conditions, and that consumers have the right to safe products and transparency in the production of their shoes.

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## LEGAL NOTICE

**Content:** Change Your Shoes Campaign

**Report published by:** Change Your Shoes, Berlin/Vienna,  
December 2017

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**Design and typesetting:** Olaf von Sass

**Photos:** Stella Haller (p.2, 4, 5 above, 7, 8, 9, 10 left, 12, 13,  
14, 16, 17, 19, 20, 22 above); Regina Webhofer (p.5 below,  
10 right, 22 below); Vijay Senthil Kumar (p. 23);  
Pradeepan Ravi (p. 24, 25, 26, 27, 28)

## ACKNOWLEDGEMENTS:

Many thanks to Rakesh Jaiswal, Sandhya Lakshmi Chellapilla, Pradeepan Ravi, Avantee Bansal and the Indian partner organisations of Change Your Shoes, CIVIDEP and SLD, for their guidance during the field research in India. Furthermore, in the name of the project we want to thank the Indian Institute of Technology Kanpur (IITK), in particular Dr. Abhas Singh and his graduate student Mainak Bhattacharya, for support with scientific questions and the analysis of our soil and water samples.

This study was sponsored by the European Union, and funded with contribution of Kirchlicher Entwicklungsdienst by Brot für die Welt - Evangelischer Entwicklungsdienst and Engagement Global commissioned by the German Federal Ministry for Economic Cooperation and Development. The publishers bear the sole responsibility for the content of this study.

