Risk-assessments for products within five categories: Workwear, footwear and textile

A report for Direktoratet for forvaltning og IKT (DIFI) by Swedwatch

Table of contents

Introduction

Swedwatch has carried out risk-assessments on thirty-four products within five product categories on behalf of Direktoratet for forvaltning og IKT (DIFI). The risk-assessment reports aim to provide information on potential adverse impacts on labour rights and human rights in the supply chains of the selected products. The reports will guide contracting authorities on the importance of social considerations in their purchasing practices and when such criteria should be applied. The risk-assessments will also improve the readers' understanding of what to look for when monitoring supplier compliance.

It is important to note that the risk-assessments do not aim to scrutinise or describe the supply chain of any particular brand or supplier. The purpose is to give a general understanding of the potential risks linked to the product in general.

Each product is described based on components and materials used in the product. The general supply chain is presented in a table, along with a narrative explanatory paragraph. The supply chain table is divided into three sections; assembly, component and raw material, and provides an overview of most relevant countries.

General risks are outlined and those which are categorised as most adverse risks for each step of the supply chain are summarised in an introductory table in order to provide an overview. The grading at the bottom of the risk-matrix indicates a combination of the *severity* and *likelihood* of the risk and aims to provide guidance on where main risks are located in the supply chain. For example, when a product is assembled in both a high-risk and a low-risk context to more or less the same extent, the risk will be graded lower than if the product had been predominantly assembled in a high-risk environment. This also means that even if a number of potential severe risks are listed in the column, the risk may still be considered low if it is likely that the production mostly takes place under safe and sound processes in a low-risk environment.

The grading includes the following steps:

Very low risk	Low risk	Medium-high risk	High risk	Very high risk

Method and data

The data used for the risk-assessments comes mainly from reports, articles, films and academic research. Suppliers, and to a smaller degree industry organisations/initiatives, have also been interviewed to provide input to the understanding of the supply chains. Trading data has been used for the mapping of the supply chains, as transparency and traceability is often limited. Therefore, the supply chain data, especially on a component and raw material level, partly presents the likelihood of a certain producing country being included in the supply chain. The supply chain data can therefore not be viewed as exact for every single product procured by Norwegian contracting authorities, but as a general estimate.
The report was written October to December 2017.

Workwear, footwear and textile

Product	Assembly	Component	Raw material
Workwear, footwear and textile	**High risk**	**High risk**	**High risk**
Workwear outdoor	**High risk**	**High risk**	**Very high risk**
Workwear indoor, bedlinen and towels	**High risk**	**High risk**	**High risk**
Protective footwear	**Medium-high risk**	**Medium-high risk**	**High risk**
Protective gloves	**High risk**	**High risk**	**Very high risk**
Disposable dust masks	**Medium-high risk**	**Medium-high risk**	**High risk**

The supply chain of the textile and footwear industry is both long and complex. Workers in this industry engage in varying activities ranging from production and extraction of raw materials to manufacturing, production and retail.[1] Top producers and exporters include China, Bangladesh, India[2], Indonesia and Thailand, but some products are also to a large degree manufactured in Europe. Production is often outsourced and trading between factories, for example in different East Asian countries, is common. Components of the same product can therefore be sourced from different factories and countries.

Working conditions can be hazardous and primitive and the industry deals with a huge range of different materials and substances, including cotton, polyester, leather, rayon and common substances such as benzene, chromium, etc. Tanneries in particular use large amounts of chemicals that are harmful for workers.[3]

The textile industry could be categorised as "hyper-competitive"[4] which in practice has led to companies and sub-contractors engaged in fast and cheap production.[5] Workers in high-risk countries such as China, Indonesia, India, Pakistan and Bangladesh, and in particular those working in the footwear and leather industries, are thus being subjected to a very high risk of being forced to work long hours, often handling hazardous chemicals. Child labour is not uncommon, with India

[1] McNamara, Kerry (2008) "The Global Textile and Garments Industry: The Role of Information and Communication Technologies (ICTs) in Exploiting the Value Chain' Enlightenment Economics, infoDev, Human rights Watch, Toxic Tanneries, 2012

[2] Stariz, Cornelia (2011) Making the cut? Low-income countries and the global clothing value chain in a post-quota and post-crisis world, World Bank.

[3] ILO, Textiles, clothing, leather and footwear sector. ITGLWF (2012), 'Fair Games? Human rights of workers in Olympic 2012 supplier factories' Play Fair, Gangopadhyay et. Al. (2011) "An Occupational Health Study of the Footwear Manufacturing Workers of Kolkata, India', Kamla-Raj, University of Calcutta, India, Human Rights Watch, Toxic Tanneries, 2012, Swedwatch, Svenska skor ger spar I miljön – en granskning av miljöeffekterna från garverier i Syd, 2009

[4] Barnes, Jusin & Morris, Mike (2008) 'Globalization, the Changed Global Dynamics of the Clothing and Textile Value Chains and the Impact on Sub-Saharan Africa', PRISM – University of Cape Town

[5] Hearson, Martin (2009) 'Cashing in – Giant retailers, purchasing practices, and working conditions in the garment industry', Clean Clothes Campaign, Primavera Quint

being one of the countries with the highest rates of child labour.[6] Many workers report income-levels below a so-called "living wage".[7] Although some of the top export and manufacturing countries have ratified the ILO core conventions on labour rights[8], restrictions on freedom of association is commonplace and workers who voice their will to form or join a union are often fired or threatened in some way.[9] Lack of safety at the workplace is also a serious problem, causing many deaths and injuries (especially in Bangladesh) due to, for example, building-collapses and fires.[10]

Many suppliers and manufacturers of work wear state that they have implemented codes of conduct and are reviewing and auditing/visiting their suppliers in order to mitigate risks. This is also true for many brands in the industry at large. Suppliers spoken to for the purpose of this risk-assessment were generally aware of the risks.[11]

This risk-assessment includes the following products:

- Workwear (outdoor)
- Workwear (indoor), bedlinen and towels
- Occupational footwear
- Protective gloves
- Disposable dust masks

Industry and Sector Initiatives

Better Cotton Initiative

Better Cotton is an initiative seeks to improve working conditions for employees in the cotton industry. It also has a more environmentally sustainable future as a goal for the sector. Members of this initiative are provided with training programs for producers and farmers, as well as frameworks and other guidelines. Members are among others H&M, Sainsbury's, Nike, Walmart, IKEA, Levi Strauss & Co etc. The initiative is funded by WWF, Sida, Rabobank etc.[12]

ACCORD (on Fire and Building Safety in Bangladesh)

The Accord is an initiative to ensure more secure workplaces for staff at Bangladeshi factories. It is a legally binding agreement signed by unions, international and local, and over 100 companies. Any company that has signed the agreement must have safety inspections at their factories and publicly report findings and results.[13]

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[6] Usher, A., Newitt, K & Merouchi, L. (2013) 'Better Cotton and Decent Work: Activities, impacts and lessons learned – Executive summary', Ergon Associates Limited.
[7] Hearson, Martin (2009) 'Cashing in – Giant retailers, purchasing practices, and working conditions in the garment industry', Clean Clothes Campaign, Primavera Quint.
[8] ILO – Ratifications of fundamental conventions by country
[9] Union to Union Facket i världen, Retrieved 2017-12-07
[10] ILO, Occupational safety and health in the textiles, clothing, leather and footwear sector, 2013,. ILO, Bangladesh: Major ILO programme aims to make garment industry safer, The Clean Clothes Campaign, (2012), 'Hazardous workplace: Making the Bangladesh Garment industry safe' WIEGO
[11] For example, Bakken & Ström
[12] Better Cotton Initiative
[13] ACCORD

International Programme on the Elimination of Child Labour (PIEC)

The International Programme on the Elimination of Child Labour is a program under the International Labour Organization (ILO). This program was launched in 1992 and works to reduce rates of child labour by providing support to countries where rates of child labour are high. It operates worldwide together with worker's organizations, government agencies, businesses, NGOs, media etc. and has a large number of operations in different countries.[14]

The Clean Clothes Campaign

The Clean Clothes Campaign works with a wider range of players: consumers, governments, companies and workers of the garment industry. The Clean Clothes campaign's core aim is to empower workers. It also focuses on poverty reduction and consumer advocacy. It collaborates with over 200 different organisations and its work includes lobbying, mobilising consumers and, more directly, supporting workers demanding better working conditions.[15]

BSCI

BSCI was launched in 2003 at the initiative of the Foreign Trade Association (FTA). The initiative works to support buying companies to integrate the BSCI Code of Conduct into their business practices. It provides support, auditing tools and a database for their members.[16]

Certifications

Global Organic Textile Standard (GOTS)

The Global Organic Textile Standard (GOTS) is a certification standard for organic cotton and environmentally and socially responsible manufacturing.[17]

Fairtrade

Fair Trade is a certification that includes human rights criteria. Pesticides and chemical-use is restricted but not forbidden.[18]

[14] The International Programme on the Elimination of Child Labour (IPEC)
[15] The Clean Clothes Campaign
[16] BSCI
[17] Global Organic Textile Standard
[18] Fairtrade

Workwear (Outdoor)

Summary of the most severe risks

Assembly	Components	Raw materials
Low Wage Excessive overtime Lack of union rights Forced labour Child labour Poor health and safety Exploitation of migrant workers	**Polyester, cotton fabric** Forced labour Child labour Poor health and safety Exposure to chemicals Fire and explosion Lack of union rights Environmental pollution Low wage Excessive overtime	**Oil, cotton farms, quartz mining** Forced labour Child labour Poor working conditions Lack of union rights Low wage Poor health and safety Exposure to chemicals, dust Environmental pollution Impacts on local communities Sexual abuse
High risk	**High risk**	**Very high risk**

The product

Workwear and protective clothing ensures the adequate protection of employees' occupational health and safety requirements.[19] Unlike fast fashion apparels, the production of work clothes need more specific skills, stable planning and dependable delivery systems.[20] This risk-assessment focuses on trousers, jackets and vests for outdoor work. The materials used in the clothes are both natural and synthetic fibers.[21] The synthetic fibers, for example, nylon, polyester, and acrylic, are created using polymerisation of various chemicals where the polymers are produced from crude oil.[22] Natural fibers are mainly cotton. Certain protective clothing is impregnated in flame retardants which uses various strong chemicals.[23] Fluorescents and glass beads are important components in manufacturing reflective materials used for certain workwear.[24] Glass beads are made from Quartz.[25]

[19] HSI Magazine. The Importance of Workwear. Issue # 72. Health & Safety International. 2012
[20] Lindström. An efficient workwear supply chain provides benefits for our customers. Retrieved 2017-11-30
[21] Market Brief: Focus on Swedish Market. Workwear and Promotional Clothing . Swedish Chambers of Commerce 2008
[22] O Ecotextiles. Man-made synthetic fibers. 2010; Dutch Ministry of Defence. Category Plan Workwear Dutch national government. 2015
[23] SewWhat. Flame Retardancy: Fabric Flammability. Retrieved 2017-11-30; DuPoint. Inherent versus Treated Flame Resistant Fabrics. Retrieved 2017-11-30
[24] Interlek. High Visibility Clothing & Accessories Requirements for Europe. USA. 2017; 3M Scotchlite. What is Reflective Material? Retrieved 2017-11-30
[25] University of Minnesota. Quartz: Silica group of silicate materials. Department of Geology, University of Minnesota. Retrieved 2017-11-30.

Supply chain

The supply chain of the workwear involves sourcing of raw material, processing and manufacturing of fabrics and components and, finally, assembling.[26] According to some suppliers, priority countries for manufacturing of workwear are China, Thailand and Vietnam.[27] Pakistan, China and India are leading in the manufacturing of woven cotton.[28] In 2015, China accounted for 66 per cent of global production of synthetic fibers.[29] China also contributes to 45 per cent of the global export of synthetic fabrics in 2016.[30] Again, China is the top exporter of quartz globally and Norway is one of the major importers. Norway also exports some quartz globally.[31]

Assembly	**Component**	**Raw Material**
Asian Countries China, Vietnam[32] India, Bangladesh[33] **EU countries:** Netherlands, France, UK, Italy, Belgium, Austria **Eastern European Countries** Estonia, Latvia, Serbia, Hungary[34] Russia[35]	**Synthetic fabric (Polyester, Nylon, Acrylic, Rayon)**: Main producing countries are China, Germany, USA[36] **plastics, acrylic**: Main producing countries are Belgium, South Korea, USA, Germany[37] **Cotton fabric (woven):** Main producing countries are Pakistan, China, India[38] **Synthetic organic fluorescent brightening agents:** Main	**Cotton**: Main producing countries are China, India, USA, Pakistan, Brazil, Uzbekistan[41] **Crude Oil:** Large producers are Saudi Arabia, Russia, Iraq, Canada, Nigeria[42] **Quartz:** Main producing countries are China, Turkey, India, Spain and Brazil[43]

[26] Dutch Ministry of Defence. Category Plan Workwear Dutch national government. 2015
[27] Telephone interviews and e-mail with suppliers, 2017-11-27
[28] OEC. Woven Cotton Fabric. The Observatory of Economic Complexity. 2016
[29] IHS Markit. Natural and Man-Made Fibers Overview. Chemical Economics Handbook. 2015.
[30] OEC. Synthetic Fabrics. The Observatory of Economic Complexity. 2016
[31] Worldatlas. Top 15 Quartz Exporting Countries. 2017
[32] Some of the information is gathered by interviewing some suppliers over the phone on the 27th November 2017; Europages. Workwear. Retrieved 2017-11-30
[33] Some of the information is gathered by interviewing some suppliers over the phone on the 27th November 2017; Europages. Workwear. Retrieved 2017-11-30
[34] Some of the information is gathered by interviewing some suppliers over the phone on the 27th November 2017; Europages. Workwear. Retrieved 2017-11-30
[35] Some of the information is gathered by interviewing some suppliers over the phone on the 27th November 2017; Europages. Workwear. Retrieved 2017-11-30
[36] OEC. Synthetic Fabrics. The Observatory of Economic Complexity. 2016; Havep. Sustainable Raw Materials. Netherlands. Retrieved 2017-11-30
[37] OEC. Propylene Polymers. The Observatory of Economic Complexity. 2016
[38] OEC. Woven Cotton Fabric. The Observatory of Economic Complexity. 2016
[41] WTFx. Cotton Exports by Country. World's Top Exporters. 2017; Worldatlas. Top Cotton Producing Countries in The World. 2017
[42] WTFx. Crude Oil Exports by Country. World's Top Exporters. 2017
[43] Worldatlas. Top 15 Quartz Exporting Countries. 2017

	producing countries are China, Germany, India[39] **Reflective materials** (Silica and quartz sand): Main producing countries are USA, Belgium, Germany[40]	

Risks

In cases where production of protective workwear takes place within Europe, risks are assessed as lower than in Asian countries. However, garment workers, for example in Serbia and Hungary, cannot make enough money to meet their basic needs despite working excessive overtime under perilous working conditions. These include: exposure to heat and toxic chemical and abusive treatment by management.[44] Anti-union activities are also reported in East-European countries including Romania, where yellow unions[45] also may occur.[46] There have also been reports of wages under minimum wage and lack of proper employment contracts for female garment workers in the UK.[47]

Often, working conditions in Southeast Asia, China, Bangladesh and India are characterised by long working hours and low wages. Workers who migrate from rural to urban areas are often at most risk of being exploited. This form of employment is rarely time-limited and the right to join a union is restricted. The working conditions and low wages for women in the textile industry, for example in Bangladesh, often has a negative impact on the rights of their children.[48] The parents cannot support their children and thus send them to their home villages, to stay with relatives. Many children who stay with their parents drop out of school to take care of their younger siblings and do household chores while parents are at work.[49] Child labour is also reported in the textile industries in high-risk countries such as Bangladesh, India (where there is also forced labour), Vietnam and China.[50]

[39] OEC. Synthetic organic fluorescent brightening agents. The Observatory of Economic Complexity. 2016
[40] OEC. Silica sands and quartz sands. The Observatory of Economic Complexity 2016
[44] Clean Clothes Campaign. Made in Europe: the ugly truth. 2017
[45]Yellow unions are associations that are established by the employer themselves and are therefore not free. The purpose is to control workers and prevent strikes. They can also be controlled or influenced by the state.
[46] World Economy, Ecology and Development, Working Conditions and Economic Development in ICT Production in Central and Eastern Europe 2010
[47] Hammer, N. UK clothing manufacturing booms, but workers' rights lag behind. University of Leicester. 2015
[48] Swedwatch. 44 Barn med föräldrar i textil industrin: drömmer om ett bättre liv. 2014
[49] Ibid
[50] US Department of labor, List of Goods Produced by Child Labor or Forced Labor, Retrieved 2017-12-09

The production of natural fibres for textiles is a well-known high-risk operation where there is evidence of child labour and forced labour.[51] A significant amount of child labour has been reported in cotton farming in China, India, and Uzbekistan amongst other countries. Pakistan is among the top-ranked countries that produce cotton using forced child labour. Children, especially girls, work longer hours during the sowing and harvesting season.[52] Excessive overtime, low wages and sexual harassment is common for children working in Indian cotton farms.[53] In India, cotton farmers are at risk of getting into a cycle of unmanageable debt, especially those growing genetically-engineered cotton. 270,000 cotton farmers committed suicide in India between 1995 and 2014.[54] Cotton cultivation is the world's most chemical-intensive agriculture. Production also requires large volumes of water.[55] Pesticides are often over-used in cotton fields in India and China (fake pesticides are also used in India[56]), with negative impacts on the environment and human health.[57]

Transforming raw cotton into fabric includes bleaching and dying and the process uses toxic chemicals and heavy metals which is harmful to the environment.[58] Lack of waste water treatment plants at dying factories discharge chemicals and pollute waterbodies.[59] In Indian dying factories, lack of knowledge about possible health impacts and lack of use of personal protective equipment while handling the chemicals during dying and bleaching process, puts workers at risk of skin, liver and respiratory related diseases.[60]

The production of polyester fibres used in workwear are highly energy intensive and are non-biodegradable as the raw material derives from crude oil.[61] The manufacturing process of polyester requires chemicals that are poisonous and risk negative impact on public health, especially for the workers and on the surrounding environment in high-risk countries.[62] In order to make fabric soft and flexible, phthalates are used.[63] This chemical is hormone-destructive and/or classified as toxic to

[51] United States Department of Labor. List of Goods Produced by Child Labor or Forced Labor. 2016
[52] Pakissan.com. Child Labour in Cotton Growing Districts of Pakistan. 2014
[53] World Vision Action. Forced and Child Labour in the Cotton Industry. 2012
[54] The Guardian, India's farmer suicides: are deaths linked to GM cotton?, 2014-05-05
[55] WWF. Cotton: a water wasting crop. Retrieved 2017-11-30
[56] Reuters, Fake pesticides endanger crops and human health in India, 2015-11-20
[57] International Journal of Applied Research, Bt cotton in India, pesticide use and environmental impact in India, 2016; International Journal of Occupational and Environmental Health, Acute pesticide poisoning among female and male cotton growers in India, 2005; Journal of Developmental Economics, Risk preferences and pesticide use by cotton farmers in China, 2013
[58] Fiber2fashion. Impact of Textiles and Clothing Industry on Environment: Approach Towards Eco-Friendly Textiles. Retrieved 2017-11-30
[59] Chequer, F M et.al. Textile Dyes: Dyeing Process and Environmental Impact, Eco-Friendly Textile Dyeing and Finishing, Dr. Melih Gunay (Ed.), InTech, DOI: 10.5772/53659. 2013
[60] Paramasivam, P et.al., Knowledge, Attitude, and Practice of Dyeing and Printing Workers
Indian J Community Med. doi: 10.4103/0970-0218.74358. 2010
[61] Chemistry World. Synthetic Fabric: Green couture. 2008
[62] Ecotextile. Polyester and our health. 2011
[63] CBC News. Phthalates: Soft plastic's hidden hazard. CBC News- Canada. 2011

reproduction.[64] Exposure to chemicals is also a risk in the production of other plastic parts, as well as risks of fires and explosions in factories and pollution.[65]

Crude oil is extracted in a number of places worldwide with very limited traceability. Oil extraction is connected to environmental and social risks in Saudi Arabia, Russia, United Arab Emirates and Nigeria, including lack of union rights, poor working conditions, and forced labour, as well as oil spills leading to health impacts and contamination of soil and water for surrounding communities.[66] Oil extraction in high-risk environments has also been linked to sexual exploitation and abuse of women in surrounding areas.[67]

The risks associated with the mining and processing of quartz to make silica and glass may involve chronic exposure to respirable crystalline silica[68], which may scar lung tissue. This disease is known as silicosis which can lead to lung cancer.[69] Low wages, lack of health and safety facilities for the workers, weak rule of law in the mining areas as well as illegal mining are common in the quartz mining sites in India.[70]

Workwear (indoor) towels, bedlinen

Summary of the most severe risks

Assembly	Components	Raw materials

[64] PRI. It's not just natural and synthetic fibers in your clothes — there are plenty of chemicals too. Public Radio International. 2015; KEMI. Phthalates which are toxic for reproduction and endocrine-disrupting – proposals for a phase-out in Sweden. Swedish Chemicals Agency. 2015

[65] Upphandlingsmyndigheten, Risker i upphandling av varor inom städ och kemikalier, 2016, Pulitzer Center, India: The Toxic Price of Leather, 2017-10-03, ITUC, Toxic work stop deadly exposure today, 2015-04-09

[66] Utrikesdepartementet, Mänskliga rättigheter i Saudiarabien 2011 Retrieved 2017-10-27; ILO, Working Paper No. 267, Working conditions of contract workers in the oil and gas industries, 2010; The Degradation of Work, Oil and Casualization of Labor in the Niger Delta, 2010; Oil price.com, Nigerian Oil Workers Go On Strike, Stop Production At Several Flow Stations, 2017, The Guardian, Shell Nigeria oil spill '60 times bigger than claimed', 2012-04-23

[67] Wday, The Bakken's dirty secret: sex trafficking has growing precense in oil patch experts say 2014-05-06, Al Jazeera, The Dark side of the oil boom: Human trafficking in the Heartland, 2014-04-28, Columbia law school, Righting wrongs? Barrick Gold's remedy mechanism for sexual violence in Papua New Guinea November 2015

[68] Indian Mineral Yearbook 2014. Quartz & Other Silica Minerals. 53rd edition. Part- III : Mineral reviews. Government of India. 2015.

[69] Business Queensland. Management of dust containing crystalline silica (quartz). Queensland Government. 2010

[70] Mishra, A. Impact of silica mining on environment Journal of Geography and Regional Planning Vol. 8(6), pp. 150-156, DOI: 5897/JGRP2015.0495 2015

Low Wage Excessive overtime Lack of union rights Forced labour Child labour Poor health and safety Exploitation of migrant workers	**Polyester, cotton fabric** Forced labour Child labour Poor health and safety Exposure to chemicals Lack of union rights Environmental pollution Lack of union rights Low wage Excessive overtime	**Oil, cotton farms** Forced labour Child labour Poor working conditions Lack of union rights Low wage Poor health and safety Exposure to chemicals, dust Environmental pollution Impacts on local communities
High risk	**High risk**	**High risk**

The product

Indoor workwear includes many different types of uniforms and apparel. This risk-assessment focuses on indoor workwear specifically used in health care facilities, nursing homes and hospitals, as well as bed linens and towels.[71] There is, however, reason to believe that the supply chains for other types of occupational workwear for indoor-use are similar, if the materials and production processes are more or less the same.

Staff uniforms include aprons, gowns, lab coats, scrub suits and scrub trousers. Materials used are mainly woven cotton (also for bedlinen and towels) and polyester. However, uniforms and textiles can be disposable and made out of non-woven fabric.[72] Towels are woven in a special process to make the fabric soft.[73]

Synthetic fibres, for example, nylon, polyester, and acrylic, are created using polymerisation of various chemicals where the polymers are made from crude oil.[74] The disposable fibres are made out of polyurethane,[75] which is oil based as well.[76] Natural fibre used is mainly cotton.[77] Chlorine and/or hydrogen peroxide solutions are used to bleach the cotton. Chemically derived dyes are used to colour the yarn and/or fabric.[78]

[71] Fijan, S and Turk, Š S. Hospital Textiles, Are They a Possible Vehicle for Healthcare-Associated Infections? International Journal of Environmental Research and Public Health. 9(9):3330-3343. doi:10.3390/ijerph9093330. 2012

[72] Techtex Industrial. Medical. Technical Textile Services Ltd. Retrieved 2017-12-11-11

[73] Urbanara. Terry towel weave. Retrieved 2017-12-01

[74] O Ecotextiles. Man-made synthetic fibers. 2010; Dutch Ministry of Defence. Category Plan Workwear Dutch national government. 2015

[75] Galworker Workwear. Disposable. Retrieved 2017-12-11

[76] Polyurethanes. Environmental Responsibility. ISOPA. Retrieved 2017-12-11

[77] Havep. Sustainable Raw Materials. Netherlands. Retrieved 2017-11-30

[78] How products are made. Bed Sheet. Retrieved 2017-12-01; How products are made. Bath Towel. Retrieved 2017-12-01

The supply chain

The textile and clothing supply chain includes a range of steps, including the treatment of raw materials for preparing natural or synthetic fibres into yarns and fabrics; finishing with bleaching, dying, printing; and transforming fabric into clothing.[79]

Pakistan remains the top country for sourcing clothes for health care staff, patients as well as bed linen and towels.[80] Other than Pakistan, some of the top exporters of towels and bed linen are Germany, China, Turkey, Brazil, India, and Portugal.[81]

Pakistan also ranked top in the manufacturing of woven cotton fabric followed by China.[82] In 2015, China accounted for 66 per cent of the global production of synthetic fibres[83] and contributed 45 per cent of the global export of synthetic fabrics in 2016.[84]

Assembly	Component	Raw Material
Pakistan, China, Turkey, Egypt, Bangladesh, India, Thailand[85] **European countries:** Portugal, Germany, Belgium, UK, Spain, Lithuania, Estonia[86]	**Cotton fabric/Textile**: China, India, Italy, Germany, Bangladesh[87] Pakistan, USA[88] **Non - woven fabric**: European countries, China, North America[89] **Light synthetic cotton fabric:** China, Pakistan, Indonesia[90]	**Cotton**: China, USA, India, Pakistan, Brazil, Uzbekistan[92] **Oil:** Saudi Arabia, Russia, United Arab Emirates, Canada, Nigeria[93]

[79] E Facts. Occupational safety and health in the textiles sector. European Agency for Safety and Health at Work. Retrieved 2017-11-30
[80] Information collected from Lise Berg Larsen, Managing Director, Sleep Scandinavia AS through email conversation on the 2017-10-31
[81] OEC. Bed linen, of cotton, nes. The Observatory of Economic Complexity, 2017; OEC. Terry towelling etc of cotton nes, width > 30cm. The Observatory of Economic Complexity, 2017
[82] OEC. Woven cotton fabric, > 200g/m2, dyed, nes. The Observatory of Economic Complexity. 2016
[83] IHS Markit. Natural and Man-Made Fibers Overview. Chemical Economics Handbook. 2015.
[84] OEC. Synthetic Fabrics. The Observatory of Economic Complexity. 2016
[85] Information was provided to Swedwatch by anonymous suppliers via email on the 10th of November 2017 and over the phone on the 28th of November 2017
[86] Europages. Hospital uniform. Undated.
[87] Adam Ross. Biggest Textile Exporters in the World. Adam Ross Fabrics Ltd. 2015
[88] information collected from an anonymous supplier from Norway, via email on the 10th of November 2017
[89] Kalebek, N A and Babaarslan, O. Fiber Selection for the Production of Nonwovens. INTECH: Open science, Open mind. 2016.
[90] OEC. Light Synthetic Cotton Fabrics. The Observatory of Economic Complexity. 2016
[92] Worldatlas. Top Cotton Producing Countries in The World. 2017
[93] Råvarumarknaden.se, USA passerade Saudiarabien som världens största oljeproducent, Retrieved 2017-10-27

	Polyester yarn and fabric: China, South Korea, United Arab Emirates[91]	

Risks

Often, the conditions of garment production in Southeast Asia, China, Pakistan, Bangladesh, and India are characterised by long working hours, low wages, lack of union rights and many migrant workers from the rural areas who are vulnerable to abuse and discrimination. The major challenges in the Pakistani garment sector are deprivation of labour rights, for example, dangerous working conditions in factories susceptible to fire-related accidents, absence of contracts and discrimination against female workers.[94] Child labour, and in some cases forced labour, is also prevalent in the garment and textile industry in China, India, Thailand and Bangladesh.[95]

There is evidence that an increasing number of Syrian refugees, including children, work in the garment factories in Turkey, who are vulnerable to exploitation and abuse (low wages, excessive overtime, lack of welfare and benefits) as most of them are not registered with the authorities.[96] Turkey has ratified the eight ILO core conventions but there are reports on union members being fired for no apparent reason, or being harassed.[97]

Migrant workers in factories in Thailand are discriminated against, including through the confiscation of passports. They are also being paid less than other workers, and often risk ending up in bonded labour (a form of forced labour) due to high recruitment fees.[98] Weak management of waste generated from the textile industry in Egypt has led to the contamination of ground water.[99]

[91] OEC. Synthetic Filament Yarn Woven Fabric. The Observatory of Economic Complexity. 2016
[94] Clean Clothes Campaign, Facts on Pakistan's Garment Industry, 2015
[95] US Department of Labor, List of Goods Produced by Child Labor or Forced Labor, Retrieved 2017-12-09
[96] Business & Human Rights Resource Centre. Syrian refugees: Abuse & exploitation in Turkish garment factories. 2017. Lendman, S. Turkey Exploiting Syrian Refugee Adults and Children in Cheap Labour Industrial Sweatshops. Global Research. 2016
[97] Utrikesdepartementet, Mänskliga rättigheter i Turkiet 2011
[98] Danwatch, Do you use rubber?, Jan 2013; Bergbom, K. Trapped in the kitchen of the world: The situation for migrant workers in Thailand's poultry industry. Swedwatch. 2015
[99] Egyptian Environmental Affairs Agency. Sustaining Cleaner Production (part C). Ministry of Environment. http://www.eeaa.gov.eg/seam/Manuals/TextileSectorReport/content.htm; Yacout, D, et.al. Applying Waste

The production of natural fibres for textiles is a well-known high-risk operation with evidence of child labour and forced labour.[100] Pakistan is among the highest producing countries for cotton and there have been reports of the use of forced child labour where girls work longer hours during the sowing and harvesting season.[101] In India, cotton farmers risk getting into a cycle of unmanageable debt, especially those growing genetically-engineered cotton.[102] Cotton cultivation is the world's most chemical-intensive agriculture. Growing the crop also requires great amounts of water.[103] Pesticides are often over-used in cotton fields in India and China (or fake pesticides used in India[104]), with negative impacts on the environment and human health**.**[105]

Transforming raw cotton into fabric includes bleaching and dying. The process includes the use of toxic chemicals and heavy metals that are harmful for the environment.[106] Lack of waste water treatment plants at dying factories in high-risk countries such as India and Pakistan means that there is a risk of chemicals being discharged which can in turn pollute waterbodies.[107] This may cause impacts on the local environment and communities' access to clean water. In Indian dying factories, lack of knowledge regarding possible health impacts and lack of use of personal protective equipment while handling the chemicals during the dying and bleaching process put workers at risk of skin, liver and respiratory related diseases.[108]

The production of polyester fibres used in work wear are highly energy intensive and are non-biodegradable as the raw material derives from crude oil.[109] The manufacturing process of polyester from crude oil to polyester requires chemicals that are poisonous and risk impacting negatively on public health, especially for the workers and on the surrounding environment and local communities in general.[110] For making the fabric soft and flexible phthalates are used.[111] This chemical is hormone-destructive and/or classified as toxic to reproduction.[112] In the manufacture of various types of plastic materials that might be used in the clothing, a lot of chemicals and large amounts of water is

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Management in Textile Industry: Case Study an Egyptian Plant. The Open Conference Proceedings Journal, 6, 35-40. 2015

[100] United States Department of Labor. List of Goods Produced by Child Labor or Forced Labor. 2016

[101] Pakissan.com. Child Labour in Cotton Growing Districts of Pakistan. 2014

[102] The Guardian, India's farmer suicides: are deaths linked to GM cotton?, 2014-05-05

[103] WWF. Cotton: a water wasting crop. Retrieved 2017-11-30

[104] Reuters, Fake pesticides endanger crops and human health in India, 2015-11-20

[105] International Journal of Applied Research, Bt cotton in India, pesticide use and environmental impact in India, 2016; International Journal of Occupational and Environmental Health, Acute pesticide poisoning among female and male cotton growers in India, 2005; Journal of Developmental Economics, Risk preferences and pesticide use by cotton farmers in China, 2013

[106] Fiber2fashion. Impact of Textiles and Clothing Industry on Environment: Approach Towards Eco-Friendly Textiles. Retrieved 2017-11-30

[107] Chequer, F M et.al. Textile Dyes: Dyeing Process and Environmental Impact, Eco-Friendly Textile Dyeing and Finishing, Dr. Melih Gunay (Ed.), InTech, DOI: 10.5772/53659. 2013

[108] Paramasivam, P et.al., Knowledge, Attitude, and Practice of Dyeing and Printing Workers Indian J Community Med. doi: 10.4103/0970-0218.74358. 2010

[109] Chemistry World. Synthetic Fabric: Green couture. 2008

[110] Ecotextile. Polyester and our health. 2011

[111] CBC News. Phthalates: Soft plastic's hidden hazard. CBC News- Canada 2011

[112] PRI. It's not just natural and synthetic fibers in your clothes — there are plenty of chemicals too. Public Radio International. 2015; KEMI. Phthalates which are toxic for reproduction and endocrine-disrupting – proposals for a phase-out in Sweden. Swedish Chemicals Agency 2015

used. There is a risk of fires and explosions in factories producing plastics, as well as the risk of air pollution and contamination of soil and water from waste water.[113]

Crude oil is extracted in a number of places worldwide with very limited traceability. Oil extraction is linked to environmental and social risks in Saudi Arabia, Russia, United Arab Emirates and Nigeria, including lack of union rights, poor working conditions and forced labour, as well as oil spills leading to health impacts and contamination of soil and water for surrounding communities.[114] Oil extraction in high-risk environments has also been linked to sexual exploitation and abuse of women in surrounding areas.[115]

[113] Upphandlingsmyndigheten, Risker i upphandling av varor inom städ och kemikalier, 2016, Pulitzer Center, India: The Toxic Price of Leather, 2017-10-03, ITUC, Toxic work stop deadly exposure today, 2015-04-09

[114] Utrikesdepartementet, Mänskliga rättigheter i Saudiarabien 2011 Retrieved 2017-10-27; ILO, Working Paper No. 267, Working conditions of contract workers in the oil and gas industries, 2010; The Degradation of Work, Oil and Casualization of Labor in the Niger Delta, 2010; Oil price.com, Nigerian Oil Workers Go On Strike, Stop Production At Several Flow Stations, 2017, The Guardian, Shell Nigeria oil spill '60 times bigger than claimed', 2012-04-23

[115]Wday, The Bakken's dirty secret: sex trafficking has growing precense in oil patch experts say 2014-05-06, Al Jazeera, The Dark side of the oil boom: Human trafficking in the Heartland, 2014-04-28, Columbia law school, Righting wrongs? Barrick Gold's remedy mechanism for sexual violence in Papua New Guinea November 2015

Protective footwear

Summary of the most severe risks

Assembly	Components	Raw materials
Poor health and safety Low wages Lack of union rights Excessive overtime	**Synthetic materials, cotton fabric, leather** Low wages Excessive overtime Forced labour Poor health and safety Lack of union rights Child labour Environmental pollution	**Cotton, rubber, oil, iron ore extraction** Low wages Excessive overtime Child labour Forced labour Poor Health and safety People trafficking Lack of union rights Poor working conditions Environmental pollution Conflict with local communities Impact on indigenous peoples' rights Sexual abuse
Medium-high risk	**Medium-high risk**	**High risk**

The product

Occupational footwear includes several types of work and protective shoes, boots, sandals, rubber boots, slippers, sneakers and insoles. This risk-assessment focuses on protective footwear. Protective footwear includes safety-toed shoes, metal instep footwear, steel insole shoes, metatarsal shoes, electric hazard shoes and water and heat resistance protective shoes.[116] Protective work shoes contain cotton, polyester, rubber, various types of plastics and leather, air mesh, including aluminum and iron to ensure the support and stability.[117] The steel toe/plate under the sole is made from steel, aluminium, aramid fibre such as Kevlar or composite.[118] The production of footwear is in general intense in chemical use.[119]

Supply chain

Raw materials (animal hides, raw rubber, synthetic polymer, textile, mineral and chemicals),

[116] Blogpost on Work Place Protective Clothing. The Different Types of Safety Shoes for Different Job Roles. 2013.
[117] Arbetssko. Products Retrieved 2017-12-05
[118] SSD. What are the Differences Between Steel-Toed and Composite Toe Shoes? Safety Shoe Distributors. Retrieved 2017-12-08, Telephone call, Torbjörn Bakken, Bakken & Ström, 2017-11-27
[119] Change your Shoes, Labour on a shoe string, 2016

component manufacturing (upper sole, heels, shanks, threads etc.) assembly (cutting, sewing parts, making and finishing) make up the footwear supply chain.[120]

The supply chain is often long and complex. Several different parts of production usually occur in different locations.[121] Although 65 per cent of the world's shoes are manufactured in China, protective footwear is to a large extent manufactured in European countries, where Germany and Italy are large producers. Asian countries are not as commonly used due to long lead times.[122]

Components and materials may originate from all over the world. The parts above the sole are often manufactured in low-wage countries, for example India and Brazil but also East European countries such as Albania.[123] The steel toe/plate under the sole is mainly produced in Italy and Germany.[124]

Due to beneficial tax regulation, it is a common practice among footwear brands and manufacturers within the EU (for example Italy) in general to send pre-cut input material, such as leather, to East and Central-European factories for assembly. The shoes are then sent back for labelling and packaging.[125] This means that even though the label might say “Made in Italy”, it is possible that the shoes have actually been produced in other significant footwear producing countries, for example Albania, Macedonia or Poland.[126] It is therefore sometimes difficult to know the correct country of assembly.

Italy, Spain and Germany are the leaders in producing leather, especially, for occupational footwear[127], but the leather may also come from India, Pakistan, Brazil and Bangladesh.[128] In regards to cattle inventory, Brazil, China and India are leaders on the world market, but their export of raw hides is limited. Instead, they first process it and/or tann it, before export.[129] However, as protective shoes are produced to a large extent in Italy and Germany, who are also major leather producers, it is likely that raw hides also come from European countries. For example, France exports 80 per cent of its raw hides to Italy.[130] Italian leather tanneries also mainly import from the US and Brazil.[131]

[120] SGS. Hazardous Chemicals in Footwear Manufacturing. 2014
[121] SOMO Summary report. Where the Shoe Pinches, Child Labour in the Production of Leather Shoes. June 2012
[122] Telephone call, Torbjörn Bakken, Bakken & Ström, 2017-11-27
[123] Telephone call, Torbjörn Bakken, Bakken & Ström, 2017-11-27, E-mail anonymous supplier, 2017-12-04
[124] Telephone call, Torbjörn Bakken, Bakken & Ström, 2017-11-27
[125] Change your Shoes, Labour on a shoe string, 2016
[126] Change your Shoes, Labour on a shoe string, 2016
[127] Pieper, A and Xu, F. Tricky Footwork: The Struggle for Labour Rights in the Chinese Footwear Industry. Change your shoes. SÜDWIND, INKOTA-netzwerk, Globalization Monitor, 2016
[128] Tarantola, A. How Leather Is Slowly Killing the People and Places That Make It. GIZMODO. March 2014
[129] Drovers. World Cattle Inventory: Ranking of countries (FAO). 2015
[130] Change your shoes, A tough story of leather, A journey into the tanning industry via Santa Croce District, 2016
[131] Change your shoes, A tough story of leather, A journey into the tanning industry via Santa Croce District, 2016

Assembly	Component	Raw Material
West European countries: Italy, Germany,[132] Spain, Portugal[133] East- and Central European Countries: Albania, Macedonia, Bosnia-Herzegovina, Slovakia and Romania,[134] Poland[135] Romania[136], Poland[137] Top producing countries of shoes in general: China, India, Vietnam[138]	**Components:** Italy, Spain, Portugal, Romania, Poland, [139] Albania[140] **Synthetic and cotton fabric/component** China, Germany, USA, [141] India, Brazil, Italy[142] **Tanned leather**: Italy, Spain, Germany, Pakistan, China, Brazil, India, Bangladesh[143] **PVC:** Main producing countries are China, US, Japan[144]	**Cotton**: Main producing countries are China, India, USA, Pakistan, Brazil, Uzbekistan[150] **Oil:** Main producing countries are Saudi Arabia, Russia, United Arab Emirates, Canada, Nigeria[151] **Cattle raring for animal skin:** France, Germany, The Netherlands, [152] Brazil, India, China, USA[153]

[132] Torbjörn Bakken, Bakken & Ström, 2017-11-27
[133] Change your shoes, Labour on a shoestring, 2016
[134] Change your shoes, Labour on a shoestring, 2016
[135] E-mail anonymous supplier, 2017-12-04
[136] Change your shoes, Labour on a shoestring, 2016
[137] E-mail anonymous supplier, 2017-12-04
[138] Change your shoes et al., Tricky Footwork - The Struggle for Labour Rights in the Chinese Footwear Industry, 2016
[139] Industriall, Report – European Footwear Sector: Structure, social dialogue, future, 2014
[140] Torbjörn Bakken, Bakken & Ström, 2017-11-27
[141] OEC. Synthetic Fabrics. The Observatory of Economic Complexity. 2016; Havep. Sustainable Raw Materials. Netherlands. Retrieved 2017-11-30
[142] E-mail anonymous supplier, 2017-12-04
[143] Fair Action, Under huden – en granskning av väskindustrins hantering av läder, 2017; Change your shoes. A tough story of leather – A journey into the tanning industry via the Santa Croce District 2016; Telephone call, Torbjörn Bakken, Bakken & Ström, 2017-11-27
[144] Merchant Research and Consulting Ltd., China to Remain World's PVC Leader in the Years to Come, Retrieved 2017-11-28
[150] WTFx. Cotton Exports by Country. World's Top Exporters. 2017; Worldatlas. Top Cotton Producing Countries in The World. 2017
[151] Råvarumarknaden.se, USA passerade Saudiarabien som världens största oljeproducent, Retrieved 2017-10-27
[152] Centro Nuovo Modello di Sviluppo, FAIR, A tough story of leather – A journey into the tanning industry via the Santa Croce industry, 2016
[153] Centro Nuovo Modello di Sviluppo, FAIR, A tough story of leather – A journey into the tanning industry via the Santa Croce industry, 2016

	Neoprene: Main producing countries are Japan[145], China, Germany[146] **Aramid fiber:** Main producing countries are Japan, USA, South Korea[147] **Steel components:** Italy, Germany,[148] China, Japan, India[149]	**Rubber (latex):** Thailand, Indonesia, Vietnam, India[154] **Iron ore:** China, Brazil, Australia, Russia, India[155] **Bauxite (aluminum ore):** Main producing countries Australia, China, Brazil, Guinea[156]

Risks

Risks are connected to all levels of the supply chain. Although European countries dominate the last production stages of protective footwear, there is a possibility that the actual sowing and assembly of the shoe is located in East and Central European countries, due to non-transparent outsourcing practices. A report from Change your shoes covering the footwear industry in these countries illustrates low wages, sometimes below legal minimum wages, excessive overtime, workers not being able to take annual leave and missing out on social security payments. There are also risks of poor health and safety, which is crucial in the chemical-intense production of footwear, as well as noise, dust and work-related health problems. Gender discrimination is also a risk.[157] Lack of unions and anti-union activities is also reported from Eastern Europe.[158] Low wages and limited job-security at shoe factories in Italy is also reported.[159]

However unlikely, it is important to note that if protective footwear is imported from China, India or other main producing countries of shoes, there are great risks of poor labour conditions, lack of health and safety, lack of union rights, low wages and excessive overtime, forced labour and child labour as well as exploitation of migrant workers.

The tanning of animal skins into leather is a high-risk process.[160] Chemicals used in tanning are generally harmful for the environment and for people working in the tanneries. In countries such as

[145] IHS Markit, Polychloroprene Elastomers, Retrieved 2017-11-28
[146] Business Wire, Technavio Announces Top Seven Vendors in the Global Neoprene Market from 2016 to 2020, 2016-06-27
[147] Fibermax Composites, Aramid fiber, Retrieved 2017-11-29
[148] Torbjörn Bakken, Bakken & Ström, 2017-11-27
[149] Worldatlas. The Top 10 Steel Producing Countries in The World (2015). Retrieved 2017-12-07
[154] Chemical Economics Handbook, Natural rubber, Retrieved 2017-11-01
[155] US Geological Survey, Iron Ore, Retrieved 2017-10-26 , U.S Geological Survey, Iron ore Retrieved 2017-10-27
[156] Worldatlas. The World's Leading Bauxite Producing Countries (2014). Retrieved 2017-12-07
[157] Luginbühl, C and Dr. Musiolek, B. Labour on a Shoe String. Change Your Shoes Campaign. 2016
[158] Change your shoes, Labour on a shoestring, 2016
[159] Clean Clothes Campaign. Italian factory conditions deteriorate. 2015
[160] Aronsson, C. In the Same Footsteps? A Review of the Sustainability Efforts of Four Shoe Store Chains. Fair Trade Center. 2014

India, Pakistan and Bangladesh tanning is informal and badly regulated.[161] About 200 chemicals are used in the tanning process, including heavy metal chrome, sulphides, ammonia, arsenic, cadmium and zinc. Chromium can cause serious health effects on lungs and mucous membranes, and are cancerous.[162] There are several reports of workers in high-risk Asian countries such as India and Bangladesh being exposed to chemicals as they lack personal protective gear, working with bare hands and feet and with little or no training on how to handle the chemicals. [163] This can be accompanied by child labour, low wages and 18 hour work days during high season.[164] Leather production is also linked to environmental pollution as heavy metals, toxic dyes and chemicals can leak and pollute soil and water in the local area.[165] Tanneries in Italy have also been reported to hire workers illegally without contracts and social security; these workers are often not paid for all worked hours and are exposed to occupational disease and injury.[166] Leather can also be vegetable-tanned which is less harmful, and this method is used by some producers.[167]

In connection to leather, livestock farming in Brazil is one of the main reasons behind the deforestation of the Amazon rainforest[168] as well one of the drivers of ongoing conflicts regarding indigenous people's lands.[169] Child labour is also reported from the livestock industry in Brazil.[170]

Glue or adhesive that is used to put the different parts of footwear together often contains very strong solvents that are directly harmful to inhale. There is a risk that the dyes used contain heavy metals, which may pose a health hazard to workers and people around the plant if polluted water is released.[171]

Rubber plantations are linked to human rights abuse such as child labour and forced labour (including trafficking of migrants from Myanmar[172]) and exposure to toxic chemicals (including

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[161] Khan, EA. SCP in Bangladesh: The Brown Hope of Hazaribagh and the Golden Fibre of Bangladesh (Chapter 5). European Union. 2017

[162] Uppsala Universitet, Occupational and Environmental Medicine Uppsala. Upsala Universitet and Akademiska Sjukuset. Retrieved 2017-12-07

[163] Aronsson, C. In the Same Footsteps? A Review of the Sustainability Efforts of Four Shoe Store Chains. Fair Trade Center. 2014; Ensing, A. Hazardous Child Labour in the Leather Sector of Dhaka, Bangladesh in The Worst Forms of Child Labour in Asia: Main findings from Bangladesh and Nepal. IREWOC. 2010.

[164] Aronsson, C. Under Huden: en granskning av väskindustrins hantering av läder. Fair Action, 2016; Engvall, M. Svenska skor ger spår i miljön: En granskning av miljöeffekter från garverier i Syd. Swedwatch. 2009

[165] Reportage sänt i TV4:s Kalla fakta del 7 – Läderslavarna. 8 december 2013, Gallagher, S. India: The Toxic Price of Leather. Pulitzer Center; PETA, Environmental Hazards of Leather, PETA/ Issues/ Animals used for clothing/ The leather Industry. Retrieved 2017-12-07

[166] Centro Nuovo Modello di Sviluppo, FAIR, A tough story of leather – A journey into the tanning industry via the Santa Croce industry, 2016

[167] According to Torbjörn Bakken, Bakken & Ström has switched to vegetable-tanning of leather in Pakistan, Telephone call 2017-11-27

[168] Greenpeace, Amazon Cattle Footprint, 2009

[169] Arsenault. C and Mendes, K. Amazon protectors: Brazil's indigenous people struggle to stave off loggers. Reuters. June; Nolen, S. Brazil's land war between Indigenous people and farmers: 'We just need to be home'. The Globe and Mail. List of Goods Produced by Child Labor or Forced Labor, Retrieved 2017-12-08

[170] US Department of Labor,

[171] CRS. Textile and Leather Testing. Chemical Inspection and Regulation Service(CIRS), Europe. Retrieved 2017-12-07

[172] Human Rights Watch, From the tiger to the crocodile: Abuse of migrant workers in Thailand, 2010

paraquat and glyphosate for rubber) in Malaysia and Indonesia. [173] Working conditions are poor and difficult, wages are low and there is a lack of freedom of association. In the extraction of rubber, migrant workers are discriminated against, including confiscation of passports and being paid less than other workers.[174]

Untreated raw rubber is sensitive to cold and heat and is therefore usually treated with sulphur, called vulcanization which, released into soil and water, causes severe acidification.

Cotton cultivation is the world's most chemical-intensive form of agriculture. Growing the crop also requires great amounts of water.[175] Pesticides are often over-used in cotton fields in India and China (or fake pesticides used in India[176]), with negative impacts on the environment and human health.[177] The production of cotton is also a well-known high-risk operation with risk of child labour and forced labour.[178]

The production of polyester fibres and synthetic materials used in protective footwear is highly energy intensive and is non-biodegradable as the raw material derives from crude oil.[179] The manufacturing process of polyester and other plastic materials and components in shoes require chemicals that are poisonous and risk negative impacts on public health, especially for workers and on the surrounding environment in general, if not managed correctly.[180] There is a risk of fires and explosions in factories producing plastics, as well as the risk of environmental pollution.[181] The chemicals used in plastic resin are often allergenic,[182] hormone-destructive and/or classified as toxic to reproduction.[183]

Crude oil is extracted in a number of places worldwide with very limited traceability. Oil extraction is linked to environmental and social risks in Saudi Arabia, Russia, United Arab Emirates and Nigeria,

[173] Verité, Rubber Retrieved 2017-11-20, CSR Academy, Combating child labor in the supply chain in India, 2013; Maplecroft, Risk calculators and dashboards, Climate change will push more children into work, 2010; Danwatch, Behind the rubber label, 2013;

[174] Danwatch, Do you use rubber?, Jan 2013

[175] WWF, Cotton Farming Cotton: A water wasting crop, retrieved 2017-11-29

[176] Reuters, Fake pesticides endanger crops and human health in India, 2015-11-20

[177] International Journal of Applied Research, Bt cotton in India, pesticide use and environmental impact in India, 2016; International Journal of Occupational and Environmental Health, Acute pesticide poisoning among female and male cotton growers in India, 2005; Journal of Developmental Economics, Risk preferences and pesticide use by cotton farmers in China, 2013

[178] United States Department of Labor. List of Goods Produced by Child Labor or Forced Labor. 2016

[179] Chemistry World. Synthetic Fabric: Green couture. 2008

[180] Ecotextile. Polyester and our health. 2011

[181] Upphandlingsmyndigheten, Risker i upphandling av varor inom städ och kemikalier, 2016, Pulitzer Center, India: The Toxic Price of Leather, 2017-10-03, ITUC, Toxic work stop deadly exposure today, 2015-04-09

[182] CNN. New allergies can be unwelcome surprise. CNN International Edition. 2011.

[183] PRI. It's not just natural and synthetic fibers in your clothes — there are plenty of chemicals too. Public Radio International. 2015; KEMI. Phthalates which are toxic for reproduction and endocrine-disrupting – proposals for a phase-out in Sweden. Swedish Chemicals Agency. 2015

including lack of union rights, poor working conditions and forced labour, as well as oil spills leading to health impacts and contamination of soil and water for surrounding communities.[184]

If steel is used from high-risk countries such as India or China, there are risks concerning health and safety, including exposing employees to harmful fumes, chemicals and dust.[185] Other risks include wages below minimum wage, job-insecurity, gender inequality (India), and lack of union rights.[186] Mining of iron and aluminium ore (bauxite) which is the most important component to make aluminium, can also include similar risks in countries such as Brazil, China and India, as well as land rights issues and conflicts with local communities and indigenous people (also in Australia), and in some cases child labour and forced labour, particularly in India.[187]

Oil extraction, and mining, in high-risk environments has also been linked to sexual exploitation and abuse of women in surrounding areas.[188]

[184] Utrikesdepartementet, Mänskliga rättigheter i Saudiarabien 2011 Retrieved 2017-10-27; ILO, Working Paper No. 267, Working conditions of contract workers in the oil and gas industries, 2010; The Degradation of Work, Oil and Casualization of Labor in the Niger Delta, 2010; Oil price.com, Nigerian Oil Workers Go On Strike, Stop Production At Several Flow Stations, 2017, The Guardian, Shell Nigeria oil spill '60 times bigger than claimed', 2012-04-23

[185] Enact Sustainable Strategies, Riskanalys: Instrument, 2017

[186] Perry, J. Company and contract labour in a central Indian steel plant. t. Economy and Society, 42 (3). pp. 348-374. DOI: 10.1080/03085147.2013.772761. LSE research online.

[187] Swedwatch, Riskanalys av material och leverantörsled i Kungsbrohuset 2011; SVT, Brasilien: Indianer ockuperar gruva, 2006-10-19, Business & Human Rights Resource Center, Business and Human Rights in Guinea Retrieved 2017-10-27 Mining Technology, China's appalling mining death rate – dealing with 'disorderly' management 2012-10-31 Swedwatch, Allt är inte guld som glimmar, 2011 World Resource Institute, Mine the Gap: Connecting Water Risks and Disclosure in the Mining Sector 2010, Cisse, K and Aboubacar, D. Guinea- Hamdallaye Bauxite: Its wealth, Its misery! (Chapter 6) in Mining, the Aluminium Industry, and Indigenous Peoples: Enhancing Corporate Respect for Indigenous Peoples' Rights. Asia Indigenous Peoples Pact (AIPP), Forest Peoples Programme (FPP) and International Union for Conservation of Nature (IUCN). 2015, Martin, S C and Larivière, C. Community Health Risk Assessment of Primary Aluminum Smelter Emissions. J Occup Environ Med.; 56(5 Suppl): S33–S39. doi: 10.1097/JOM.0000000000000135. May, 2014

[188] Wday, The Bakken's dirty secret: sex trafficking has growing precense in oil patch experts say 2014-05-06, Al Jazeera, The Dark side of the oil boom: Human trafficking in the Heartland, 2014-04-28, Columbia law school, Righting wrongs? Barrick Gold's remedy mechanism for sexual violence in Papua New Guinea November 2015

Protective gloves

Summary of the most severe risks

Assembly	Components	Raw materials
Low wages Excessive overtime Forced labour Child labour Poor health and safety Exploitation of migrant workers	**Synthetic materials, cotton fabric, leather** Forced labour Child labour Poor health and safety Lack of union rights Environmental pollution Low wages Excessive overtime	**Cotton, rubber, oil, iron ore** Poor Health and safety Child labour Forced labour People trafficking Lack of union rights Low wages Environmental pollution Impact on indigenous peoples' rights Conflict with local communities Sexual abuse
High risk	**High risk**	**Very high risk**

The product

Protective gloves come in many different shapes and forms for varying situations and purposes. Common materials in protective gloves are polyester, cotton, synthetic or real leather. Gloves to protect against chemicals can include petroleum based material such as PVC/vinyl and neoprene, as well as rubber (latex) and nitrile, but these materials can also exist in regular workers gloves. Aramid materials such as Kevlar (carbon based), as well as steel and glass fibres and other cut-proof materials are also used.[189] The production of protective gloves includes a number of different steps; spinning and combining different types of yarn (steel, spandex, etc.), weaving, processing of fabric and sewing or knitting to produce the glove liners. Gloves with knitted liners are placed on hand-shaped moulds and dipped into different chemical polymers such as latex, polyurethane, neoprene or nitrile, to give the glove different protection properties and comfort. Bleaching and fire-resistant treatment with fire retardants can also be part of the process.[190] Parts can also be stamped out of different fabrics using machines and sown on to the liner.[191] The production of sown gloves is typically labour intense, whereas the production of "knitted and dipped" gloves is more automated.[192]

[189] See for example Guide - the rights gloves, or Engineering 360, Safety gloves information, Retrieved 2017-11-28

[190] Midas Safety, Manufacturing facilities, Retrieved 2017-11-28

[191] Globe Gloves factory shoot, Retrieved 2017-11-28

[192] E-mail, Anonymous supplier 2017-12-01

Supply chain

The production of protective gloves is concentrated to Asian countries, with China as the dominant producer along with Pakistan and Indonesia.[193] Materials and components used in the gloves are usually sourced locally[194] and Asian countries are dominant. The supply chain is in general non-transparent, which is a risk in itself.

Assembly	Components	Raw Materials
China Pakistan Indonesia South Korea Sri Lanka[195]	**Synthetic and cotton fabric:** China, Taiwan,[196] India, Turkey, Bangladesh[197] **Tanned leather**: Pakistan, Italy, China, Brazil, India, Bangladesh[198] **PVC:** China, US, Japan[199] **Neoprene**: Japan[200], China, Germany[201] **Aramid fiber:** Large producing countries are Japan, USA, South Korea[202]	**Rubber (latex):** Thailand, Indonesia, Vietnam[204] **Cotton**: India, China, USA[205] **Oil:** Saudi Arabia, Russia, United Arab Emirates, Canada, Nigeria **Iron ore:** China, Brazil, Australia, Russia, India[206] **Cattle raring for animal skin:** Brazil, India, China, USA[207]

[193] Telephone call, Torbjörn Bakken, Bakken & Ström, 2017-11-27, E-mail, Anonymous supplier 2017-12-01
[194] E-mail, Anonymous supplier 2017-12-01
[195] Telephone call, Torbjörn Bakken, Bakken & Ström, 2017-11-27, E-mail, Anonymous supplier 2017-12-01, ATG gloves are made in Sri Lanka
[196] Telephone call, Torbjörn Bakken, Bakken & Ström, 2017-11-27
[197] Large fabric producing countries in general Textile Exchange, Fabrics Industry Overview, Retrieved 2017-11-29
[198] Fair Action, Under huden – en granskning av väskindustrins hantering av läder, 2017 Change your shoes, A tough story of leather – A journey into the tanning industry via the Santa Croce District 2016 Telephone call, Torbjörn Bakken, Bakken & Ström, 2017-11-27
[199] Merchant Research and Consulting Ltd., China to Remain World's PVC Leader in the Years to Come, Retrieved 2017-11-28
[200] IHS Markit, Polychloroprene Elastomers, Retrieved 2017-11-28
[201] Business Wire, Technavio Announces Top Seven Vendors in the Global Neoprene Market from 2016 to 2020, 2016-06-27
[202] Fibermax Composites, Aramid fiber, Retrieved 2017-11-29
[204] Chemical Economics Handbook, Natural rubber, Retrieved 2017-11-01
[205] National Cotton Council of America, Production ranking, 2016
[206] US Geological Survey, Iron Ore, Retrieved 2017-10-26 , U.S Geological Survey, Iron ore Retrieved 2017-10-27
[207] Centro Nuovo Modello di Sviluppo, FAIR, A tough story of leather – A journey into the tanning industry via the Santa Croce industry, 2016

	Steel: Main producing countries are China, Russia, Canada, India, Japan, Germany, USA[203]	

Risks

Some suppliers and producers state that they have codes of conduct and do factory visits and audits, working with the same suppliers over several years, in an effort to mitigate human rights and environmental risks.[208] Still, the general risks surrounding the production of gloves are still numerous and need to be highlighted. Risks in countries such as China, India, Bangladesh and Indonesia include excessive overtime and low wages, short-term contracts and limited or no access to union rights.

In the production of textile fibers and materials, many different chemicals and substances are used, some of which can be cancerous, allergenic or impact on the reproductive system.[209] Health and safety is therefore also a concern as workers risk being exposed to toxic chemicals, especially in the dying and bleaching of fabrics, as well as environmental impacts .[210] If waste water is not cleaned, there is a risk of water pollution in the local area surrounding the factories.[211] Manufacturing of nitrile, neoprene and vinyl gloves can involve cancerous chemicals which may cause serious negative impacts on workers' health.[212] During the vulcanization of rubber gloves, employees may be exposed both to heat from the presses and to fumes from the heated rubber products.[213]

Migrant workers are common in China, South Korea and India, and are particularly at risk of being exploited and discriminated against. Forced labour and/or child labour is also reported from the textile industry in countries such as China, India and Bangladesh,[214] most prevalent in sub-tiers of the supply chains. In Bangladesh, most textile workers are women, and the low pay and excessive working hours are affecting their children's rights to health and decent living conditions, as many live in unsanitary slum areas.[215]

Leather is a high-risk component concerning both environmental and social aspects, particularly in countries such as India, Bangladesh and Pakistan. Preparation and tanning of hides into leather is considered one of the most polluting industries in the world. About 200 chemicals are used, including

[203] World Steel Association, World Steel in Figures 2017, The Balance, The biggest Aluminum producers 2014, Retrieved 2017-11-23
[208] For example Bakken & Ström do factory visits and keep close communications with their suppliers, according to Torbjörn Bakken, 2017-11-27
[209] Kemikalieinspektionen, Chemicals in textiles – Risk to human health and environment rapport 6/14 2014
[210] Clean Clothes Campaign, Health and Safety: Getting sick and risking lives 2012-11-14
[211] Swedwatch, Den blinda klädimporten, 2008
[212] Enact, Riskanalys: medicinska undersökningshandskar, 2017
[213] International Agency for Research on Cancer, Chemical Agents and Related Occupations, 2012
[214] Department of Labor, List of Goods Produced by Child Labor or Forced Labor, Retrieved 2017-11-29
[215] Swedwatch, 44 barn 2014

chromium which can be cancerous. There are several reports of workers being exposed to chemicals as they lack personal protective gear, working with bare hands and feet and with little or no training on how to handle the chemicals. This can be accompanied by low wages and 18 hours of work a day during high season.[216] Leather production is also linked to environmental pollution as heavy metals, toxic dyes and chemicals can leak and pollute soil and water in the local area.[217]

In connection to leather, livestock farming in Brazil is one of the main reasons behind the deforestation of the Amazon rainforest[218] as well one of the drivers of ongoing conflicts regarding indigenous peoples' lands.[219] Child labour is also reported from livestock industry in Brazil.[220]

Cotton and rubber are also linked to human rights abuse such as child labour and forced labour (including trafficking of migrants from Myanmar[221]) and exposure to toxic chemicals (including paraquat for rubber) in several of the large producing countries.[222] Working conditions are poor and difficult, wages are low and there is a lack of freedom of association. In the extraction of rubber, migrant workers are discriminated against, including confiscation of passports and being paid less than other workers.[223] Cotton cultivation is the world's most chemical-intensive agriculture. Growing the crop also requires great amounts of water.[224] Pesticides are often over-used in cotton fields in India and China (or fake pesticides used in India[225]), with negative impacts on the environment and human health.[226]

Synthetic materials used in gloves originally derive from oil. Oil is extracted in a number of places worldwide with very limited traceability. Oil extraction is linked to environmental and social risks in Saudi Arabia, Russia, United Arab Emirates and Nigeria, including lack of union rights, poor working conditions and forced labour, as well as oil spills leading to health impacts and contamination of soil and water for surrounding communities.[227]

Mining of iron also includes risks in countries such as Brazil, China and India. Risks include harsh working conditions, lack of health and safety, low pay, high water usage and leaching of toxic

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[216] Fair Action, Under huden, 2016 Swedwatch, Svenska skor ger spår i miljön 2009

[217] Upside Distribution, Puteaux, Frankrike. Leather: Slaves to fashion. Reportage sänt i TV4:s Kalla Fakta 8 december 2013.

[218] Greenpeace, Amazon Cattle Footprint, 2009

[219] Arsenault. C and Mendes, K. Amazon protectors: Brazil's indigenous people struggle to stave off loggers. Reuters. June; Nolen, S. Brazil's land war between Indigenous people and farmers: 'We just need to be home'. The Globe and Mail. List of Goods Produced by Child Labor or Forced Labor, Retrieved 2017-12-08

[220] US Department of Labor, List of goods produced with forced labor or child labor, 2016

[221] Human Rights Watch, From the tiger to the crocodile: Abuse of migrant workers in Thailand, 2010

[222] Verité, Rubber Retrieved 2017-11-20, CSR Academy, Combating child labor in the supply chain in India, 2013, Maplecroft, Risk calculators and dashboards, Climate change will push more children into work, 2010, Danwatch, Behind the rubber label, 2013

[223] Danwatch, Do you use rubber?, Jan 2013

[224] WWF, Cotton Farming Cotton: A water wasting crop, retrieved 2017-11-29

[225] Reuters, Fake pesticides endanger crops and human health in India, 2015-11-20

[226] International Journal of Applied Research, Bt cotton in India, pesticide use and environmental impact in India, 2016; International Journal of Occupational and Environmental Health, Acute pesticide poisoning among female and male cotton growers in India, 2005; Journal of Developmental Economics, Risk preferences and pesticide use by cotton farmers in China, 2013

[227] Råvarumarknaden.se, USA passerade Saudiarabien som världens största oljeproducent, Retrieved 2017-10-27

substances. Other risks associated to the countries involved are lack of union rights and harassment of unionized workers, conflicts connected to land with local communities and indigenous people, and in some cases child labour and forced labour, particularly in India.[228] Mining, and oil extraction, in high-risk environments has also been linked to sexual exploitation and abuse of women in surrounding areas.[229]

Disposable dust masks

Summary of the most severe risks

Assembly	**Components**	**Raw materials**
Forced labour Child labour Low wages Excessive overtime Poor health and safety Exploitation of migrant workers	**Plastics, Cotton mills** Forced Labour Poor health and safety Lack of union rights Child labour Low wages Environmental pollution	**Oil, cotton farms, rubber** Forced labour Child labour Poor working conditions Lack of union rights Poor health and safety People trafficking Low wages Environmental pollution Impacts on indigenous peoples' rights Conflict with local communities Sexual abuse
Medium-high risk	**Medium-high risk**	**High risk**

The product

Disposable respiratory face masks come in various executions dependant on intended purpose. In general, face masks consist of a polypropylene filter, a polypropylene valve, a polyisoprene (synthetic rubber) valve diaphragm, aluminium nose clip, steel staples and a cotton, thermoplastic elastomer or synthetic rubber strap.[230] The face seal can be made from PVC and the nose foam that absorbs sweat

[228] Swedwatch, Riskanalys av material och leverantörsled i Kungsbrohuset 2011; SVT, Brasilien: Indianer ockuperar gruva, 2006-10-19, Business & Human Rights Resource Center, Business and Human Rights in Guinea Retrieved 2017-10-27 Mining Technology, China's appalling mining death rate – dealing with 'disorderly' management 2012-10-31 Swedwatch, Allt är inte guld som glimmar, 2011 World Resource Institute, Mine the Gap: Connecting Water Risks and Disclosure in the Mining Sector 2010

[229] Wday, The Bakken's dirty secret: sex trafficking has growing precense in oil patch experts say 2014-05-06, Al Jazeera, The Dark side of the oil boom: Human trafficking in the Heartland, 2014-04-28, Columbia law school, Righting wrongs? Barrick Gold's remedy mechanism for sexual violence in Papua New Guinea November 2015

[230] See for example Technical datasheet 3M™ 8300 series Particulate Respirators or 3M™ Aura™ Particulate Respirator 9300+ Series, or RSG, Product FS Particulate respirators data sheet, Retrieved 2017-11-30

is made from polyurethane.[231] Latex can also be used but many masks are latex free and some also free from metal.[232] The production is to a large extent automised.

The supply chain

Disposable masks are produced all over the world, including in European countries. However, China is a large producing country and exporter.[233] It is worth noting that the large player 3M™ assembles more or less all of their protective masks for the Norwegian market in the UK and the US.[234]

Assembly	Components	Raw Materials
China, UK, USA, Sweden, Turkey[235]	**Polypropylene:** Main producing countries are China, South Korea, Saudi Arabia, Singapore[236] **Polyurethane:** Main producing countries are China, Italy, Spain, Germany[237] **PVC:** Main producing countries are China, US, Japan, Germany, South Korea[238] **Isoprene rubber:** Main producing countries are Russia, Japan, USA[239] **Steel staples:** China, Germany, USA[240]	**Oil:** Main producing countries are Saudi Arabia, Russia, United Arab Emirates, Canada, Nigeria **Rubber:** Main producing countries are Thailand, Indonesia, Vietnam[241] **Cotton**: Main producing countries are India, China, USA, Brazil[242] **Aluminium/Bauxite:** Main producing countries are Australia, Brazil, India, China[243] **Iron ore:** Main producing countries are China, Brazil, Australia, Russia[244]

[231] 3M™ Personal Safety, Better protection through simple selection, Retrieved 2017-11-30
[232] FFP3 Respiratory Masks,
[233] Telephone call, Anonymous producer, 2017-11-28
[234] E-mail from Johan Rapp, 3M, 2017-12-01
[235] Telephone call, Anonymous producer, 2017-11-28 and e-mail from Johan Rapp, 3M, 2017-12-01
[236] The Observatory of Economic Complexity, Where does China import Polypropylene in primary forms from? (2016) Retrieved 2017-11-30, ICIS, US polypropylene imports rise as China aims for self-sufficiency, 2016-07-06
[237] Cision PR Newswire, Global and China Polyurethane Industry Chain Report, 2011-2012, 2012-09-10
[238] Merchant Research & Consulting Ltd. China to Remain World's PVC Leader in the Years to Come 2014-12-12
[239] The Observatory of Economic Complexity, Isoprene Rubber (IR) trade, and HIS Markit, Isoprene, retrieved 2017-11-30
[240] The Observatory of Economic Complexity, Where does China import Nails/staples/etc, iron/steel, not office stationary from? (2016), Nails/Staples/ETC, Iron/Steel, not office stationary trade, Retrieved 2017-11-30
[241] Chemical Economics Handbook, Natural rubber, Retrieved 2017-11-01
[242] National Cotton Council of America, Production ranking, 2016, The Observatory of Economic Complexity, Cotton, not carded or combed, Retrieved 2017-11-20
[243] Index Mundi, Bauxite production by country 2017-10-26
[244] US Geological Survey, Iron Ore, Retrieved 2017-10-26 , U.S Geological Survey, Iron ore Retrieved 2017-10-27

Risks

As China is a large player on the world market, risks are linked to the manufacturing stage of respiratory masks, although the level of risk is significantly lower if the production is located in the West (for example the UK). Factories in China have a high risk of human rights abuses including forced and debt bondage and child labour.[245] Health and safety conditions in Chinese factories are often poor.[246] There is a risk that people are paid very low wages and required to work excessively long hours.[247] Migrant workers from rural areas constitute a particularly vulnerable group at risk of being exploited and discriminated against. Trade union rights are not respected in China.[248] Production in Turkey also means risks of anti-union activities and exploitation of migrant workers.[249]

There are risks linked to the production of thermoplastic (PVC and polypropylene) and thermoset materials (polyurethane) as they may be produced in high risk countries such as China and Russia. Heavy machines are used which increase risks for work-related injuries, accidents and workers being exposed to loud noise. High temperatures are used in the process and there are risks regarding burns, explosions and fire.[250] There is also the risk of exposure to toxic and cancerous chemicals. If waste management is lacking, there is a risk that chemicals leaks into surrounding water which can result in negative impacts on local communities' access to clean water in the area and health impacts.[251]

Oil is the raw material for plastic materials used in respiratory masks. It is extracted in a number of places worldwide with very limited traceability. Oil extraction is linked to environmental and social risks in Saudi Arabia, Russia, United Arab Emirates and Nigeria, including lack of union rights, poor working conditions and forced labour, as well as oil spills leading to health impacts and contamination of soil and water for surrounding communities.[252]

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[245] Topical research digest: Human rights and contemporary slavery, The dark side of labour in China, Retrieved 2017-11-02, US Department of Labor, List of Goods Produced by Child Labor or Forced Labor, 2016

[246] International Journal of Occupational and Environmental Health, Occupational Health and Safety in China, Oct/Dec 2003; Labor Watch Pakistan, Safety at workplace, 2015-08-24

[247] South China Morning Post, 'Low pay, long hours': life inside factory that supplied Ivanka Trump brand in China, 2017-06-28; The Guardian, The grim truth of Chinese factories producing the west's Christmas toys, 2016-12-04; China Labor Watch, Minimum wage standards in China, 2016; International Labor Rights Forum, Six cents an hour, 1996

[248] ITUC, Survey of violations of trade union rights in China, 2016-2017

[249] Business & Human Rights Resource Centre. Syrian refugees: Abuse & exploitation in Turkish garment factories. 2017. Lendman, S. Turkey Exploiting Syrian Refugee Adults and Children in Cheap Labour Industrial Sweatshops. Global Research. 2016, Utrikesdepartementet, Mänskliga rättigheter i Turkiet 2011

[250] Enact, Riskanalys: Medicinska undersökningshandskar, 2016

[251] Enact, Riskanalys: Medicinska undersökningshandskar, 2016

[252] Utrikesdepartementet, Mänskliga rättigheter i Saudiarabien 2011 Retrieved 2017-10-27; ILO, Working Paper No. 267, Working conditions of contract workers in the oil and gas industries, 2010; The Degradation of Work, Oil and Casualization of Labor in the Niger Delta, 2010; Oil price.com, Nigerian Oil Workers Go On Strike, Stop Production At Several Flow Stations, 2017, The Guardian, Shell Nigeria oil spill '60 times bigger than claimed', 2012-04-23

If natural rubber is used, it is likely to come from plantations in Thailand, Indonesia or Malaysia, where there is a risk of use of child labour [253] or forced labour and trafficking of migrants from Myanmar.[254] There is also a risk of violations of ILO conventions concerning working conditions, including the right to form unions, the right to have permanent contracts for permanent jobs, the risk that wages do not meet the legal minimum, or are not sufficient for a living wage, and the risk that migrant workers are discriminated against, including confiscating people's passports and being paid less than other workers.[255] Toxic herbicides are used without adequate protective equipment in rubber plantations in Indonesia and Malaysia. [256]

China's steel production is a major contributor to air pollution and greenhouse gas emissions, due to insufficient pollution-protective devices and the use of coal as the main energy source.[257] Polluted waste water and solid waste from steel production can also cause environmental impacts in the local area, if not maintained properly.[258] In addition, illegal steel plants also exist in China. These plants are unregulated due to corruption, with hazardous working conditions and environmental impacts as a consequence.[259]

On a raw material level, social and environmental impacts are connected to iron and bauxite mining in countries such as Brazil, India, Guinea, China and Jamaica. Bauxite is extracted from open mine pits, which can cause leaching of toxic substances, dust and water pollution, soil erosion, water shortage and negative impacts on biodiversity.[260] Other risks associated with the countries involved are lack of union rights and harassments of unionized workers, conflicts connected to local communities and indigenous peoples' land rights, low wages, poor working conditions and in some cases child labour and forced labour.[261] In Guinea, there are reports of army interference and killings when people have questioned company activities.[262] In Jamaica, the bauxite extraction is believed to be the single greatest cause of deforestation on the island.[263] Mining, and oil extraction, in high-risk environments has also been linked to sexual exploitation and abuse of women in surrounding areas.[264]

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[253] US Department of Labor, Report on child labor, Thailand, 2012; ILO, Combating the worst forms of child labour in shrimp and seafood processing areas in Thailand, 2016; Danwatch, Do you use rubber?, Jan 2013
[254] Human Rights Watch, From the tiger to the crocodile: Abuse of migrant workers in Thailand, 2010
[255] Danwatch, Do you use rubber?, Jan 2013
[256] Danwatch, Do you use rubber?, Jan 2013
[257] Washington Post, This documentary went viral in China. Then it was censored. It won't be forgotten, 2015-03-16
[258] Greenspec, Steel production & environmental impact, Retrieved 2017-11-17
[259] Wired, Step inside Chinas hellish, illicit steel factories, 2016-12-20
[260] The Wilderness Society, Bauxite mining threatens Wild Rivers 2015-07-31; Naturskyddsföreningen, Bra Miljöval – Kriterier 2013:4 2013
[261] Swedwatch, Riskanalys av material och leverantörsled i Kungsbrohuset 2011; SVT, Brasilien: Indianer ockuperar gruva, 2006-10-19, Business & Human Rights Resource Center, Business and Human Rights in Guinea Retrieved 2017-10-27
[262] Business & Human Rights Resource Center, Business and Human Rights in Guinea Retrieved 2017-10-27
[263] Inter Press Service, As Jamaica's Prime Forests Decline, Row Erupts Over Protection, 2015-06-04
[264]Wday, The Bakken's dirty secret: sex trafficking has growing precense in oil patch experts say 2014-05-06, Al Jazeera, The Dark side of the oil boom: Human trafficking in the Heartland, 2014-04-28, Columbia law school, Righting wrongs? Barrick Gold's remedy mechanism for sexual violence in Papua New Guinea November 2015

Cotton means high risks of the use of child labour and forced labour in countries such as India, China and Uzbekistan.[265] Indian cotton farmers risk ending up in debt, especially those growing genetically-engineered cotton.[266] Pesticides are often over-used in cotton fields in India and China (or fake pesticides used in India[267]), with negative impacts on the environment and human health.[268]

[265] CSR Academy, Combating child labor in the supply chain in India, 2013, Maplecroft, Risk calculators and dashboards, Climate change will push more children into work, 2010, Human Rights Watch, Uzbekistan: Forced Labor Linked to World Bank, 2017

[266] The Guardian, India's farmer suicides: are deaths linked to GM cotton?, 2014-05-05

[267] Reuters, Fake pesticides endanger crops and human health in India, 2015-11-20

[268] International Journal of Applied Research, Bt cotton in India, pesticide use and environmental impact in India, 2016, International Journal of Occupational and Environmental Health, Acute pesticide poisoning among female and male cotton growers in India, 2005, Journal of Developmental Economics, Risk preferences and pesticide use by cotton farmers in China, 2013