Skills for Sustainability

Manufacturing Skills Australia

# Sustainability issues in clothing

This project is supported by the Australian Government
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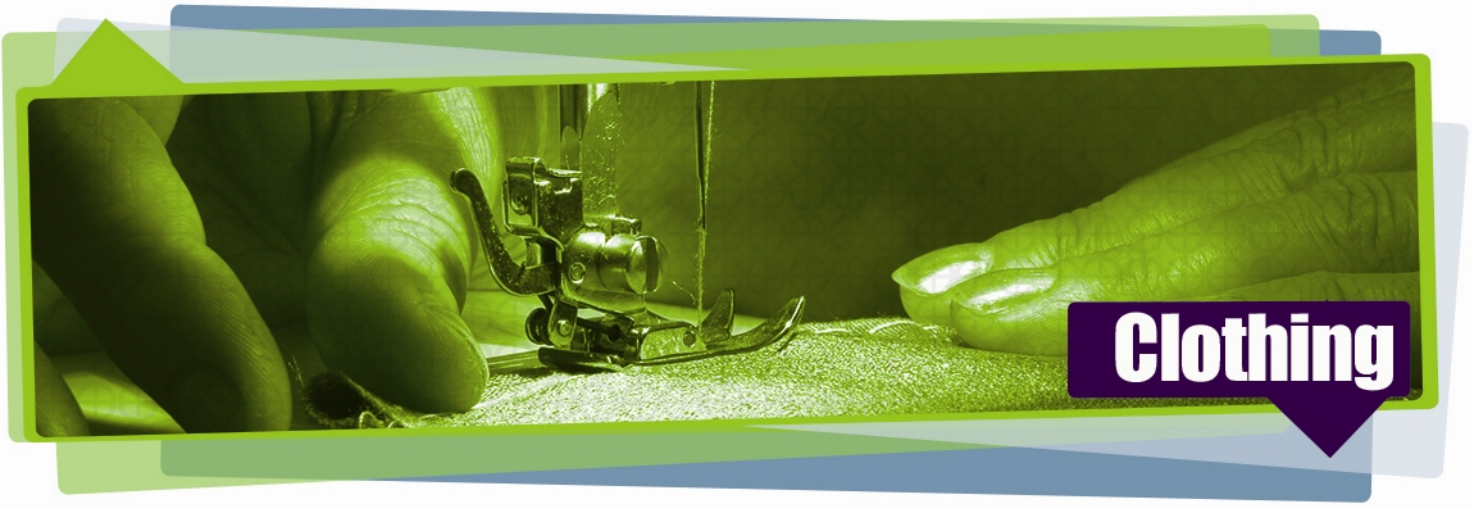


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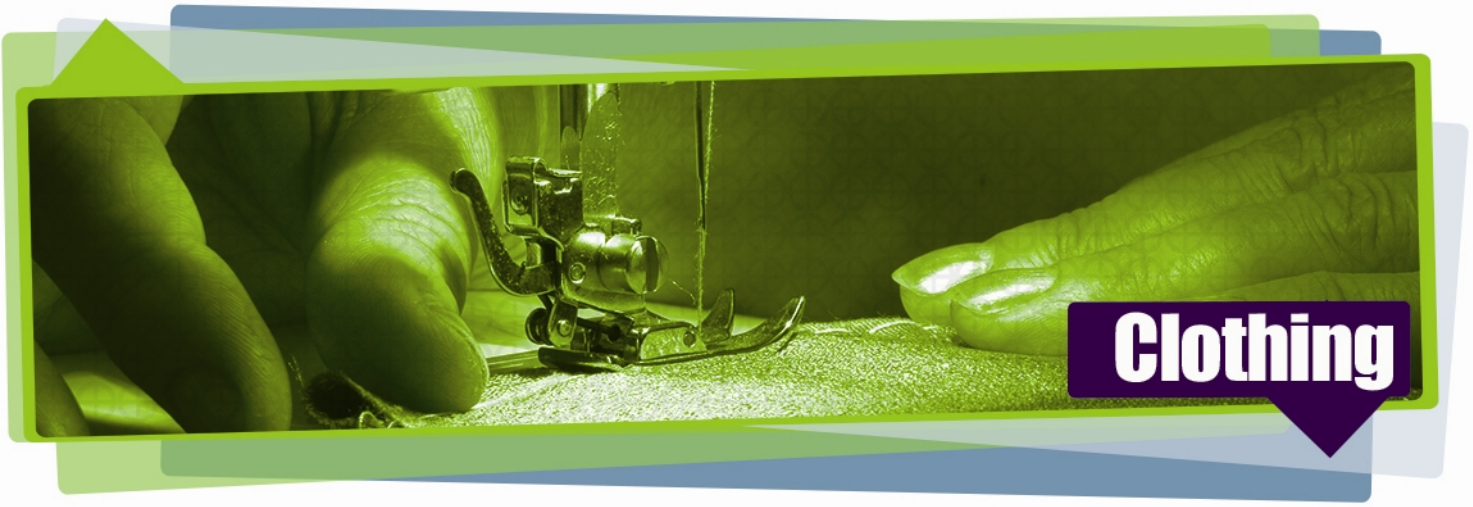



## About the guide

This guide presents an outline of the social, economic and environmental sustainability issues that typically arise in the clothing sector. This guide focuses on the manufacture of clothing using natural, man-made, woven, knitted or bonded (non-woven) fabrics. The manufacture of fabrics is covered in the *Sustainability issues in textiles guide*.

Examples of products include:

- 'Ready to wear' clothing
- Men's, women's and children's clothing
- Clothing made from leather, woven, knitted and/or bonded fabrics
- Specialist clothing (e.g. uniforms, hospital gowns and masks, and disposable wear).

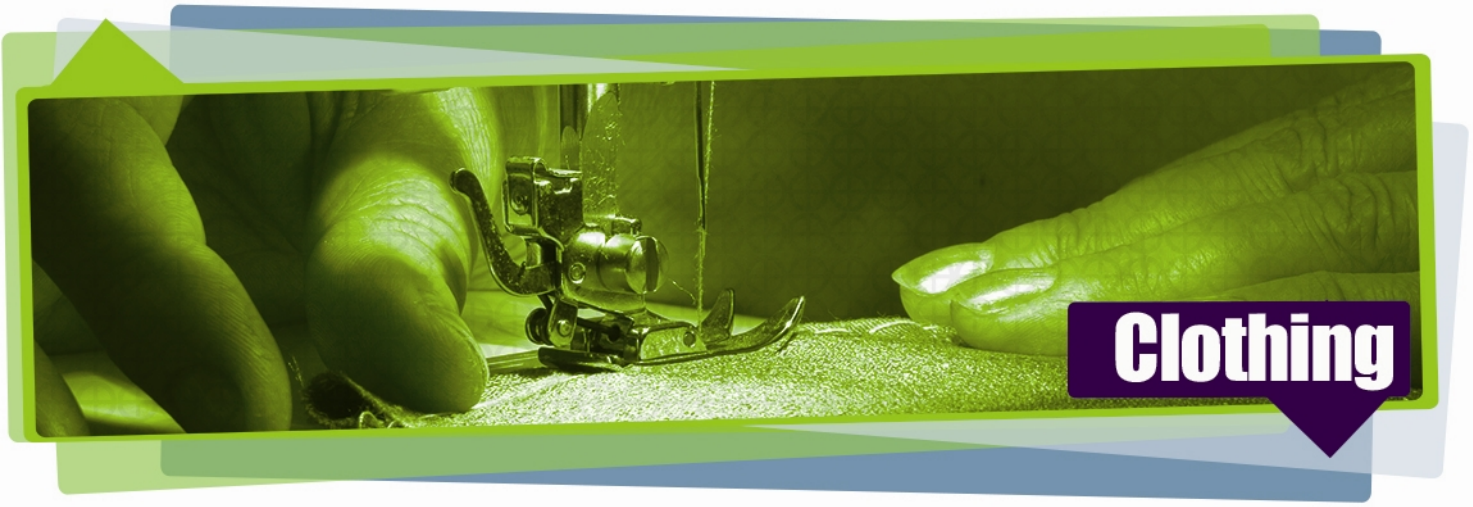
The guide shows some of the processes that are common across the sector and how sustainability issues relate to different parts of the process. These issues will vary depending on the inputs and activities in each process step.

The guide will assist Registered Training Organisations (RTOs) to identify the sustainability issues in a sector and/or business. It provides a high-level snapshot of sustainability in the sector. This can be used as a basis for the RTO to undertake its own research in order to:

- Consult with clients and understand their business and skill needs
- Develop their training and assessment strategy
- Contextualise training and assessment materials and activities.

The guide is not intended as learning material for students, however, it may be useful as part of a suite of information resources. It may also provide a model which an RTO can adapt, expand and/or contextualise for use in its own materials.

The Skills for Sustainability website provides further support for RTOs, including links to more information about this sector and guides to identifying the sustainability issues in five other manufacturing sectors. See http://www.sustainabilityskills.net.au.



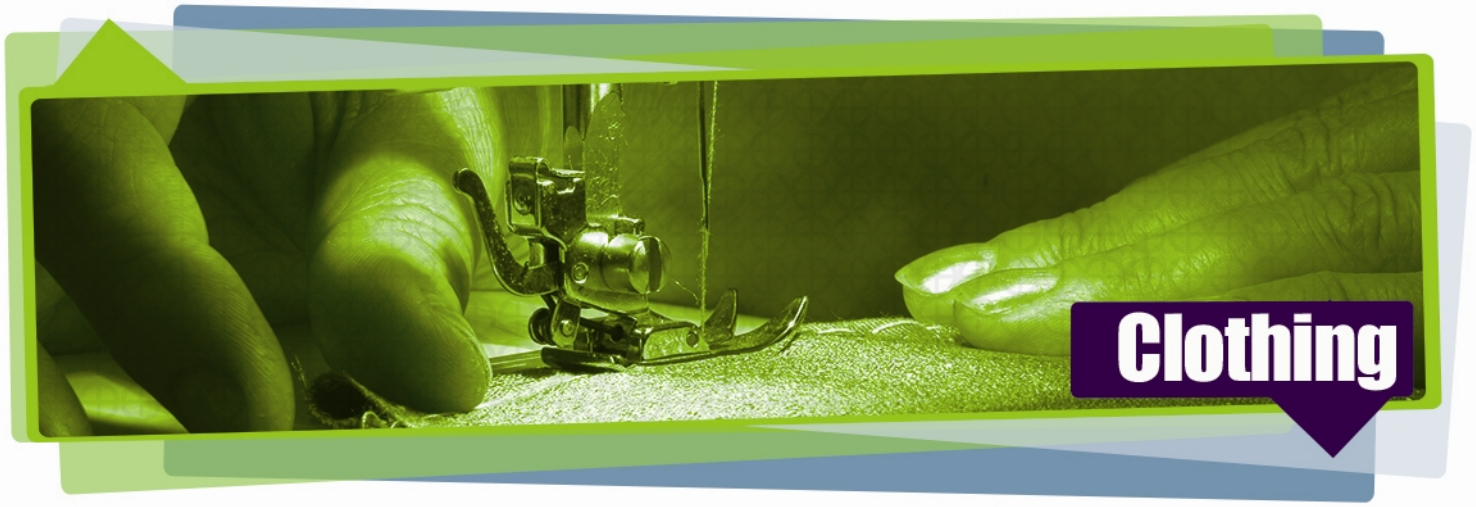

## What is in the guide?

The guide includes:

- An overview of sustainability issues
- A simple process flow
- A risk rating table for sustainability issues at various points in the process
- Examples of possible *high impact* issues and their causes.

The guide provides a 'map' of where sustainability issues are likely to arise in a particular manufacturing process, and what the impact of these issues might be. It uses a risk rating system and explains the potentially *high impact* issues in more detail. Brief and simplified examples are provided, which do not cover all of the possible sustainability issues and variables within the sector.

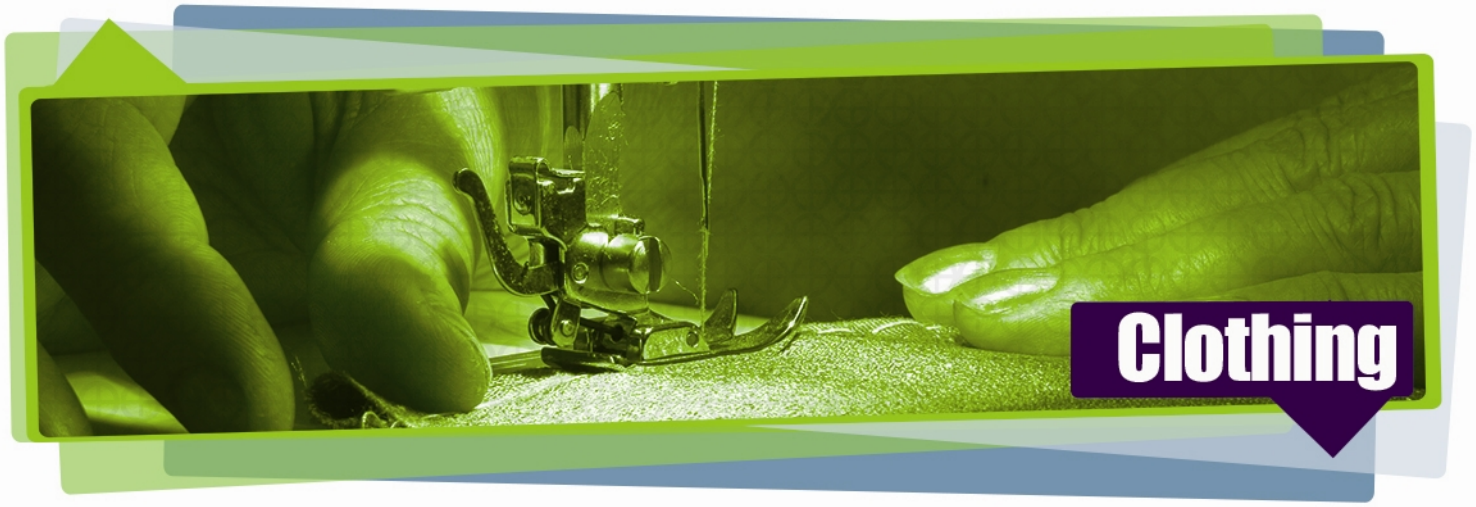
The process steps and sustainability issues in the sector have been identified through discussions with stakeholders and desktop research. Sources include IBIS World Industry Research Reports, International Finance Corporation (IFC) Environmental Health Guidelines, the MSA Environmental Scan 2012 and the National Pollutant Inventory Emission Estimation Technique (EET) Manuals.




## Overview of sustainability issues

This section provides an overview of sustainability issues that are likely to affect enterprises in clothing manufacture.

| Sustainability issues | |
|---|---|
| **Economic sustainability** | • Large number of small to medium enterprises (SMEs) with limited production volumes. These businesses have limited capacity to invest in innovation and sustainability, particularly when competing with developing countries with low labour and compliance costs.<br>• High cost of capital – limits capacity to invest in new technology, particularly for small businesses.<br>• High electricity usage – an increasing cost, generates greenhouse gas (GHG) emissions and exposure to the Carbon Price.<br>• Labour intensive industry – exposure to relatively high labour costs and risk of industrial action.<br>• Competition from developing markets in Asia (particularly China), with up to 85% of all clothing being sourced from developing countries. |
| **Environmental sustainability** | • High electricity usage to operate dryers and presses – generates significant GHG emissions.<br>• High use of fuels in supply and distribution – non-renewable resources and GHG and particulate emissions.<br>• High use of pesticides and other chemicals in the farming supply chain (e.g. cotton and wool).<br>• Environmental degradation and animal welfare issues caused by farming (e.g. cotton and wool).<br>• Use of chemicals, detergents and other treatments – may contaminate water, soil, air.<br>• High use of potable water (high quality, treated and drinkable) in manufacture and for the future care of the garment.<br>• Waste materials, including end-of-product life, going to landfill, and relatively short product life due to fashion trends.<br>• Significant use of packaging (e.g. plastic, cardboard and paper), typically not recycled. |
| **Social sustainability** | • Significant levels of outsourcing and subcontracting, making worker conditions and ethical behaviour hard to monitor.<br>• Workplace health and safety issues are significant given the amount and type of chemicals used throughout the manufacturing process.<br>• Competition with developing countries threatens worker conditions in Australia and in supplier countries. |




## Process flow

This section is a simple process flow of some common steps in clothing manufacture (Figure 1). It provides a broad indication of the inputs (such as materials, energy, labour and equipment) and outputs (such as GHG emissions, particulates, waste materials and products). This defines a focus area so that specific sustainability interactions can be identified.

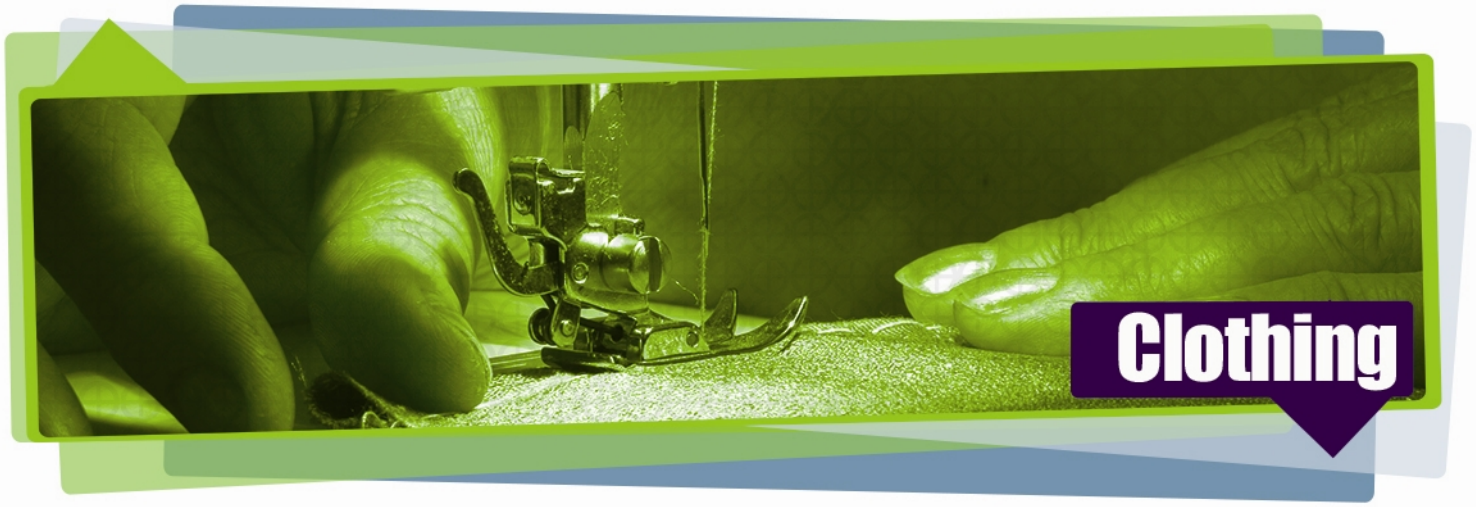
Process flows for this sector could also be developed for specific product lines or production processes and this would affect the sustainability issues that are identified.

### Value chain issues

This process flow focuses on a 'gate to gate' section of clothing manufacture. Other parts of the value chain which are not included in this process flow can have a significant influence on the mix of sustainability issues that are identified for the sector. For example, the process flow could include material sourcing and supplier management processes.

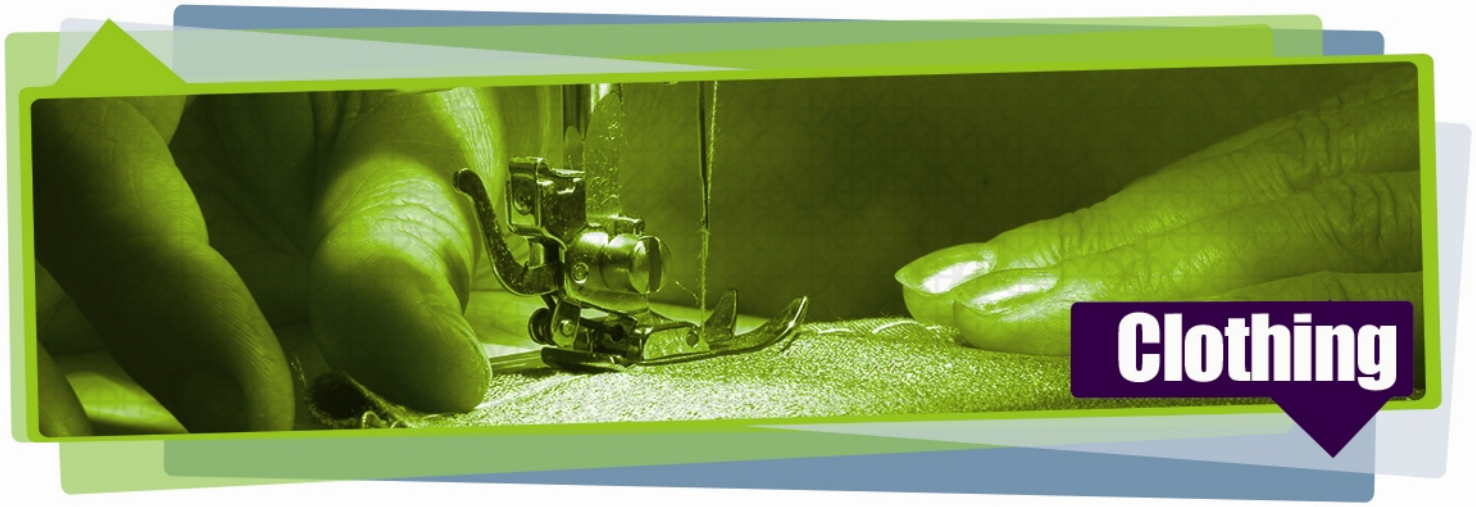
This would show more social sustainability issues, such as poor working conditions in fabric manufacturing businesses and exploitation of agricultural labour. It could also highlight different environmental sustainability issues, such as the use of man-made vs. natural vs. organic fibres and waste management in the supply chain.

Businesses can influence these issues and many are including environmental and social sustainability criteria in tenders and contracts. See Sustainable supply chain.




| Design and sample making | Fabric selection | Cutting | Sewing | Finishing |
|---|---|---|---|---|
| •INPUTS<br>•Concept, design and pattern making<br>•Pre-production planning<br>•Materials estimation<br>•Transport and fuel<br>•OUTPUTS<br>•Design 'signed-off' for production<br>•Materials sourced and stored onsite<br>•GHG emissions<br>•Pollution from vehicles | •INPUTS<br>•Design<br>•Market data<br>•Matching of product needs to available products<br>•Fabric preparation (e.g. stretching and cleaning)<br>•Drying, if required<br>•Energy<br>•Labour<br>•OUTPUTS<br>•Ready for cutting phase<br>•Wastewater<br>•Waste chemicals<br>•GHG emissions<br>•Dust | •INPUTS<br>•Fabric<br>•Patterns<br>•Spreading<br>•Labour<br>•OUTPUTS<br>•Pieces of garments ready for assembly<br>•Dust<br>•Emissions to air (e.g. VOCs) | •INPUTS<br>•Garment pieces<br>•Labour<br>•Energy for machining<br>•OUTPUTS<br>•Assembled garments<br>•Dust<br>•Pre-consumer waste (e.g. off-cuts)<br>•GHG emissions | •INPUTS<br>•Garments<br>•Cleaning agents<br>•Energy for washing, drying and pressing<br>•Water<br>•Packaging materials<br>•OUTPUTS<br>•Packaged product<br>•Dust<br>•GHG and other emissions from garment treatments and/or finishes (e.g. VOCs)<br>•Pre-consumer waste (e.g. off-cuts) |

**Figure 1: Process flow for clothing manufacture**




## Risk rating of sustainability issues in the process flow

This section looks at each step in the clothing manufacturing process flow. Typically, each step in a process will apply different techniques, use a range of equipment and require various inputs. These can result in very different sustainability issues at each step. This risk assessment investigates the risk of a particular type of sustainability issue occurring at each step and estimates the potential level of impact.

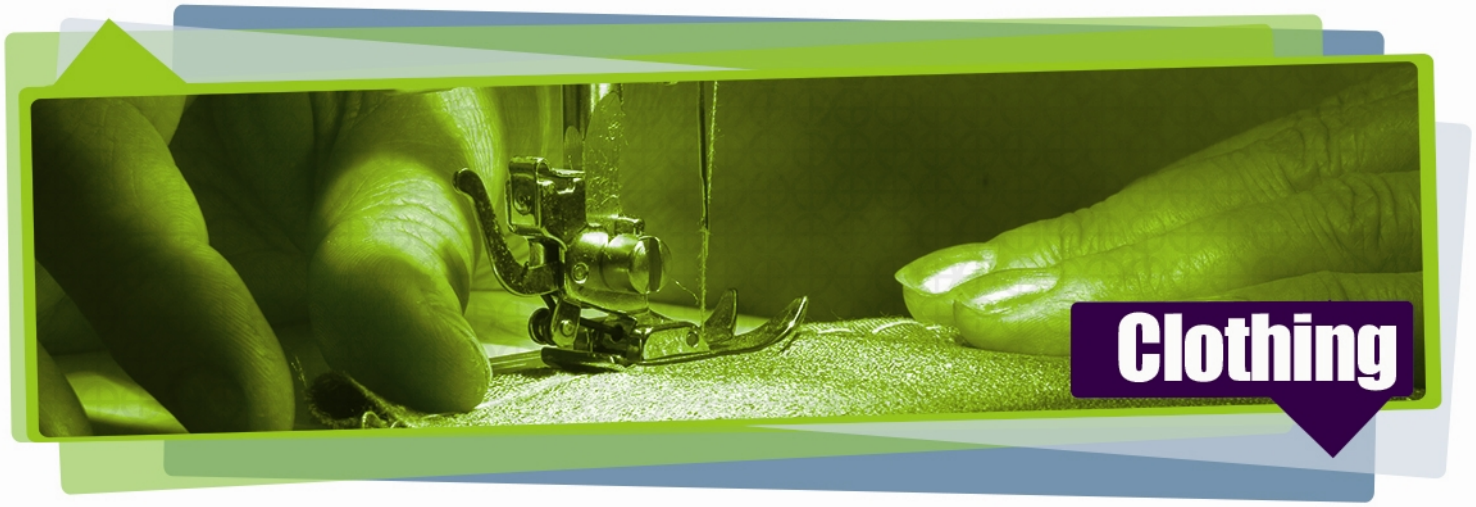
Risk assessments are subjective and require the identification and interpretation of relevant information, including local and enterprise variables, such as physical location, management systems, the economy, the skill level of the workforce, external events and available technologies.

The risk of economic, social and environmental sustainability issues occurring within the manufacturing process is assessed, along with the possible consequences of occurrence. The list of issues provided is not exhaustive; there are many different ways that sustainability issues can be described and categorised. This list draws on a number of sources, including the Global Reporting Initiative (GRI), ISO 14001 Environmental management systems, ISO 26000 Guidance on social responsibility and the Skills for Sustainability website.

The risks have been rated using a scale for **likelihood** (probability) and **impact** (consequence).

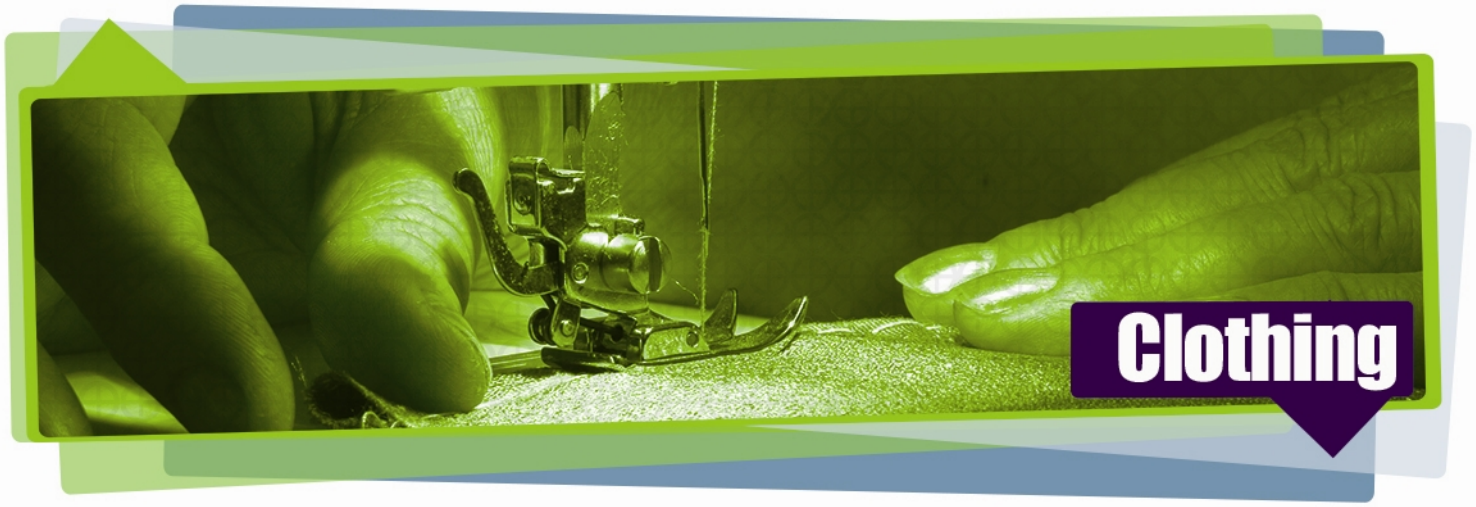
| Likelihood – the probability of occurrence | Impact – the consequences of occurrence |
|---|---|
| H = highly likely | H = high impact |
| M= might happen | M = moderate impact |
| L = less likely | L = limited impact |

In the following table the probability is listed first followed by the likely level of impact. So ‘H/M’ would be highly likely to happen and, if it did happen, would be expected to have moderate impact. *High impact* risks are discussed in further detail, as an example. However, this does not imply that other risks do not need to be considered in analysing the sector or in delivering training and assessment.




## Clothing risk rating table

| **Sustainability issues** | **Process flow elements and sustainability risks** (Clothing) | | | | |
|---|---|---|---|---|---|
| **Economic** | **Design and sample making** | **Fabric selection** | **Cutting** | **Sewing** | **Finishing** |
| Political/economic<br>• AUD (exchange rate)<br>• Cost of capital and taxes (including Carbon Price)<br>• Competition with developing countries | M/M | **H/H** | | | |
| | • High cost of energy and exposure to the Carbon Price.<br>• Strong AUD limits competitiveness against countries that have lower labour and compliance costs. | | | | |
| Markets<br>• Global and local | L/L | | | | |
| | • Low cost imports and the high AUD exchange rate put pressure on Australian businesses and limit export opportunities. | | | | |
| Value<br>• Costs and financial risks<br>• Value add and Intellectual property<br>• Efficiency | H/M | **H/H** | | | |
| | • High labour costs relative to developing country competitors.<br>• Energy and labour efficiency is required to compete with developing countries.<br>• High costs relative to developing country competitors reduce profit margins and limit investment in new technology. | | | | |




<table>
<tr><td>Sustainability issues</td><td colspan="5">Process flow elements and sustainability risks (Clothing)</td></tr>
<tr><td>Environmental</td><td>Design and sample making</td><td>Fabric selection</td><td>Cutting</td><td>Sewing</td><td>Finishing</td></tr>
<tr><td>Materials (and packaging)<br>• Consumption/reduction<br>• Source – recycled/renewable</td><td colspan="3">M/H</td><td>L/L</td><td></td></tr>
<tr><td></td><td colspan="5">• Life cycle issues vary for different fibre and fabric options (e.g. water/chemical intensive agriculture, energy intensive man-made fibres and recycled materials).<br>• Significant amounts of packaging are used (e.g. plastic bags, wire/plastic coat hangers, paper and cardboard), often ending up in landfill.<br>• Significant materials wastage from design, patterns and cutting processes.</td></tr>
<tr><td>Energy and fuels<br>• Consumption/reduction<br>• Source – renewable/non-renewable</td><td>M/M</td><td>H/H</td><td>L/L</td><td colspan="2">H/H</td></tr>
<tr><td></td><td colspan="5">• Use of gas and electricity to power dryers, generates GHG emissions.</td></tr>
<tr><td>Water<br>• Consumption/reduction<br>• Source – captured, recycled and potable<br>• Impact on local waterways</td><td>L/M</td><td>H/H</td><td colspan="2">L/M</td><td>H/H</td></tr>
<tr><td></td><td colspan="5">• Significant water usage in cleaning and as a delivery mechanism for chemicals used to dye and treat fabrics and garments.<br>• Impact of potentially contaminated water run-off to local waterways and other environments.</td></tr>
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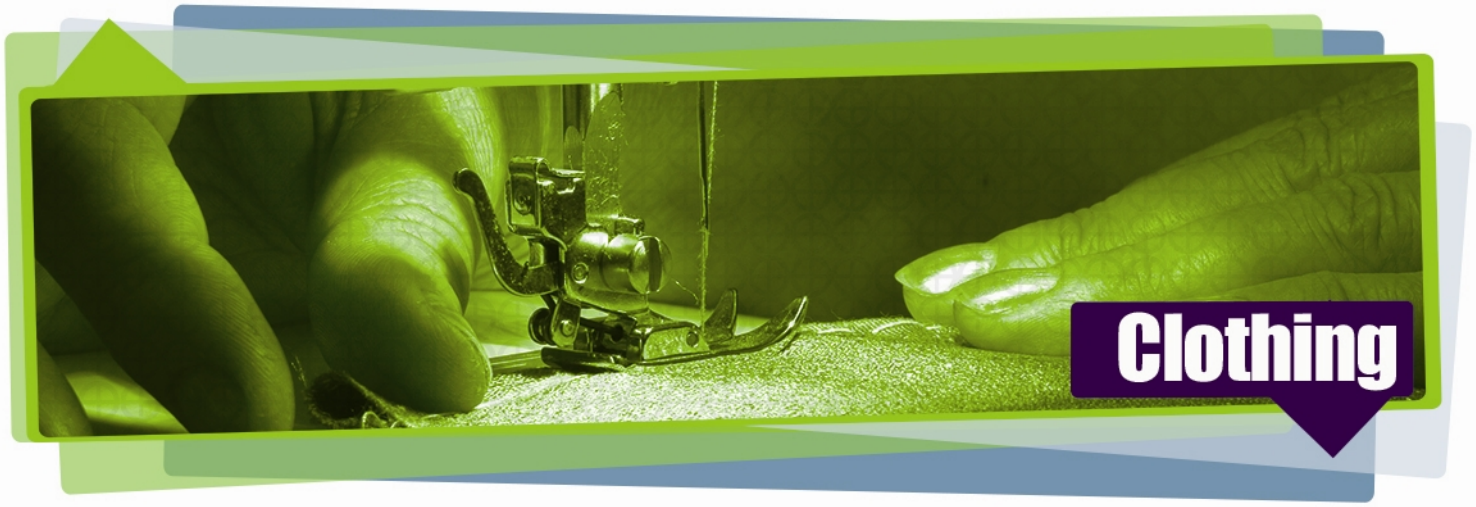
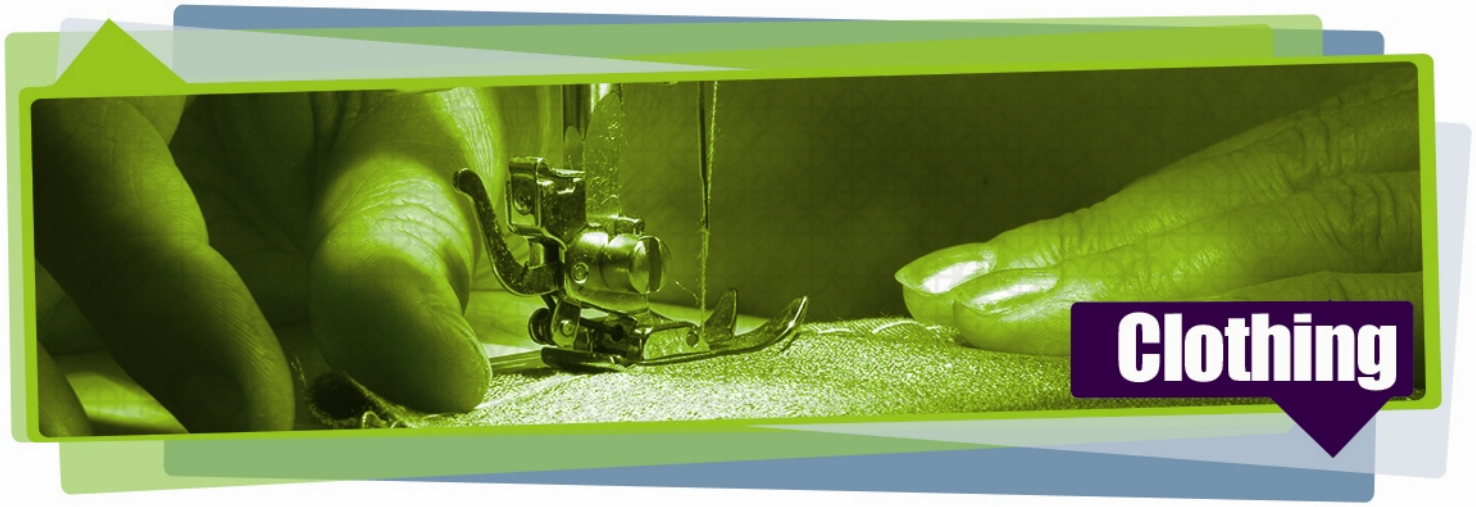



| Sustainability issues | Process flow elements and sustainability risks (Clothing) | | | | |
|---|---|---|---|---|---|
| **Environmental** | **Design and sample making** | **Fabric selection** | **Cutting** | **Sewing** | **Finishing** |
| Emissions, effluent and waste<br>• GHG and ozone depleting emissions<br>• Trade and solid waste<br>• Toxins and hazardous substances | M/M | **H/H** | L/L | **H/H** | |
| | • GHG emissions, pollutants, odours, dust and waste from manufacturing processes may enter the local environment.<br>• Toxic chemicals and substances used or released during production may affect workers, land, air and water quality.<br>• Worker transport to and from sites impacts surrounding environments.<br>• Non-degradable waste from production processes (chemical, off-cuts and plastic packaging) may contaminate land, water and air. | | | | |
| Habitat<br>• Risk management and mitigation<br>• Vulnerable area impacts | L/L | | | | |
| | • Impact of issues in the supply chain, such as farming practices, which impact local habitats. | | | | |

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<tr><th>Sustainability issues</th><th colspan="5">Process flow elements and sustainability risks (Clothing)</th></tr>
<tr><th>Social</th><th>Design and sample making</th><th>Fabric selection</th><th>Cutting</th><th>Sewing</th><th>Finishing</th></tr>
<tr><td>Worker health and safety<br>• Operation of heavy machinery<br>• Handling of heavy, hot or hazardous materials<br>• Safety training, equipment handling and drills</td><td>M/M</td><td>M/H</td><td>L/L</td><td colspan="2">M/H</td></tr>
<tr><td colspan="6">• Worker exposure to heat, chemicals, dust and pollutants can cause serious health issues.<br>• Operation of equipment requires specialised training and monitoring.<br>• Handling of chemicals used in manufacturing processes requires specialised training and monitoring.</td></tr>
<tr><td>Workplace culture and workforce development<br>• Worker engagement, job design and working conditions<br>• Diversity and equal opportunity<br>• Training and development</td><td>M/M</td><td colspan="4">H/H</td></tr>
<tr><td colspan="6">• Clothing manufacture is labour intensive, currently exposed to the high costs of a large but low skilled workforce and the risk of industrial action.<br>• Workers within the clothing value chain are highly susceptible to exploitation and outsourcing decreases the ability of businesses to monitor the working conditions of each employee or contractor.</td></tr>
<tr><td>Heritage and amenity<br>• Cultural heritage<br>• Visual amenity, noise and pollution from plant/site<br>• Impact on pedestrian movement and resident privacy<br>• Traffic entering and leaving the plant (noise, pollution and hazards)</td><td colspan="5">L/L</td></tr>
<tr><td colspan="6">• The delivery of supplies or the distribution of finished product may generate traffic and associated pollution and emissions. This can have a detrimental effect on community amenity and lead to complaints and poor profile in the local community.</td></tr>
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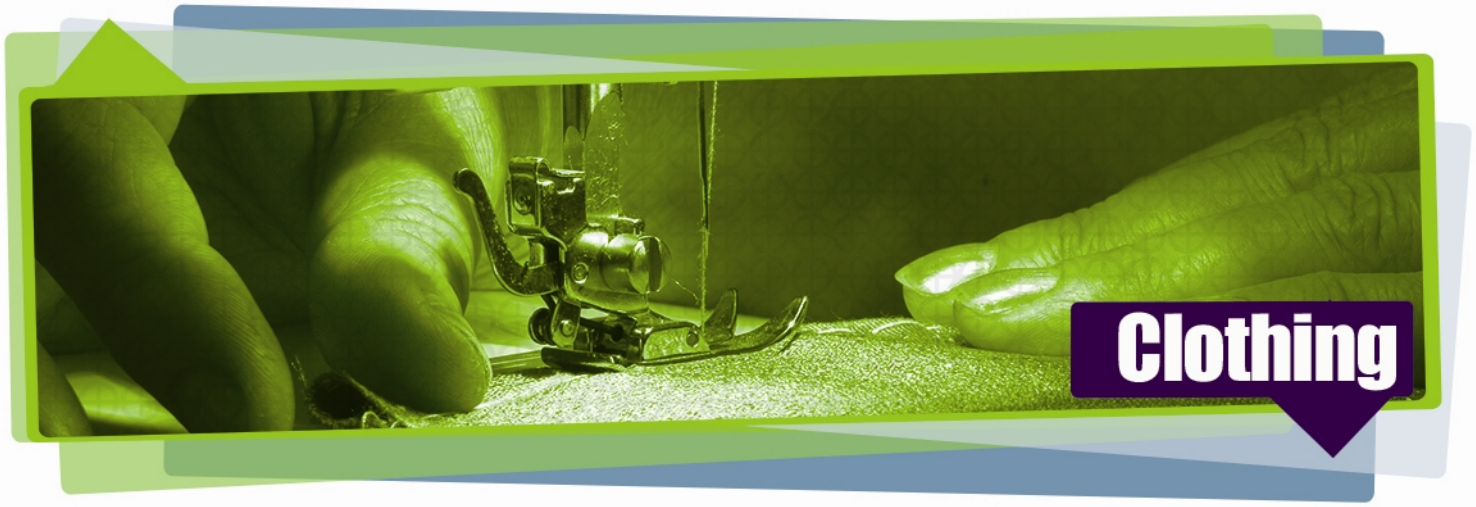


| Sustainability issues | Process flow elements and sustainability risks (Clothing) | | | | |
|---|---|---|---|---|---|
| **Social** | **Design and sample making** | **Fabric selection** | **Cutting** | **Sewing** | **Finishing** |
| Community<br>• Engagement<br>• Local programs<br>• Complaints | L/L<br>• The clothing industry reputation of poor conditions for 'outworkers' can result in negative media coverage and community complaints. These can be costly, time-consuming and threaten the 'social license to operate' of the business. | | | | |
| Ethical practice<br>• Governance and compliance<br>• Management of contracts and transactions<br>• Treatment of workers, suppliers, customers, competitors, locals and Indigenous persons | M/H<br>• The risk of collusion or unethical practice in supply chain contracts, which may cost the business through fines and/or negative media coverage.<br>• Increased outsourcing and subcontracting makes worker conditions and ethical behaviour hard to monitor. | | | | |
| Product responsibility<br>• Safety and sustainability of products<br>• Labelling, stewardship and transparency<br>• Ethical marketing | M/M<br>• The design, types and sources of materials, manufacturing process, packaging and distribution can all affect the safety of the product to end users. This in turn may pose a risk of negative publicity and ongoing liability to remedy any issues.<br>• Consumers increasingly want information about the life cycle impacts and or carbon footprint of products and materials. | | | | |