SUSTAINABLE AND CIRCULAR TEXTILE VALUE CHAINS:

LINKAGES WITH TRADE AND TRADE POLICY

Case Study:
Thailand

ABOUT THIS CASE STUDY

This case study was developed as part of a joint project on trade and the sustainable and circular textile value chains. The project was led by Ying Zhang (Economic and Trade Policy Unit) and Bettina Heller (Consumption and Production Unit), under the guidance of Fulai Sheng, Elisa Tonda and Joy Aeree Kim, all from the United Nations Environment Programme (UNEP).

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KEY MESSAGES

Thailand has built a complete value chain of textile and apparel products, with a competitive synthetic fibre production segment. Efforts were made to upgrade the Thai textile and apparel value chain towards higher value-added and more knowledge- and skill-intensive segments such as technical textiles.

Environmental hotspots were identified in Thailand's textile sector: the sector relies on fossil fuels as a major source of energy, for both electricity and thermal generation. This results in high emission footprints. Crude oil and petroleum products are also used as raw material inputs for synthetic fibre production. **The sector is a significant contributor to macroplastic and microplastic pollution. Textile fibres disposed of in unsanitary landfills or dump sites, or left uncollected, pose an increasing threat to the environment and human health. There is an urgent need to upgrade the dyeing, printing and finishing industry towards higher environmental standards.** Textile waste is putting growing pressure on waste management systems, with limited recycling capacity.

Trade policy measures can have positive impacts on the sustainability and circularity of textile and apparel value chains. These measures include tariff removal for clean technologies, voluntary sustainability standards, ecolabels and sustainable trade finance programmes. More data is needed to assess their full impacts and effectiveness.

Free trade agreements with its neighbouring countries and trading partners have opened up markets for Thai textile products. Yet environment-related elements remain limited in these agreements, and very few have done environmental impact assessments. This makes it difficult to assess their impacts on sustainability and circularity.

As the government is building Thailand into a regional hub for textiles through targeted supporting programmes, trade policy instruments can be used more effectively to tackle environmental hotspots beyond energy and resource efficiency. This is especially so for those in synthetic fibre and apparel production and consumption (such as plastic leakage, wastewater pollution and textile waste). **New trade and investment incentives for technical and medical textiles need to take full account of potential environmental impacts** (such as chemical pollution) throughout their design and implementation.

In response to increasingly stringent sustainability standards from major textile markets such as the European Union (EU), **more efforts are needed to enhance knowledge and capacity of textile companies, especially SMEs, to comply with such standards and requirements.**

I. Introduction

Thailand has a well-established textile and apparel industry (T&A),[1] which has developed over many decades. Thailand was among the first countries in the Association of Southeast Asian Nations (ASEAN) to establish a strong T&A industry, especially apparel. In the 1980s, the T&A industry was booming, driven by international trade. In 1988, T&A became the country's top exported products, with an export value of $2.4 billion, accounting for 12 per cent of overall gross domestic product (GDP). It has gradually declined over the years, as a result of growing competition and Thailand's increased competitiveness in other manufacturing sectors such as electronics, machinery and equipment. **The T&A sector has gone through transitions from relying on low labour costs to a full value chain that is more skill- and capital-intensive.**

Today, although the share of T&A in total export and economy is not as high as in the 1980s, it remains an important sector. The T&A sector is closely related to employment and industrialization, as well as regional and global economic integration. **In 2020, overall T&A exports were valued at $5.75 billion,[2] making it the eighth-largest exporting sector in the country** (2.37 per cent of overall export). Many segments within the T&A value chain focus their business on exports. For example, in the fibre industry, 71 per cent of productions are allocated to exports. Thailand also relies heavily on cotton imports to meet demand from the T&A sector.

Meanwhile, the government and industry in Thailand are trying to further upgrade the T&A value chain towards high-end and more value-added segments such as technical textiles. Simultaneously, there is effort to maintain and improve competitiveness in fibre and apparel production to explore the global market. There is also a push to reduce the sector's environmental footprint in order to meet emerging sustainability standards from major T&A markets, as well as to achieve national targets on environment and climate. This opens up new opportunities for trade, investment and business.

This paper looked at environmental hotspots in textile value chains in Thailand and trade policy instruments that can have an impact on sustainability and circularity. It built on UNEP's work on environment and trade, and its framework for Sustainability and Circularity in the Textile Value Chain.[3] Trade and trade policy have an important role to play in the transition towards a green and circular economy. Yet its potential has not yet been fully unlocked. Taking Thailand's T&A sector as a case study, this paper aims to draw on useful insights that could be shared with other developing countries.

To achieve this, information was collected, reviewed and evaluated from various sources. **Desk research was conducted, together with expert consultations.** Data and information on the T&A industry in Thailand were collected from different sources, such as:

- Government agencies (e.g. Thai Customs Office, the Office of Industrial Economics and the Office of SMEs Promotion)
- Industry associations (e.g. the Thailand Textile Institute)
- Media reports
- International and regional organizations (e.g. the World Trade Organization and ASEAN)

Expert consultations brought in insights from government agencies, industry associations, businesses and start-ups. Limitations include:

- The lack of detailed data at country and sectoral level (especially on environmental impacts and trade policy measures)
- The limited number of participating experts (and potential bias)
- A lack of in-depth quantitative analysis to assess the linkages between environmental hotspots and trade policy

[1] In Thailand, the Office of Industrial Economics, under the Ministry of Industry and the Statistics Office, use textiles and apparel (T&A) in their official reports. These include the full value chain of "textiles" (as used in UNEP's report, Sustainability and Circularity in the Textile Value Chain: Global Stocktaking), such as fibre, yarn, fabric and apparel. This study uses T&A to cover textile and apparel value chains. Data on trade and economy (including gross domestic product and import–export statistics) is collected from the Thai Customs Department and the Office of SMEs Promotion using this scope. Data from other sources sometimes uses different terms, such as clothing or garment. In order to ensure consistency, this study uses T&A throughout.

[2] "Thailand", Observatory of Economic Complexity (OEC) (https://oec.world/en/profile/country/tha?depthSelector1=HS2Depth).

[3] https://wedocs.unep.org/handle/20.500.11822/34184.

Box 1. UNEP's approach to a sustainable and circular textile value chain

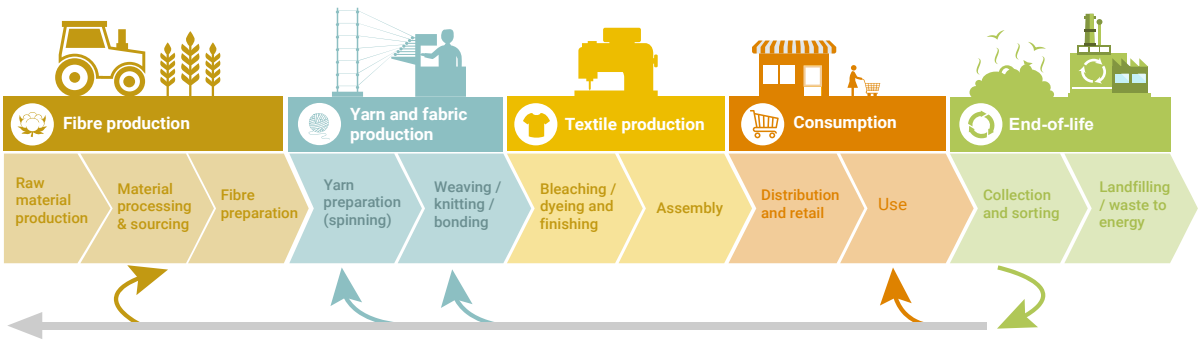
UNEP has adopted a value chain approach to advancing sustainability and circularity in the textile sector. Analysing the value chain rather than just the supply chain increases the range of stakeholders to include all those with influence or engagement in the textiles sector. This includes policymakers, financial institutions and non-governmental organizations (NGOs). Taking a value chain approach also implies looking not only at the physical processes (such as farms or factories), but also at the way products are designed, promoted and offered to consumers.

For a textile product, the value chain starts with fibre production. This can be sourcing natural agricultural materials and their subsequent processing to extract the fibre (e.g. cotton), or crude oil extraction and the manufacture of chemicals from which synthetic fibres are made (e.g. polyester), or a combination of both.

Subsequent manufacturing stages involve spinning the fibres into yarn, and knitting, weaving or bonding the fibres in some other way into fabric. The fabric is then subjected to chemical and/or mechanical processing (known as finishing) to produce a textile with the desired properties (e.g. softness or water repellence). The next step in the value chain involves cutting and sewing the textile into the product, followed by getting the product to the user (distribution and retail). After its first use, the textile product can be used again (e.g. donated second-hand clothing) or it can be recycled to a different use.

The aim of circularity is to shift the "take-make-dispose" linear value chain into a circular system. This means the materials are not lost after use, but remain in the economy, circulating as long as possible at the highest possible value.

Figure 1: Linear representation of activities along the textile value chain



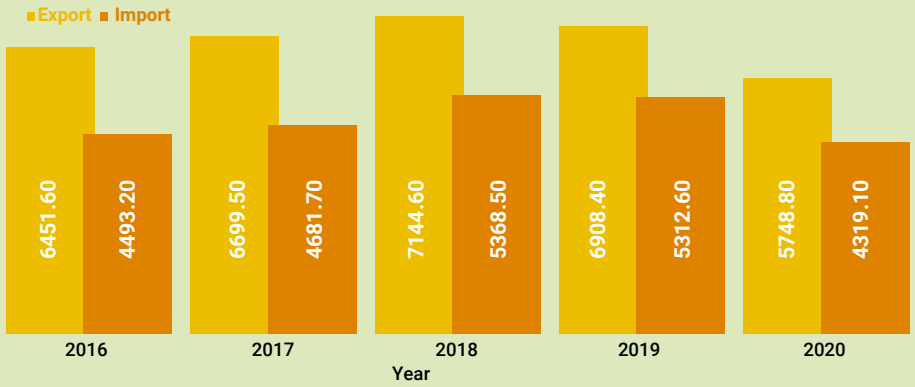
Source: Sustainability and Circularity in the Textile Value Chain: Global Stocktaking, UNEP, 2020.

II. Overview of trade and T&A value chains in Thailand

This section maps out the trade flow and value chain structure of Thailand's T&A sector. It includes the upstream and midstream (fibre, yarn and fabric) and the downstream (apparel, clothing and other textile products). The Thai T&A industry has transitioned in the last few decades, from relying on low labour costs to developing a complete value chain, covering production of fibre, yarn, fabric, apparel and clothing.

Over the years, a skilled labour force, together with the geographic location at the heart of the ASEAN region, has put Thailand in a competitive position. The country now enjoys easy access to regional and global markets. As shown in Figure 2 from 2016 to 2018, Thailand's T&A exports grew steadily from $6.4 billion to $7.1 billion. In 2019, the number slightly declined, followed by a big drop in 2020 due to the COVID-19 pandemic.

Figure 2: Total value of T&A exports and imports between 2016 and 2020 (in USD million)

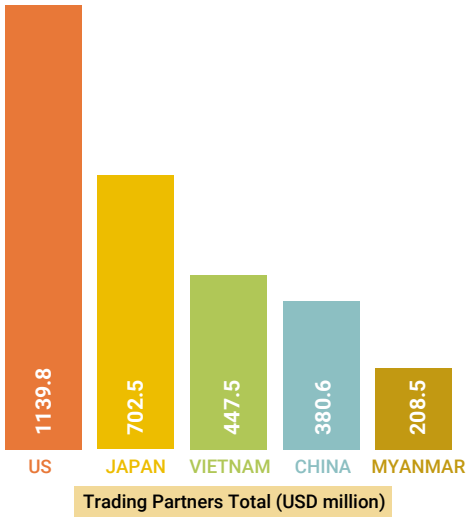


Source: Thai Textile Statistics 2020/2021, Thailand Textile Institute (THTI), 2021.

Trade analysis – export

Thailand is an export-orientated economy, with exports making up 65 per cent of the country's gross domestic product (GDP). In 2020, its T&A exports reached $5.75 billion,[4] comprising 2.37 per cent of overall exports. Among them, 34% was clothing and 12% was man-made fibre. Major exporting country partners are the United States (US), Japan, Viet Nam, China, and Myanmar. Among them, the US is the biggest exporting destination for clothing, Viet Nam is the biggest exporting destination for fabric and China is the biggest exporting destination for fibre.

Figure 3:Top 5 trading partners (export) in 2020



Source: Thai Textile Statistics 2020/2021, Thailand Textile Institute (THTI), 2021.

[4] Thai Textile Statistics 2020/2021, Thailand Textile Institute (THTI), 2021 (https://www.thaitextile.org/th/insign/downloadsrc.preview.58.html).

Comparing total production with exports, Table 1 shows that 68 per cent of the total volume of fibre and 39 per cent of yarn produced in 2020[5] was exported. There is currently no such data for apparel.

Table 1: Production vs export for textile value chain in 2020 (measured in volume)

Product	Production (tons)	Export(tons)	Export ratio (%)
Fibre	964,400	659,114	68
Yarn	566,200	222,470	39
Fabric	657,800	95,105	14

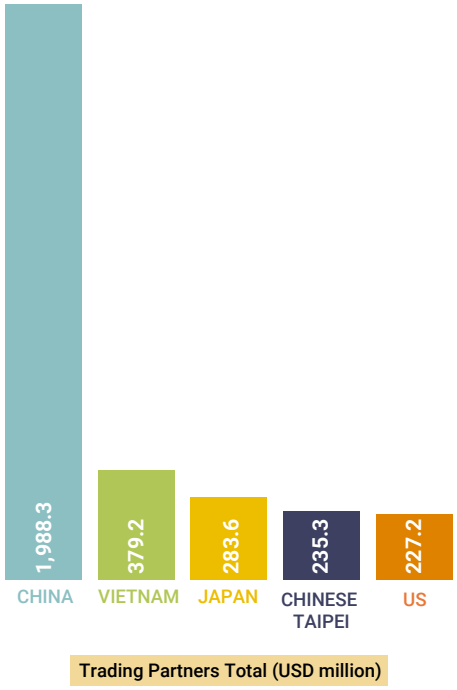
Source: Thai Textile Statistics 2020/2021, Thailand Textile Institute (THTI), 2021.

Trade analysis – import

In 2020, T&A imports were valued at $4.32 billion (2.24 per cent of total imports), most of which (77.6 per cent) were associated with upstream products such as fibre, yarn and fabric. Thailand relies on imports to provide 99 per cent of the cotton needed.

As shown in Figure 4, nearly half (46 per cent) of these imports came from China. China was also the top importing partner for clothing, fabric and yarn, while the US is the top importing partner for fibre (mainly cotton).

Figure 4: Top 5 trading partners (import) in 2020



Source: Thai Textile Statistics 2020/2021, Thailand Textile Institute (THTI), 2021.

[5] Thai Textile Statistics 2020/2021, Thailand Textile Institute (THTI), 2021 (https://www.thaitextile.org/th/insign/downloadsrc.preview.58.html) (production p. 33, export p.36).

Integration into regional and global value chains

The Thai T&A sector is deeply integrated into regional and global value chains. Within the ASEAN region, Thailand, with its complete T&A value chain and capital-intensive operations, exports upstream textile products to Viet Nam and others for apparel manufacturing.[6] Data shows that inputs worth $667 million are generated in Thailand for all ASEAN T&A exports (worth $56.1 billion).[7]

In 2017, the T&A sector's domestic value added (DVA)[8] was 67.5 per cent, higher than Viet Nam (45.3 per cent), another leading T&A exporter in the region.[9] Part of this is done through original equipment manufacturers (OEM) in apparel production, where Thai producers specialize in the "cut-make-trim" process as suppliers to global brands. A number of well-known global brands, including Nike, Adidas and GAP, outsource their production to Thailand.[10]

There are efforts to transition from the OEM model towards more complex operations such as original design manufacturing (ODM) or original brand manufacturing (OBM) through "functional upgrading". Branding, product design and marketing functions are more knowledge-intensive and have higher value-added. Thus, this shift is expected to allow Thailand to have a larger role in the global and regional T&A value chain.

One emerging trend is the increasing use of environmental standards from major exporting markets such as the European Union. Examples include:

- **The General Product Safety Directive**
- **The REACH regulation[11] (on chemicals)**
- **The textile labelling regulations**
- **The newly released Strategy for Sustainable and Circular Textiles**
- **The Corporate Sustainability Reporting Directive (CSRD)**
- **The sustainable products initiative**

These regulations are likely to have an important impact on Thai textile suppliers who export or aim to export to the European Union.

The Thai Government is also promoting the upgrade of the T&A value chain towards more technology-based products with higher value-added. This includes technical textiles (those with unique properties and that can be used beyond apparel, such as automotive textiles or Mobiltex, protective textiles or medical textiles) and textiles based on nanotechnology (water-repellent fabrics and anti-bacterial textiles).

[6] Global Value Chains in ASEAN: Textiles and Clothing, Paper 14, ASEAN-Japan Centre, 2020 (https://www.asean.or.jp/ja/wp-content/uploads/sites/2/GVC_Textiles-and-clothing_Paper-14_full_web.pdf), pp.5–6.
[7] Global Value Chains in ASEAN: Textiles and Clothing, Paper 14, ASEAN-Japan Centre, 2020 (https://www.asean.or.jp/ja/wp-content/uploads/sites/2/GVC_Textiles-and-clothing_Paper-14_full_web.pdf), p. 4.
[8] Part of exports created in the country that contributes to GDP.
[9] In Viet Nam's case, the low DVA is due to the lack of a strong upstream sector; thus, its downstream apparel industry has to rely on imported textiles. In Singapore's case, it is assumed that the low DVA is due to the fact that it has lost its comparative advantages in both textiles and apparels, with most of the related businesses having moved abroad. Source: Global Value Chains in ASEAN: Textile and Clothing, Paper 14, ASEAN-Japan Centre, 2020 (https://www.asean.or.jp/ja/wp-content/uploads/sites/2/GVC_Textiles-and-clothing_Paper-14_full_web.pdf), p.10.
[10] Thailand Board of Investments, THAILAND: TEXTILE INDUSTRY (https://www.boi.go.th/upload/content/Textile_5a3b8121275a0.pdf).
[11] REACH – more information at https://ec.europa.eu/environment/chemicals/reach/reach_en.htm.

Role of small and medium-sized enterprises (SMEs)[12]

According to the Office of SMEs Promotion (OSMEP) in Thailand, SMEs account for a big share in the number of T&A enterprises (99.8 per cent). SMEs also account for a relatively big share of T&A employment (66.6 per cent) and a low share of the value of the T&A industry (31.2 per cent).[13] SMEs are most active in the clothing, weaving and knitting segments. More information can be found in Annex II.

There is no detailed data on SMEs' participation in T&A exports and imports. In 2018, Thai SMEs' shares of exports and imports in general were 29 per cent and 37 per cent respectively.[14]

Foreign direct investment (FDI)

FDI has long been a key factor for industrial development in Thailand, supported by various investment incentives issued by the government. According to the latest Thailand Investment Review,[15] foreign investments in T&A in 2016 were $125.86 million (2 per cent of all foreign investments). These were mainly from the United States (40 per cent), Japan (17 per cent) and the European Union (10 per cent).

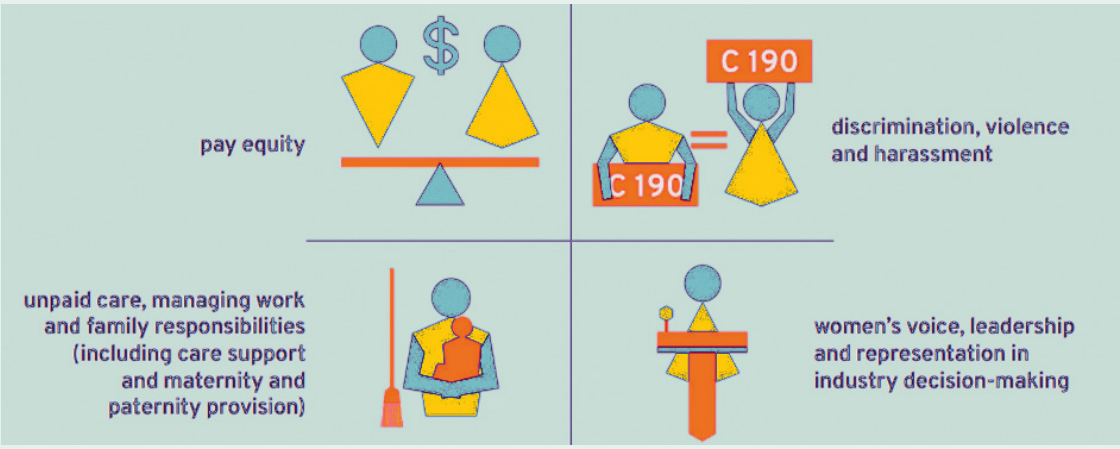
Most companies in the fibre industry operate in joint ventures with foreign companies.[16] The Board of Investment (BOI) in Thailand has been working actively to attract FDI in the textile sector.

[12] Thai definition of SMEs: enterprises with value of fixed asset less than THB 200 million or number of employees less than 200 persons.
[13] "แผนปฏิบัติการส่งเสริมวิสาหกิจขนาดกลางและขนาดย่อมรายสาขา อุตสาหกรรมสิ่งทอและเครื่องนุ่งห่ม" (implementation plan to support SME – T&A industry), Office of SMEs Promotion (OSMEP).
[14] Trade, Global Value Chains, and Small and Medium-Sized Enterprises in Thailand: A Firm-Level Panel Analysis, Asian Development Bank Institute (ADBI) Working Paper, 2020.
[15] 2016 is the last year in which data on T&A is included in the Board of Investment's (BOI's) Thailand Investment Review. After 2016, the BOI's Thailand Investment Review focuses on the 10 "S-curve" industries, or targeted industries, of which T&A is not part.
[16] "แผนปฏิบัติการส่งเสริมวิสาหกิจขนาดกลางและขนาดย่อมรายสาขา อุตสาหกรรมสิ่งทอและเครื่องนุ่งห่ม" (implementation plan to support SME – T&A industry), Office of SMEs Promotion (OSMEP), p. 20.

Box 2. Gender and textile trade

The link between trade and gender is of particular relevance to the textile and apparel sector, as one of the most female-dominated sectors. Women are more likely to have low-skilled and low-paid jobs in the garment sector. This means that they are disproportionately affected by job losses due to COVID-19. A recent ILO report identified four themes pointing to long-standing and deep-seated gender inequality issues in Asia's garment sector (shown in the figure below).

In 2020, chief executives of 110 companies in Thailand (including two T&A companies) signed up to a new set of United Nations principles on women's economic empowerment. The companies pledged to improve gender equality in the boardroom, equal pay for equal work, and safer and more inclusive workplaces. In the ASEAN region, a UN Women report shows that men continue to have higher labour force participation rates (79 per cent) than women (56 per cent).



Source: International Labour Organization, 2021, Moving the Needle: Gender equality and decent work in Asia's garment sector.

These issues existed prior to COVID-19, but they can be expected to worsen in response to the pandemic and within the emerging recovery phase.In Thailand, women make up a large majority of the T&A sector's workforce (65 per cent in 2015). Data from UN Women shows that Thailand has done "comparatively well" in terms of women occupying senior business roles. Twenty-four per cent of chief executive officers and managing directors are women, compared to an Asia-Pacific average of 13 per cent.

Women only participate in 11 per cent of the value of ASEAN exports. The report identified immense opportunities to create more gender-inclusive trade and value chains, given the concentration of women in sectors such as textile and clothing. More can be done to promote education, training and professional development for women, implement gender-responsive procurement and supply chain practices, and provide specific support for women-owned businesses.

III. Environmental hotspots in textile value chains in Thailand

This section analyses environmental hotspots (stage in the product life cycle that accounts for a significant part of its environmental impacts) and their link to the triple planetary crisis of climate, nature and pollution.[17] It follows the framework developed by UNEP and its partners on the textile value chain (as shown in Box 1).

Textile industry in Thailand still relies on fossil fuels as a major source of energy

In textile production, energy is required for two main purposes:

- **Electricity generation to keep the plants in operation (including lighting, cooling, machinery and offices, etc.)**
- **Thermal energy generation (used for heating systems, petrochemical, fibre production, moulding, extruding, steam processor and hot oil boiler in the dyeing process, etc.)**

In 2017, Thailand's textile industry consumed total energy of 958.62 ktoe (62.55 per cent in electricity and 37.45 per cent in thermal energy).[18] Industrial sectors (including T&A) accounted for roughly 28 per cent of Thailand's total greenhouse gas (GHG) emissions in 2019.[19] In 2020, more than half of Thailand's total electricity (55.3 per cent) was generated from natural gas (down from 72.0 per cent in 2010). In the same year, 17.9 per cent was from coal, 14.3 per cent was imported, 10 per cent was from renewables and 2.2 per cent was from large domestic hydropower.[20]

Efforts are being made to promote the use of renewable energy, as well as increase energy efficiency in industries. For example, Thailand's Board of Investment (BOI) has been offering incentives for factories to install solar panels on their rooftops.[21]

For thermal energy generation, Thai T&A factories typically use fossil fuels (such as natural gas) for on-site heat generation. The government has been encouraging alternative fuels such as biomass, especially those generated from agricultural waste. This aims to reduce reliance on imported fossil fuels and decarbonize the sector. **However, there are still some challenges, including high costs, problems with grid connectivity and access to clean technology.**

T&A industry is a notable contributor to macroplastic and microplastic pollution

Recent research found that the Thai T&A industry is a significant contributor to the country's plastic waste pollution.[22] In 2018, the textile sector was the second-largest contributor to plastic leakage in absolute value (19 kt of plastic in the form of textile fibres leaked to the ocean). In the same year, the sector had a 68 per cent mismanagement rate due to limited sanitary landfill and incinerator capacities. There were also approximately 700 kt of polyester fibre waste (polyester is extensively used in the T&A industry), of which 66 per cent was mismanaged. More than 30 per cent of the collected polyester fibre waste was disposed of at unsanitary landfills or dump sites, while approximately 30 per cent remains uncollected.

[17] The triple planetary crisis: Forging a new relationship between people and the earth, statement prepared for delivery to the Sub-Committee, Committee of Permanent Representatives, UNEP, 2020 (https://www.unep.org/news-and-stories/speech/triple-planetary-crisis-forging-new-relationship-between-people-and-earth).

[18] Energy conservation tracking of Thailand's energy and GHG mitigation plan: A case of Thailand's textile industry, Energy Reports, 2019 (https://www.sciencedirect.com/science/article/pii/S2352484719310315).

[19] Greenhouse Gas Emission from Energy Consumption in Dyeing Factory at Samut Prakan Province, Thailand, CHEMICAL ENGINEERING TRANSACTIONS, 2021 (https://www.cetjournal.it/cet/21/89/013.pdf).

[20] Tunpaiboon, Narin, Industry Outlook 2021-2023: Power Generation, Krungsri Research, 2021 (https://www.krungsri.com/en/research/industry/industry-outlook/Energy-Utilities/Power-Generation/IO/io-power-generation-21#:~:text=In%202020%2C%2055.3%25%20of%20the,and%20oil%20(Figure%205).

[21] A Guide to the Board of Investment 2021, Thailand Board of Investment, 2021 (https://www.boi.go.th/upload/content/BOI-A%20Guide_EN.pdf).

[22] National Guidance for Plastic Pollution Hotspotting and Shaping Action, Country report Thailand, IUCN-EA-QUANTIS, 2020 (https://plastichotspotting.lifecycleinitiative.org/wp-content/uploads/2020/11/Thailand_Final-report_2020_11_03_SMALL.pdf).

Unsanitary landfills and dump sites can cause multiple environmental effects such as air pollution and methane emissions from unregulated trash burning. T**he combination of garbage and heavy rainfall can pose a serious threat to human health. Moreover, textile fibres that were thrown away into rivers or sent to landfills also lead to leakage of microplastics into waterways and oceans,[23] disrupting ecosystems and biodiversity.**

Impacts on biodiversity due to expansion of manufacturing production, including T&A

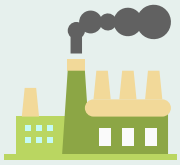
The growth of the manufacturing and export industries (including T&A) has driven land use changes. This can have negative impacts on biodiversity. For example, the Eastern Economic Corridor (EEC) in Thailand has caused major controversies over its impacts on coastal ecosystems in the Gulf of Thailand area.[24]

The Chana industrial estate in Songkhla Province triggered concerns by civil society and local communities over land use changes and biodiversity loss.[25] Industrial pollution (including in air, water and soil) is also one of the major threats to Thailand's biodiversity.[26] More research could be done to explore the impacts of textile production and exports on land use change and biodiversity loss in Thailand.

Box 3. Environmental situation in Thailand

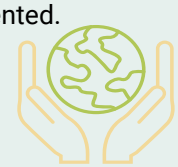
Climate

According to the Global Climate Risk Index 2019, Thailand is ranked thirteenth in the "extreme risk" category for countries most vulnerable to climate change. Climate change is high on the government's agenda. Through the nationally determined contribution (NDC), Thailand aims to reduce its GHG emissions by 20 per cent by 2030 (with the possibility of reaching 25 per cent). In 2021, the Thai Prime Minister pledged that Thailand will be carbon neutral by 2050 and net zero by 2065. To achieve these goals, various plans were developed and implemented, including the Climate Change Master Plan (2015-2050), the Power Development Plan (PDP) and the Environmental Sustainable Transport Master Plan.



Biodiversity

Thailand is famous for being among the most biodiversity rich in the region, boasting approximately 15,000 plants, representing 8 per cent of the world's total. Forest covers approximately 33 per cent of the country's total area (falling from 53.35 per cent in 1961). Urbanization and industrial growth are among the most recognized drivers of shrinking habitats for plants and animals, as well as the worsening of agricultural ecosystems. The Thai Government signed the Convention on Biological Diversity (CBD) in 1992. To meet the CBD's goals, three national biodiversity strategies and action plans (NBSAPs) comprising 5 strategies and 17 actions plans, and the 2009 National Biodiversity Policy, have been developed and implemented.



[23] National Guidance for Plastic Pollution Hotspotting and Shaping Action, Country report Thailand, IUCN-EA-QUANTIS, 2020 (https://plastichotspotting.lifecycleinitiative.org/wp-content/uploads/2020/11/Thailand_Final-report_2020_11_03_SMALL.pdf).
[24] Phuangketkeow, Sihasak, Thailand's Eastern Economic Corridor: A Bold Strategic Move, Perspective, Yusof Ishak Institute, 2020 (https://www.think-asia.org/bitstream/handle/11540/11514/ISEAS_Perspective_2020_13.pdf?sequence=1 p. 9).
[25] Greenpeace Southeast Asia, Thai coastal communities unite against the Chana industrial project, Greenpeace, 2021 (https://www.greenpeace.org/southeastasia/story/45080/thai-coastal-communities-unite-against-the-chana-industrial-project/).
[26] Combating Industrial Pollution in Thailand, National Biodiversity Strategy and Action Plans, 2018 (https://nbsapforum.net/knowledge-base/best-practice/combating-industrial-pollution-thailand).

Synthetic fibre production uses fossil fuels as raw materials, resulting in high carbon footprint

Thailand's fibre production industry focuses on synthetic fibre rather than natural fibres such as cotton.[27] Thailand ranks the fifth- and the ninth-largest producer globally of acrylic and polyester, with 71 per cent of total fibre production dedicated to exports. Synthetic fibre production uses crude oil and petroleum products as raw material inputs. In 2020, Thailand imported raw materials for manufactured fibre with a total value of $198 million, including ethylene glycol, acrylonitrile and dissolving pulp.[28] On a global level, acrylic production is found to have the highest CO_2 emissions (35.7 kg CO_2 eq/kg) compared with other fibre types, while polyester is the third (27.2 kg CO_2 eq/kg).[29] There is no data about carbon emissions from fibre production in Thailand.

Most cotton is imported, making it difficult to assess associated environmental impacts

While Thailand is a strong agricultural economy, cotton farming has traditionally not been a major industry, as it is considered less financially rewarding than crops such as rice, corn or rubber. The total cotton production of 1,500–1,600 metric tons in 2019 was less than 1 per cent of total demand.[30]

On a global level, cotton is found to be closely associated with water, ecosystems and land impacts along the textile value chain.[31] With limited local production, Thai cotton yarn and fabric manufacturers rely heavily on cotton imports, mainly from the US, Brazil, and Australia. Therefore, to fully understand the environmental footprint of cotton used in Thailand, one needs to consider environmental impacts in producing countries and from international transport.

Wastewater pollution from textile production poses major threats to the environment

Wet processing (including bleaching, dyeing and finishing of textile products) uses various chemicals and releases a significant amount of wastewater that can damage the environment. Production of synthetic fibre also has wastewater that can contain pollutants such as lead, arsenic and benzene.[32] It is estimated that textile mills generate one-fifth of the world's industrial water pollution and use 20,000 chemicals.[33]

Water pollution remains a severe problem in Thailand, particularly in industrial zones. **It is estimated that one-quarter of surface water is assessed as poor quality, with some reported improvements in recent years.[34] There were 201 dyeing factories in Thailand in 2020. The majority were located outside industrial estates, with many on the outskirts of Bangkok.** One example is the Ormnoi municipality, which hosts nearly 90 dyeing factories. Wastewater pollution from these factories poses major threats to the nearby river.

To tackle the problem, the government invested in a large wastewater treatment plant in Ormnoi. Government also issued a ban on the setting up and expansion of dyeing factories with more than 50 horsepower capacity since 2007. An exception is granted to those in industrial estates, where environmental protection facilities were built to meet higher environmental standards. The Textile and Fashion Industry Development Strategy 2016–2031 aims to further upgrade the dyeing, printing and finishing industry towards global standards.

Yet, more needs to be done. One challenge is that 95 per cent of wet processing factories are small and cannot afford to relocate or set up business in industrial estates.

[27] This is not to imply preference of one type of fibre over another; material assessments, including contextual information, are important to know trade-offs and avoid burden shifting.
[28] Thai Textile Statistics, Thailand Textile Institute, 2021 (https://www.thaitextile.org/th/insign/downloadsrc.preview.58.html).
[29] Environmental improvement potential of textiles (IMPRO Textiles), Institute for Prospective Technological Studies (Joint Research Centre), 2014 (https://op.europa.eu/en/publication-detail/-/publication/f8d0def8-4fd5-4d84-a308-1dfa5cf2e823/language-en).
[30] Prasertsri, Ponnarong, Thailand: Cotton and Products Annual 2019, Global Agricultural Information Network, USDA Foreign Agricultural Service, 2019 (https://apps.fas.usda.gov/newgainapi/api/report/downloadreportbyfilename?filename=Cotton%20and%20Products%20Annual_Bangkok_Thailand_3-29-2019.pdf).
[31] Sustainability and Circularity in the Textile Value Chain: Global Stocktaking, UNEP, 2019 (https://wedocs.unep.org/handle/20.500.11822/34184).
[32] Interwoven risks, untapped opportunities: The business case for tackling water pollution in apparel and textile value chains, CDP, 2020.
[33] Encourage Textile Manufacturers to Reduce Pollution, Natural Resources Defense Council (NRDC) (https://www.nrdc.org/issues/encourage-textile-manufacturers-reduce-pollution).
[34] Investment Policy Reviews: Thailand, Organisation for Economic Cooperation and Development (OECD), 2021.

Furthermore, without expanding their current site, they lack space to install wastewater treatment facilities. The Association of Thai Textile Bleaching Dyeing Printing and Finishing Industries (ATDP) has been supporting companies in capacity building, technology transformation and compliance with international standards (such as ISO 9000/ISO 1400).

Apparel waste is becoming a bigger concern due to growing demand and limited recycling capacity

Apparel imports in Thailand grew 48 per cent from 2016 to 2019, to reach $1.21 billion[35] driven by growing demand. A recent survey[36] found that 77 per cent of respondents have thrown away clothes in the past year, while 40 per cent have thrown away more than 10 items in the same period. Forty per cent have thrown away an item of clothing after wearing it just once, while 18 per cent estimated that they own more than 100 garments (excluding underwear and accessories). Twenty per cent of millennials responded that they keep their clothes for less than a year before throwing them away (compared to 6 per cent of baby boomers).[37] This adds great pressure to Thailand's waste management system, where recycling facilities are limited.

T&A waste is not separated from other waste, and most of it ends up in landfills. Some Thai fibre producers use collected PET bottles to produce recycled PET (rPET) resins and recycled polyester yarns.There are also attempts by civil society, such as the N15 Technology Company, which strives to turn textile waste into refuse derived fuel (RDF).[38]

Behaviour during the use phase also impacts emissions

On a global level, the use phase contributes substantially to an apparel product's climate impact. This is due to the electricity used in washing and drying. It varies widely depending on the country's electricity mix and consumer behaviour, such as cold wash. **In Thailand's case, electricity is generated mostly from natural gas, with a high carbon footprint. The use of washing machines and tumble dryers has become more common in recent years. Further, Thailand saw a rapid rise of "convenient laundry franchise stores" (estimated growth by 100 per cent from 2020 to 2021).** It remains to be seen how these trends will affect environmental footprint in the T&A consumption stage.

[35] Thai Textile Statistics 2020/2021, Thailand Textile Institute (THTI), 2021 (https://www.thaitextile.org/th/insign/downloadsrc.preview.58.html).
[36] YouGov staff, Fast fashion: 40% of Thais have thrown away clothing after wearing it just once. Data was collected online by YouGov Omnibus between 20 and 30 October 2017 from 1,137 respondents in Thailand. Results are representative of the adult online population, 2017 (https://th.yougov.com/en-th/news/2017/12/06/fast-fashion/).
[37] YouGov staff, Fast fashion: 40% of Thais have thrown away clothing after wearing it just once. Data was collected online by YouGov Omnibus between 20 and 30 October 2017 from 1,137 respondents in Thailand. Results are representative of the adult online population, 2017 (https://th.yougov.com/en-th/news/2017/12/06/fast-fashion/).
[38] Chaiyong, Suwitcha, The high cost of fast fashion, Bangkok Post, 2021 (https://www.bangkokpost.com/life/social-and-lifestyle/2195755/the-high-cost-of-fast-fashion).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IV. Trade policy that can impact sustainability and circularity of textile value chains

Overview

Thailand has been a full-committed member of the World Trade Organization (WTO) since 1995 and a strong supporter. As such, Thailand has been promoting an open economy and integration into the regional and global value chains. The latest Thailand Trade Policy Review[39] highlighted the need for investments in science, research and innovation in order to achieve a Bio-Circular-Green economy. It calls for efforts to restructure industry's production pattern from linear to a new circulating pattern that employs cost-effective waste management and raw materials recycling concepts.

Trade policy instruments that can impact sustainability and circularity of textile value chains[40]

Tariff removals for clean technologies help to encourage uptake by industries, including textile manufacturers. For example, tariffs for wastewater treatment machines (HS 84.21) were reduced to zero in January 2013.[41] Zero tariffs for solar cells (HS 8541) in 2007 proved to be vital to its affordability.[42] Zero tariffs also apply to worn clothing (HS 6309).[43] Yet, there is room for improvement. While import duties were exempted for energy efficient (EE) products, such efforts are reportedly on an ad hoc basis and lack consistent support.[44] Moreover, tariffs for LED products (HS 85.39) remain high (40 per cent).

Environmental standards and regulations for the manufacturing industry apply to textile factories. Thailand has set up a number of environmental standards for manufacturing. Most of these standards aim to improve energy efficiency, promote energy conservation and reduce pollution. An example relevant to textiles is the technical regulation for the use of dyes, such as sulphur and acid, based on the Thai Industrial Standards for synthetic dyestuffs.

Ecolabels are increasingly used for textile products. Thai textile exporters use many voluntary sustainability labels, such as:

- The Global Organic Textile Standard (GOTS)45
- Green Label: Thailand 46 (developed by the Thailand Business Council for Sustainable Development)
- The EU Ecolabel
- The Bluesign standard (see examples in Figure 5)

These labels helped open up the global market to producers. Challenges include the limited range of products that have been certified, a lengthy and complicated certification process, and the lack of information about the benefits.[47]

[39] The Thailand Trade Policy Review is a government report submitted to the WTO. The Trade Policy Review is part of the Trade Policy Review Mechanism (TPRM), which offers a forum for Members to shed light on the trade policies of the country under review from a multilateral perspective. All WTO members undergo review. There are two key documents: 1) Secretariat Report, written independently by the WTO Secretariat, and 2) Government Report, a policy statement by the government of the member under review.

[40] This section mapped out trade policy instruments that can have potential impacts on sustainability and circularity. There is no data showing to what extent they were designed with environmental considerations, or to what extent they have affected environmental hotspots identified in the previous section. More quantitative analysis such as modelling could be done in future to take a closer look of their impacts and effectiveness.

[41] Global Value Chains in ASEAN: Textiles and Clothing, Paper 14, ASEAN-Japan Centre, 2020 (https://www.asean.org/wp-content/uploads/images/archive/22692.pdf) (p. 201).

[42] Global Value Chains in ASEAN: Textiles and Clothing, Paper 14, ASEAN-Japan Centre, 2020 (https://www.asean.org/wp-content/uploads/images/archive/22692.pdf) (pp. 255–256).

[43] Global Value Chains in ASEAN: Textiles and Clothing, Paper 14, ASEAN-Japan Centre, 2020 (https://www.asean.org/wp-content/uploads/images/archive/22692.pdf) (p. 194).

[44] Accelerating Energy Efficiency: Initiatives and Opportunities – Southeast Asia, Copenhagen Centre on Energy Efficiency, UNEP DTU partnership, 2015 (https://unepdtu.org/wp-content/uploads/2015/08/southeast-asian-regional-report.pdf) (p. 32).

[45] This is hugely popular due to the decision by the United States Department of Agriculture (USDA) to approve GOTS products in its National Organic Program (NOP), which is a federal regulatory programme that develops and enforces consistent national standards for organically produced agricultural products sold in the United States.

[46] โครงการฉลากเขียว - สำหรับผลิตภัณฑ์สำหรับผ้าและผลิตภัณฑ์ทำจากผ้า (Green Label project – Products Made from Cloth) (http://www.tei.or.th/greenlabel/download/TGL-16-R2-11.pdf).

[47] From expert consultation session with Moreloop.

Figure 5: Examples of ecolabels used for textile and apparel products in Thailand

Box 4. Thailand's Bio-Circular-Green (BCG) Economy Model

The Thai Government launched the BCG Economy Model and incorporated it into Thailand's national strategy in January 2021. The model's core purpose is to enhance the potential technological development and integrate sustainability into products and services.

Key actions include investment incentives and grants (such as incentives for the purchase of bioplastic packaging), and setting up of an Industry 4.0 transformation centre in every province. So far, there is no concrete action plan linking the framework with trade.

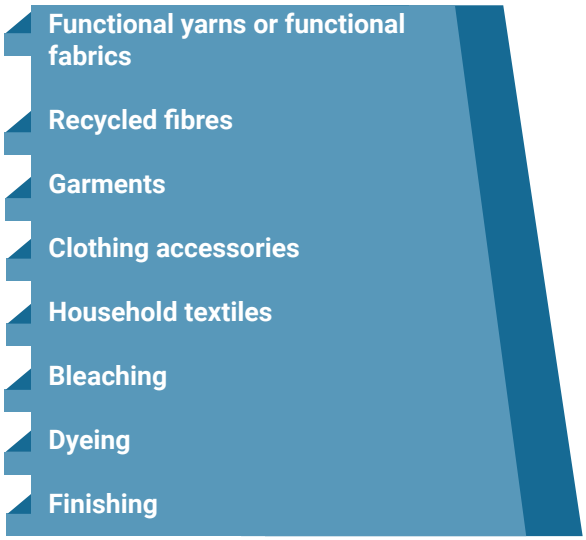
Box 5. Environment-related notifications and measures reported by Thailand to the WTO

According to the WTO Environmental Database, from 2009 to 2021, Thailand reported 121 environment-related notifications, 187 environment-related measures and 263 environment-related Trade Policy Review entries. Nearly half of them are related to the manufacturing sector (46.5 per cent). Of the measures, 50.3 per cent are technical regulations or specifications, 17.6 per cent are conformity assessment procedures, 16 per cent are ban and prohibition, and 13.4 per cent are export licences.

Non-tariff-measures for imported textile products include authorization requirements, production or post-production requirements, certification requirements and labelling requirements.[48] For example, surgical gowns, isolation gowns and medical coveralls, either domestically produced or imported, are required to meet the specified labelling requirements. These include warnings, contraindications, precautions, instructions on use and expiration).[49]

Investment management and incentives

Thailand is an early adopter of policies to attract foreign investments for manufacturing industries. Foreign direct investment (FDI) has played a key role in its industrialization and integration into the global value chain, including in the textile sector. Large-scale ventures with significant environmental or surrounding habitat impact are required to conduct an environmental impact assessment (EIA) for approval.[50] **The Board of Investment (BOI) offers a wide range of tax and non-tax incentives for textile investments in areas such as manufacturing of:**



Eligible companies can benefit from exemption from import duties, corporate income tax (CIT) reduction or exemption, a permit to own land, remit foreign currency abroad and bring in expatriates, etc.[51]

Special economic zones (SEZs)

Special economic zones,[52] such as the Eastern Economic Corridor (EEC), seek to promote high-tech and innovative industries. This includes protective and medical textiles, which are highly innovative and might see an increase in demand in the future, as well as new materials and nanotechnology. Incentives include CIT exemption, exemption of import duties on machinery, and of import duties on raw materials for production and research and development (R&D).

SEZs in Thailand were found to have environmental impacts on natural resources, air quality, waste and sewage pollution.[53] At a global level, production of medical textiles is found to use chemicals that can harm human health and the environment. These include formaldehyde, azo dyes, heavy metals, organotin compounds, perfluoroalkyl and polyfluoroalkyl substances (PFAS) and flame retardants. Thailand is promoting medical textiles production in SEZs. **Thus, it is important to take full account of potential environmental impacts and incorporate environmental sustainability in the design and implementation of relevant policies.**

Other measures

National plans to build Thailand into a regional hub for textiles: The 20-year National Industrial Development Master Plan contains a "textile cluster" to promote functional textiles, such as fibre production from agricultural products and environmental-friendly dyeing. It also promotes Thailand as a fashion business centre, a sourcing hub for the ASEAN region. The country is also a destination for global fashion institutes such as the Fashion Institute of Technology, New York and the London College of Fashion.[54]

[48] Thailand NTM Measures for Textiles and Clothing, WITS World Integrated Trade Solution (https://wits.worldbank.org/tariff/non-tariff-measures/en/type-count/country/THA/product/50-63_TextCloth).
[49] Trade Analysis and Information System (TRAINS) from the United Nations Conference on Trade and Development (UNCTAD).
[50] THAILAND BOARD OF INVESTMENT GUIDE ON ENVIRONMENTAL REGULATIONS, Thailand Board of Investment, 2014.
[51] Thailand Textile Industry, Board of Investment (BOI), 2021.
[52] Special Economic Zones (SEZs) were set up by the Thai Government to support trade and investment alongside the borders of Thailand.
[53] Social and Environmental Impacts from SEZ, Open Development Thailand (https://thailand.opendevelopmentmekong.net/topics/social-and-environmental-impacts/).
[54] Chansuwan, Krit, "The Strategic Policy for Developing Thai Industry": In Globalization, Office of Industrial Economics, Ministry of Industry, 2016 (https://www.fpo.go.th/main/getattachment/News/Public-Relations/4817/CNT0015113-5.pdf.aspx) (p. 23).

Subsidies and grants to promote biomass energy for heat generation and to encourage relocation into industrial estates: The government encourages the switching of fuels for heat generation, from fossil fuel-based steam burner to biomass-based (agricultural products/wastes). Here, grants are given of up to 30 per cent of investment for projects less than 2,000,000 baht ($58,320) per factory.[55] This has a big impact on the T&A sector, which needs a large amount of heat in the production process. Further, the Industrial Estate Authority of Thailand (IEAT) offers various grants and subsidies to encourage businesses to relocate into industrial estates with better environmental protection measures.[56]

Adjustment in domestic regulations to comply with international environmental standards: Thailand has adjusted its domestic laws on the use of chemical substances in producing T&A products. Examples include:

- **The ban on establishment or expansion of a factory producing benzidine-based dyes and chromic compounds-based dyes**
- **The ban on using the dyes in the dyeing and finishing industry**
- **The regulation on the hazardous waste manifest system**

Adjustments were also made by T&A producers to comply with international standards.

More efforts are underway to assist SMEs in pursing sustainability and circularity: The Office of SMEs Promotion (OSMEP) set up the SME ASEAN Textile and Clothing Center to provide information on upcoming trends and demand changes. There is also support for original brand manufacturers (OBM). This opens opportunities to factor in sustainability and circularity right from the product design process.[57] The Circular Textile Cluster promotes innovations to reduce energy use and CO_2 footprint, from the design phase and raw material selection to the use of a rental model and resource sharing.[58]

[55] SUBSIDIES – Thailand, World Trade Organization (WTO), 2018

[56] To see the grants and subsidies: Investment Privileges from I-EA-T, Industrial Estate Authority of Thailand (https://onestopservice.ditp.go.th/download/file/7.%20Investment%20Privileges%20from%20I-EA-T.pdf).

[57] "แผนปฏิบัติการส่งเสริมวิสาหกิจขนาดกลางและขนาดย่อมรายสาขา อุตสาหกรรมสิ่งทอและเครื่องนุ่งห่ม" (Implementation plan to support SME – T&A industry), Office of SME Promotion (OSMEP) (Implementation plan to support SME – T&A industry), Office of SME Promotion (OSMEP) (pp. 97–114).

[58] "กิจกรรมพัฒนาคลัสเตอร์ BCG Fashion Lifestyle ภายใต้ โครงการสนับสนุนเครือข่าย SME ปี 2563" (BCG Fashion Lifestyle Cluster Development Activities under the SME support project of 2020), Thailand Textile Institute (THTI), 2020 (https://www.thaitextile.org/th/service/detail.1626.1.0.html).

Currently, Thailand has 14 free trade agreements (FTAs) in force, including:

- The ASEAN Free Trade Area (AFTA)
- ASEAN Plus One trade agreements[59]
- The recent Regional Comprehensive Economic Partnership (RCEP)[60]

Thailand is also a member of the Bay of Bengal Initiative on Multi-Sectoral Technical and Economic Cooperation (BIMSTEC), with negotiations launched in 2014 for a free trade area.[61] Very few of these agreements have specific environmental chapters or have done environmental impact assessments. This makes it difficult to assess their full impacts on the sustainability and circularity of textile value chains.

Negotiations for the EU-Thailand Free Trade Agreement (FTA) were launched in March 2013 and put on hold in 2014. Efforts are being made towards the resumption of negotiations.[62] Negotiations were launched in June 2022 for a trade agreement with the European Free Trade Association (EFTA). This can hopefully include the environment.[63] The EU and EFTA members (Iceland, Liechtenstein, Norway and Switzerland) are important importing markets for apparel products and active players in promoting sustainability and circularity. As such, agreements with them are likely to have a big impact on textile value chains in Thailand.

Selected trade agreements with potential implications for textile value chains

Regional Comprehensive Economic Partnership (RCEP)

Signed on 15 November 2020 and entered force on 1 January 2022, the RCEP is the world's largest free trade agreement. It is estimated to cover 2.3 billion people or 30 per cent of the world's population and to contribute $25.8 trillion or approximately 30 per cent to global GDP.[64]

Out of Thailand's top 5 T&A trading partners,[65] three are RCEP members (Japan, Viet Nam and China). The RCEP does not provide a drastic change for tariff reductions, as many of the traded products were already subject to zero tariffs from ASEAN Plus One FTAs. However, **RCEP members are committed to gradually reducing most remaining tariffs on T&A to zero.** Some products make a significant difference, such as apparel products exported from Thailand to China under HS 61 (subject to tariffs as high as 25 per cent).[66] This tariff will be reduced to zero within several years and could boost T&A exports to main export partners. For imports, Thailand's tariff schedule under the RCEP also sets out a gradual tariff removal on remaining import tariffs.[67] This will benefit Thai T&A businesses, as they can gain access to cheaper imports, especially for those importing upstream products (fibre, yarn and fabric). However, for apparel manufacturers, this will also mean increased competition.

[59] These included agreements with Australia, New Zealand, China, Hong Kong (China), the Republic of India, Japan and the Republic of Korea.
[60] Information on RCEP: https://rcepsec.org/
[61] Asia Regional Integration Center, 2022, BIMSTEC FTA (https://aric.adb.org/fta/bay-of-bengal-initiative-for-multi-sectoral-technical-and-economic-cooperation-(bimstec)-free-trade-area).
[62] European Commission, EU trade relations with Thailand. Facts, figures and latest developments (https://policy.trade.ec.europa.eu/eu-trade-relationships-country-and-region/countries-and-regions/thailand_en).
[63] The Deputy Prime Minister and Minister of Commerce of Thailand attended the launching ceremony for the free trade negotiations between Thailand and the European Free Trade Association (EFTA), Ministry of Foreign Affairs, Kingdom of Thailand, 2022.
[64] RCEP Agreement enters into force, ASEAN, 2022, (https://asean.org/rcep-agreement-enters-into-force/).
[65] Consists of the United States, Japan, the European Union, Viet Nam and China.
[66] RCEP, Schedule of China for ASEAN (https://www.dfat.gov.au/trade/agreements/in-force/rcep/rcep-text).
[67] RCEP, Schedule of Thailand (https://www.dfat.gov.au/trade/agreements/in-force/rcep/rcep-text).

The RCEP's true benefits are **the new rules of origin** (ROO), **which are expected to make trade easier within the bloc.** In international trade, ROO will determine the nationality of the product, and thus duties and restrictions applied to it. Materials coming from outside the country must have been altered in the production process in such a way that a different tariff classification applies to the product.

For some apparel products, ROOs are met if the good has a regional value content of at least 40 per cent. The RCEP adds the "cumulation" rules, which enable businesses to count added value in any RCEP country towards the product's domestic value.[68] Simply put, Chinese imports into Thailand no longer need to be altered to qualify for preferential treatment, if exported out of Thailand.

The RCEP does not contain a separate chapter on trade and sustainability, or the environment. It does, however, recognize the importance of promoting sustainable development in its preamble. It also allows the imposition of higher standards in conformity assessment procedures when necessary to protect the environment and allows derogation from certain transparency rules in those cases.

ASEAN Plus One FTAs

The Association of Southeast Asian Nations (ASEAN), founded in Bangkok in 1967, is a political and economic union of 10 member states in the region of Southeast Asia. In 1992, the ASEAN Free Trade Area (AFTA) was signed, promoting regional economic integration by removing trade barriers. Thailand is one of the founding members of ASEAN and has played an active role in it since the beginning.

ASEAN has signed free trade agreements with several trading partners. These ASEAN Plus One FTAs contain various references to the environment. For example, the ASEAN–China FTA refers to cooperation on environmental matters. Preambular language in other FTAs allows the application of standards and technical regulations to fulfil a legitimate objective such as environmental protection. The EU–ASEAN Free Trade Agreement did a sustainability impact assessment in 2008, commissioned by the European Commission.[69]

Trade finance

In Thailand, a key player for trade finance is the Export–Import Bank of Thailand (EXIM Thailand), a state-owned specialized financial institution under the Ministry of Finance. Its main role is to promote Thai exports, imports and investments by providing various support mechanisms, such as credit facilities and guarantees. Loans are granted for various conditions such as for business expansion, export of capital goods or for those wishing to expand their markets through international trade fairs.[70]

The bank also offers supply chain financing solutions to boost liquidity for SMEs and help them reach out to new business opportunities.[71] EXIM Bank, in cooperation with the Small and Medium Enterprise Development Bank of Thailand (SME Bank) and the Small Business Credit Guarantee Corporation (SBCG), has been providing support to increase liquidity and offering export credit insurance coverage to T&A businesses since 2009.[72] According to its Sustainability Report 2020, there were 33.49 billion baht ($976.5 million at today's rate) of outstanding loans for eco-friendly projects, and guidelines supporting exports in industries related to BCG Economy.[73]

[68] RCEP, Rules of Origin.
[69] ECORYS, 2008, Trade Sustainability Impact Assessment for the FTA between the EU and ASEAN (https://trade.ec.europa.eu/doclib/docs/2009/january/tradoc_142063.pdf).
[70] Trade Finance, Export–Import Bank of Thailand (EXIM Bank) (https://www.exim.go.th/en/Products_Services/Trade-Finance.aspx).
[71] "EXIM Thailand Launches "EXIM Supply Chain Financing Solution" to Support Capital for SMEs in Exporters' Global Supply Chain, Export–Import Bank of Thailand (EXIM Bank), 2021.
[72] EXIM Thailand Promotes Thai Textile Exports to the Global Market, Export–Import Bank of Thailand (EXIM Bank), 2009.
[73] The New Normal is Sustainability, Export–Import Bank of Thailand (EXIM Bank), 2020 (https://www.exim.go.th/en/About-Exim-Thailand/Sustainable-Development/Sustainability-Report.aspx).

While the majority of these projects are in the clean energy sector, the T&A sector can take advantage too. One potential opportunity is to use trade finance to support T&A exports that need to meet increasingly stringent environmental requirements. Further, investments in solar rooftops can benefit T&A factories, which are energy intensive. The bank will also expand its loan to BCG-related businesses to 100 billion baht ($2.92 billion) by 2027. The focus will be on developing a zero waste system to recycle factory waste.[74]

In addition to EXIM Bank, commercial banks also offer trade financing services that could be helpful to T&A businesses. The Siam Commercial Bank (SCB) offers "green forward"[75] loans. These loans are for those striving to increase energy efficiency, prevent and control pollution, produce environmental-friendly goods, improve responsible sourcing or provide environmental consultation and advisory services.[76] Kasikornbank launched the Go Green Together campaign in 2022. This campaign offers the "green zero" loan with earmarked funding of 3 billion baht ($87.47 million) specifically for businesses that seek to install solar rooftops.[77]

Nevertheless, most trade finance schemes emphasized promoting renewable energy and energy efficiency. While these green loans can benefit the T&A industry, there is potential to use them to support other sustainability efforts such as wastewater treatment, emission reduction or circular business models.

Box 6. EXIM Biz Transformation Loans

This programme was developed and managed by EXIM Bank of Thailand. The aim is to promote Thai exporters to adapt towards the environmental, social and governance (ESG) guidelines and other environmental standards required by end markets, as well as plans to reduce carbon emissions. The loan offers 2 per cent interest per year, with a maximum loan of 100 million baht ($2.91 million) per business and a payback period of seven years.

Also, there is the Solar Orchestra Loan to support investments in solar rooftops. This loan has a facilitation process for related companies to be registered for the selling of carbon credits. Currently, there are 194 projects supported by these schemes, with a total value of 373.6 billion baht ($10.9 billion).

[74] EXIM BANK ปักธงปล่อยสินเชื่อสร้างเศรษฐกิจ BCG 1 แสนล้านใน 5 ปี" (EXIM Bank to give out loans to support BCG with the amount of 100 billion baht in 5 years, BangkokBiz, 2021 (https://www.bangkokbiznews.com/business/993698).

[75] The interest rate for this loan starts at MRR+0.25 per cent, with the highest being MRR+2.5 per cent per year.

[76] สินเชื่อธุรกิจเพื่อโลก เพื่อเรา (Green Forward campaign), SCB SME (https://www.scb.co.th/th/sme-banking/business-loan/secured-loan/ssme-green-financing.html).

[77] Here, loans for solar rooftops can be up to 100 per cent of the project value, with an eight-year payback period, while, for energy efficiency equipment, it can also be up to 100 per cent of the project value, with a seven-year payback period and 0 per cent interest for the first three months.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V. Main players and initiatives

Within the Thai Government, the Ministry of Commerce is leading the design, negotiation and implementation of trade policies and trade agreements. It also supports business in exploring international markets, many of which have sustainability requirements for imports. The **Ministry of Industry** is responsible for managing investment and supporting SMEs in order to boost productivity and market integration. It launched the Thailand Textiles Tag to increase brand awareness both domestically and internationally.[78] The ministry's green industry policy and Industry 4.0 policy, both of which are in line with the BCG Economy Model, seeks to push Thai companies to meet the stringent international standards for green industry. The **Ministry of Natural Resources and Environment** works to evaluate environmental performance of factories, including T&A factories.

The **Thailand Textile Institute** (THTI) was created as part of a cooperation between the government and the private sector. It's mandate is to support the T&A sector in meeting local and global standards, compile statistics related to the industry, and promote knowledge sharing and capacity building, including on sustainability issues. The THTI is partnered with the **Office of SMEs Promotion** to provide training for textile SMEs, covering issues of sustainability. The **Thailand Board of Investment** provides financial and investment incentives for businesses operating in Thailand, including T&A companies.

In the private sector, there are a few business associations in the T&A sector. These include the Thai Man-Made Fiber Industries Association (TMFA), the Thai Weaving Industry Association (TWIA), The Association of Thai Bleaching Dyeing Printing and Finishing Industries (ATDP) and the Thai Garment Manufacturers Association (TGMA). They support their respective value chains in terms of business growth and the sustainability dimension.

There are also initiatives launched by different groups on sustainable and circular textile value chains. For example, the Mae Fah Luang Foundation under Royal Patronage (MFLF) builds on local skills and knowledge in weaving, embroidery and sewing. It also promotes the use of environmentally friendly production methods.

The Thai Style Solutions initiative, led by the government, works to bolster Thai product and design services. It further encourages young designers and entrepreneurs to work with communities and to integrate sustainability into their work.

More information about these players and initiatives can be found in Annex I.

[78] https://www.thailandtextilestag.com/index.php.

VI. Conclusion

This study looked at environmental hotspots in textile value chains in Thailand and trade policy instruments that could have an impact on sustainability and circularity of textile value chains. By mapping out trade flows of T&A products in Thailand, it finds that the country has built a complete value chain of T&A products, with a competitive synthetic fibre production segment in particular. So far, 68 per cent of its fibre production and 39 per cent of yarn production are allocated to exports. This makes it the fifth- and ninth-largest producer globally of acrylic and polyester respectively.

This leads to environmental hotspots in different segments of the T&A value chain. In general, **the T&A sector relies on fossil fuels as a major source of energy, for both electricity and thermal generation.** Efforts have been made to expand the use of renewable energy and increase energy efficiency. **Crude oil and petroleum products are also widely used as raw material inputs to produce synthetic fibre,** resulting in high emissions. **The T&A sector is a significant contributor to macroplastic and microplastic pollution.** Every year, large quantities of textile fibres are disposed of in unsanitary landfills or dump sites, or even remain uncollected. This poses an increasing threat to the environment and human health. Some of them lead to leakage of microplastics into waterways and oceans. **Wastewater pollution from wet processing (including the bleaching/dyeing and finishing of textiles) is another big problem.** There is an urgent need to upgrade the dyeing, printing and finishing industry towards higher environmental standards. The fast-growing demand and emerging trend of throw-away culture has further exacerbated the textile waste issue. Despite some business piloting efforts, recycling capacity remains limited.

The Thai Government has long had an open policy towards trade and global integration. A number of trade policy tools were used to promote trade and investment in the T&A sector. Some of them are likely to have a positive impact on the sustainability and circularity of textile and apparel value chains. Examples include:

- **Tariff removal for solar photovoltaic (PV) products** (which could help textile companies reduce reliance on fossil fuels)
- **Voluntary sustainability standards and labels for textile products**
- **Environmental standards and regulations for industries**
- **Sustainability related trade finance programmes**

There are also national plans to build Thailand into a regional hub for textiles, and targeted supporting programmes for SMEs. This is important, because SMEs account for more than 99 per cent of companies in the T&A sector.

Trade agreements such as the ASEAN Plus One FTAs and the newly signed Regional Comprehensive Economic Partnership (RCEP) have relatively limited provisions on **the environment so far. Very few environment impact assessments were done for these agreements.** This makes it difficult to assess their full impacts on sustainability and circularity.

Moving forward, more work can be done to **systematically collect data and assess trade impacts on environmental hotspots in synthetic fibre production, apparel production and consumption.** These are key parts in Thailand's T&A value chain. It would also be useful to **assess the effectiveness of current policy incentives** (most of which focus on expanding the use of renewable energy and increasing energy efficiency). It should also be explored how trade policy instruments, trade agreements and trade finance tools can better **assist in addressing a wider range of environmental hotspots, such as plastic leakage, wastewater pollution and textile waste.**

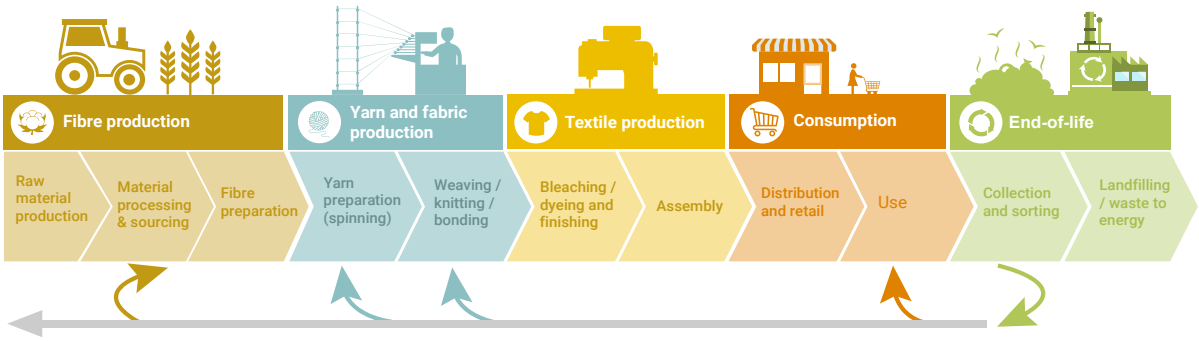
Apart from quantitative and qualitative research, this assessment could also benefit from:

- **Closer cooperation between trade and environment policymakers**
- **Inclusive consultation with stakeholders from different groups along the value chain (including SMEs, civil society groups and local communities)**
- **Dialogues with major trading partners**

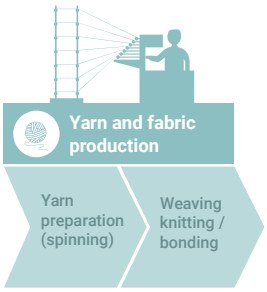
Such assessments could better inform policymaking and ensure that new policies, incentives and agreements fully incorporate sustainability in their design and implementation. Such incentives could include those that aim to steer towards more competitive technical and medical textiles.

Thai exporters face increasingly stringent sustainability standards from major textile markets such as the European Union. Thus, more efforts are needed to **enhance knowledge and capacity of textile companies, especially SMEs, to comply with such standards and requirements.** This is also in line with the government's ambition to upgrade the Thai T&A value chain towards higher value-added and increased competitiveness in regional and global markets.

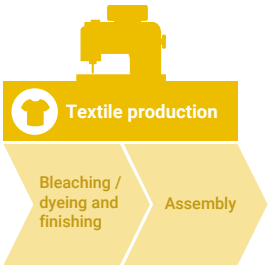
Annex I. Main players and initiatives in Thailand's T&A value chain

Name	Roles in T&A value chain	Focus
		
Ministry of Commerce	Design and implement trade policies; negotiate and implement trade agreements; increase competitiveness of Thai businesses in the global market; promote and sustain value creation for Thai products; expand international market.	Full value chain
Ministry of Industry	Promote investment in targeted industries; support SMEs and increase their productivity; created Thailand Textile Tag and offers consultations and capacity-building support; monitor and analyse key trends in industrial development.	Full value chain
Ministry of Natural Resources and Environment	Develop and manage policies related to environment and natural resources (such as on biodiversity, land management, water management, eco-friendly production and consumption, climate change and pollution); evaluate environmental performance of factories, including T&A factories.	Full value chain
Board of Investment	Provide financial and investment incentives for businesses operating in Thailand, including T&A companies; develop and manage investment policies; support development and innovation of technology.	Full value chain
Thailand Textile Institute (THTI)	Support the T&A sector in meeting local and global standards; support in networking, capacity building and knowledge sharing; conduct research and analysis, such as on textiles and BCG Economy, life cycle analysis and clean technology in textiles.	Full value chain
Thai Industrial Standards Institute (TISI)	(National standards organization under the Ministry of Industry.) Develop mandatory and voluntary industrial standards; issue product certifications according to established Thai standards.	Full value chain
Office of SMEs Promotion (OSMEP)	Partner with THTI to jointly provide training for T&A businesses such as how to shift to sustainability, how to adapt to the rise of ecommerce or how to survive the "new normal".	Full value chain

Name	Roles in T&A value chain	Focus
Textile Industry Club	Boost innovation in the T&A industry; promote functional textiles; offer services on resource sharing, events, activities, news and trends.	All value chain
Export–Import Bank of Thailand (EXIM Thailand)	Boost international trade and investment in textiles, through financial support to Thai businesses in the global market; help to mitigate trade and investment risks; enhance capacity for businesses; offer loans that are linked to the BCG Economy; offer incentives and support in complying with standards and requirements by foreign markets; manage the EXIM knowledge centre where information on T&A is updated frequently.	All value chain
Multiple commercial banks in Thailand (e.g. Bangkok Bank, Siam Commercial Bank and Kasikornbank)	Offers financial incentives for companies to shift towards sustainability, such as installation of solar rooftops in factories, use of energy efficient equipment or investments in green tech.	All value chain



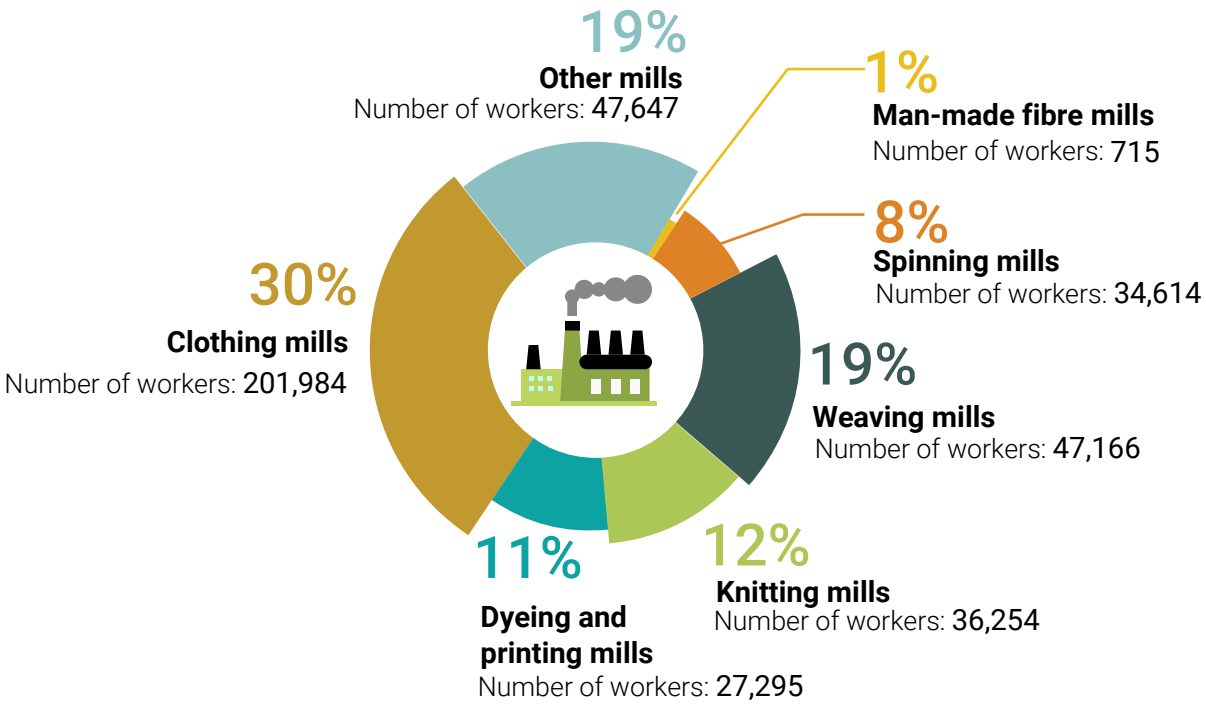
Thai Weaving Industry Association (TWIA)	Support the weaving industry, including on sustainability and circularity in the production methods and design phrase.	Weaving stage



The Association of Thai Bleaching Dyeing Printing and Finishing Industries (ATDP)	Support wet processing businesses, including on their transition towards sustainability through R&D, use of cleaner technology and better wastewater treatment; offer training programmes; help members with compliance with quality standards (ISO 9000 and 1400).	Wet processing stage
Thai Garment Manufacturers Association (TGMA)	Support the apparel sector in improving competitiveness; provide knowledge and information, including on sustainability; partner with other institutions and private sector to present innovative tech to increase efficiency of garment manufacturers.	Apparel

Name	Roles in T&A value chain	Focus
Mae Fah Luang Foundation under Royal Patronage (MFLF)	Support Thai handicrafts in textile production (such as hand-woven textiles) that uses natural dyes, with unique ethnic patterns, and is environment friendly; build on local skills and knowledge in weaving, embroidery and sewing.	Yarn; fabric; apparel
Thai Style Solutions initiative	Promote Thai textile products and design services; encourage young designers and entrepreneurs to work with communities and to integrate sustainability into their work; promote upcycling of furniture and textiles.	Apparel
IKAT/eCUT – sustainable textile industry project	Bring together stakeholders from different fields to brainstorm creative ideas for more sustainable production of textiles; explore T&A connection with future technologies or smart textiles.	Apparel

Annex II. SME establishments and workers in Thailand's T&A sector



Source: Thai Textile Statistics 2020/2021, Thailand Textile Institute (THTI), 2021.

Learn more:

www.oneplanetnetwork.org/value-chains/textiles

www.unep.org/explore-topics/resource-efficiency/what-we-do/sustainable-and-circular-fashion