# *Conservation Investment Blueprint:*
# *Cleaner Production in the Textile Sector - Büyük Menderes*

By WWF, August 2019

## *i. Overview of the conservation need/opportunity*

**The Conservation Need**

The Büyük Menderes river delta and basin are of international importance for nature conservation. It contains a significant number of endangered animals and endemic species and is an important habitat for migratory birds and a breeding area for marine fish species. Within the boundaries of the Büyük Menderes Delta national park area 804 plant species have been identified, including 30 endemic species. It is the only place where Anatolia Chestnut specific to North Anatolian forests and Snowball, Phoenician Juniper and Holm Oak grow in small communities[1]. Within the river itself 34 fish species have been recorded (19 endemic and 6 non-native species) belonging to 13 families. The most dominant family in the river and its branches is the Cyprinidae with 20 species, along with the discovery of a previously undescribed species Chondrostoma turnai in 2018.

At the same time the basin is home to important industries for Turkey and accounts for 50 per cent of Turkey's textile exports and significant parts of its agricultural production (20% of olives, 13% of cotton and 65% of figs). The basin produces US$3.5 billion of exports each year, while the city of Denizli alone is home to 10 of Turkey's biggest 500 companies[2]. This Blueprint focuses on the garment and cotton production industries, though could also be applied to other industries in the basin.

Within the basin WWF Turkey aims to protect three wetlands, which are potential Ramsar sites and one national park in total of 44.200 hectares area. Traditional conservation activities have not proven effective in incentivising or influencing production practices of the basin's garment industry, which continues to impact and threaten the healthy functioning of the Büyük Menderes ecosystem, as described below.

The garment industry uses a vast amount of water throughout the dyeing and finishing processes and is among the largest consumers of water among all industries. The amount of water used to produce one kilogram of textile product can range from 95 to 400 liters. The industry also uses very high levels of chemical substances due to pre-finishing, dyeing, finishing, sizing and other processes, which harm the river's ecosystem and its biodiversity.

Depending on the wet textile process in the facility, the chemical content of wastewater can vary. For example, wastewater resulting from de-sizing and finishing process can contain high BOD (Biochemical Oxygen Demand), wastewater from bleaching can contain AOX (Absorbable Organic Halogen) and wastewater following painting processes can contain BOD, COD (Chemical Oxygen Demand) and heavy metals. Concentrations of volatile organic compounds (VOC) are also high in the printing and finishing processes.

As an example, the dyeing process during garment manufacture has the following impacts on the river's ecology:

- **Dyes:** In oxidative conditions, biodegradation is absent or very low, so it must be removed from the wastewater. Dyes that pass-through wastewater treatment plants may inhibit photosynthesis by changing the color of the water. In addition, AOX emissions (absorbable organic halogens) and heavy metal emissions which originate from dyes, can lead to serious toxicity problems.

[1] National Parks of Turkey Website (http://www.nationalparksofturkey.org/dilek-peninsula-buyuk-menderes-delta-national-park-en) Last access 10th April 2019.
[2] WWF (2019) https://wwf.panda.org/our_work/water/?345315/Millions-of-Dollars-Flowing-into-Cleaner-Textile-Production-in-Turkey

- **Sulfur-containing reducing agents, which are used in the dyeing processes:** These are poisonous for aquatic organisms and they increase the COD load. Furthermore, sulfur anions convert into hydrogen sulfuric acid under acidic conditions, resulting in odor and corrosive qualities. Sodium hydrosulfite (sodium dithionite) transforms into sulfide during the dyeing process and is poisonous for species of fish and bacteria.

- **Oxidizing substances:** Dichromate is still widely used for fixation of chrome dyes in wool dyeing. While Cr (III) exhibits low toxicity, Cr (VI) is very toxic and carcinogenic to animals. Bromate, iodate, chlorite and hypochlorite usage can cause AOX (Adsorptive Organic Halogen) emissions.

- **Salt:** Large amounts of salt are used with reactive dyes, especially in cotton dyeing processes. Salt cannot be removed in conventional wastewater treatment systems, so is discharged into the environment. Although the toxicity of commonly used salts in the aquatic environment is very low, the use of large-scale salt in arid or semiarid regions can cause concentrations above the toxicity limit values and increase the salinity of groundwater.

- **Carriers:** Many contain different organic compounds that are volatile by steam, are difficult to biodegrade and are poisonous to aquatic life and to humans. However, carriers are usually 75 – 90% absorbed by fibers due to their high affinity for the fibers, and only hydrophilic carriers are found in wastewater.

- **Other auxiliary chemical substances:** Leveling agents, retarders, dispersants, and complex agent compounds are water soluble, hard to biodegrade and as a result pass through the wastewater treatment plants with little to no change. Some of these are toxic and/or lead to the creation of metabolites that can affect the reproduction processes of aquatic organisms.

## *ii. Describing how the Blueprint contributes to conservation goals*

**Overall statement**

This Blueprint contributes to the conservation and enhancement of freshwater and delta biodiversity. This is achieved by the provision of purchase guarantees from clothing brands to garment manufacturers in the Büyük Menderes River Basin, based on them converting to more efficient and cleaner production practices. This reduces pollution and wastewater discharge into the river, improving water quality, ecosystem health and biodiversity levels. Garment Factories are incentivised to participate based on these purchase guarantees, the additional bank loan finance they can access based on these guarantees, increased profitability from improving production practices, and achieving compliance with environmental regulations. The local banking sector is incentivised to participate by the expanded customer base they achieve for their loan products.

Key outcome indicators to measure progress against the conservation goal are the following:

- Improvement in water quality in the Büyük Menderes river
- Increased populations of key species in the Büyük Menderes river
- Improved profitability for garment manufacturing companies
- Improved profitability for cotton farmers based on improved water quality in their irrigation systems
- Improved sustainability in the textile supply chain from cotton farming to the garment industry
- Strengthened job security across the garment manufacturing and cotton production sectors based on improved profitability and environmental sustainability of these industries

## *iii. The business model*

**Organisation and governance**

The organisations and their roles in the initiative include:

- *A Conservation NGO (WWF)* – Plays a general coordination and oversight role for the initiative. This includes the following roles:

- Identify the biodiversity threats and pressures in the landscape

- Work with all the local stakeholders (including factories) to highlight how their operations are impacting the rivers system in question

- Engage public groups (Ministries, Unions, Chambers of Commerce etc.) to understand their strategy and priorities for the landscape

- Work with local technology partners to understand the technical needs of the project, the factories to understand what kind of finance they require, and with financial partners to make loans available

- Conduct surveys to understand why these kinds of investments are not being made already

- Aligning all the stakeholders with a shared vision for the programme and connecting factories, banks and technical providers

- Engage international textile brand partners to mobilise resources and collective action for interventions

- Work with the public sector to build an enabling environment to de-risk and improve the outcomes of these projects- Manages the 'pipeline' process for bankable projects to receive loan finance as part of the initiative

- *Garment Factories and Cotton Growers* – Participate in feasibility studies to assess the cost savings and environmental benefits possible from reducing water and chemical use and improving manufacturing/production processes. Depending on the findings of these assessments, access loan finance to make the necessary investments for making these improvements (or self-finance these improvements).

- *Apparel Brands* – Support the process of engaging Garment Factories in their supply chain, participate in a collective 'Call to Action' amongst Brands sourcing from the area and potentially contribute financially to feasibility studies mentioned above.

- *Local Authorities* – Mobilize Garment Factories in the basin to implement cleaner production methods at their facilities in accordance with environmental regulation. One of the reasons they have not enforced these regulations to date is that shutting down factories would lead to job losses. However, by encouraging Garment Factories to participate in the Büyük Menderes Cleaner Production programme they provide Factories with a final opportunity to comply with regulations, prior to enforcement action.

  To further encourage this, they have developed a small grant programme to Garment SMEs for feasibility studies for investing in cleaner production at their facilities, via a local Development Bank. The programmes value is $800k in total with support of $80k maximum for each SME project.

- *Local Commercial Banks* – Provide loan finance to Garment Factories to help improve manufacturing processes and reduce pollution discharge (as well as achieve general efficiency improvements).

**Products and services being sold**

<u>Products sold and associated conservation outcomes</u>

- The end-products are garments produced with lower water and chemical use than typical production processes, that are sold to Apparel Brands. Lower chemical use in the production process reduces the quantity of pollutants entering the river, and lower water use reduces the extractive pressure on the river basin, helping it to retain through-flow volumes. This helps the river maintain its role as a habitat for flora and fauna and ecosystem services to human populations.

## Cash flows and commercial sustainability

Description of cash flows

- Garment Factories use loan finance to fund efficiency improvements in their production processes, which improves their profitability, and their ability to comply with environmental regulation. With this increased profit, these actors can pay back their loans to the lending banks along with interest payments. Therefore, both the Factories, Producers and the Banks generate additional cash flow for their businesses.
- As an approximate average, the aim is for investments to pay back within 48 months, but this is dependent on the size of the investment. The average size of a loan is between $90-200k.
- The improved production processes represent a cost saving of on average $200k per year per Factory. For a target of 50 Factories this equates to a $10m saving in total per year across participating Factories.

Replicability of business model

The threats to nature conservation (and human wellbeing) posed by river pollution from garment manufacturing or other industries is a common issue across the world, and the situation described above applies in multiple geographies. Therefore, this Blueprint Model has high potential for replication at a global scale.

## External dependencies

Reliance on Laws & Regulations

This Blueprint Model helps factories comply with regulations related to cleaner production, but there has been a significant gap in the compliance with these regulations to date. However, enforcement is set to become stricter soon, and this Blueprint Model helps factories achieve compliance in a cost-effective manner before they face punitive action.

The cleaner production concept was first introduced in Turkey in 1999 by TÜBİTAK and TTGV (Technology Development Foundation of Turkey) with the "Industry Sector Report from the Science-Technology-Industry Discussion Platform, Cleaner Production-Cleaner Products Eco-Friendly Technology". It was recognized on the national scale, between 2008 and 2011, via the United Nations Joint Program "Enhancing the Capacity of Turkey to Adapt to Climate Change". These initiatives and many others have raised awareness, increased knowledge and available information, created capacity, and led to impactful partnerships.

Several laws support the concept of cleaner production and identify the need for the development of cleaner production technologies and often refers to cleaner production concepts. However, apart from the "Notification on Integrated Pollution Prevention and Control in the Textile Sector", legislation and action plans that directly incentivize cleaner production do not exist in Turkey.

Fortunately, the 2009 legislation the "Identification of the Framework Conditions and Research & Development Needs for the Promotion of Cleaner Production Applications in Turkey Project" brings cleaner production into the legislative framework. The General Directorate of Efficiency within the Ministry of Science, Industry and Technology published an assessment report of this legislation.

Legislative regulations related to cleaner production include:

1. Integrated Pollution Prevention and Control Communication in the Textile Sector (Ministry of Environment and Urban Planning, 14 December 2011)

a. The aim of the Communiqué is to encourage the most effective and efficient use of raw materials, energy and cleaner production technologies. It also aims to control all kinds of emissions, discharges and wastes discharged to the water, air and soil during production.

b. Textile facilities with a capacity exceeding 10 ton/day, which engage in weaving, washing, desizing, mercerizing, bleaching, dyeing-printing, finishing and other finishing operations are subject to the provisions of this Communiqué.

c. Manufacturers are obliged to submit Cleaner Production Plans (CPP) containing the Best Available Techniques (BATs) to the Ministry every five years and implement these plans.

2. Draft Regulation on Integrated Pollution Prevention and Control (IPPC) (Ministry of Environment and Urban Planning, 2017)

a. With this Regulation, it is obligatory to obtain an IPPC certificate in order to construct, install, change, operate or relocate facilities which carry out certain resource-intensive activities (see Annex-I List).

b. In this context, pretreatment (washing, bleaching, polishing, etc.) or dyeing of fabric fibers or fabrics of a quantity greater than 10 tons per day is subject to this directive.

c. It is essential that all measures are taken to prevent waste, to prevent or reduce any environmental impact, and to make efficient use of energy, water, raw materials and other resources. This includes the implementation of all the necessary preventive measures to prevent and reduce pollution, especially by applying the Best Available Techniques (BAT), to prevent, to minimize waste or to prepare waste for reuse, recycling, recovery processes in case of waste, when it is not economically feasible.

There are also range of further environmental laws that support the concept of cleaner production, for example the National Environmental Law and Regulations on Water Pollution Control.

**Risk management**

Social and environmental risk is managed by the fact that:

- The project is aiming to adopt the IFC Performance standards as its environmental safeguards. Currently the commercial bank involved in the programme has its own ESG policy (cannot be disclosed for confidentiality reasons).
- Brands have indicated that they only buy from suppliers who meet the minimum standard as measured by the Higg Index (https://apparelcoalition.org/the-higg-index/).
- WWF applies its own environmental and social safeguard criteria when selecting factories to work with.

## *iv. The investment model*

**The financial instruments being sought to fund the business model**

The role of debt and equity financing in the business model

- Debt financing is used via loans of between $90-200k that are provided by local banks to Garment Factories to improve production practices and reduce water and chemical use.
- 6.5 million Euros of equity has been invested in cleaner production from their existing balance sheets.

The roles of grants, guarantees or concessionary finance

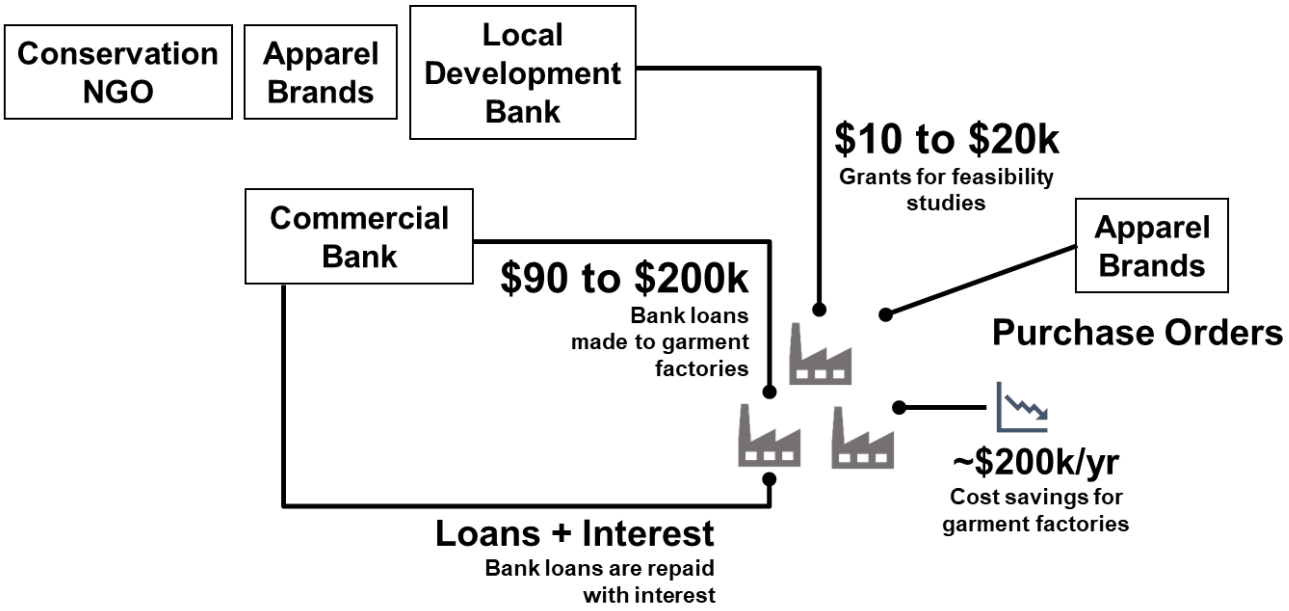
- Grants of between $10-20k are provided by Apparel Brands, a local development bank and WWF to fund feasibility studies to assess the economic viability and potential positive environmental impacts from the production improvements described above.

**The relative size of these instruments and basic information on their terms**

- Loans of between $90-200k to Garment Factories are provided by banks on commercial terms, with repayment periods in typically in the range of 48 months. Information on exact interest rates cannot be disclosed for commercial reasons.

**Investor types and the finance they provide at different stages of project maturity**

The diagram below shows the investor types and the types of finance they provide for the programme.




**Risk mitigation instruments used**

Financial Risks

The main financial risk associated with the programme is default on loan repayments by Garment Factories due to a lack of cash flow or poor financial management.

The main instruments available to manage financial risk include:

- Offtake guarantees by global brands (buyers) – this reduces the risk of loan default by factories as they have a guarantee in place for product sales.
- Bank (first loss) guarantees by DFIs – this means that in the event of defaults, commercial banks in Turkey are more likely to be able to recoup any losses via guarantee mechanisms offered by DFIs. They provide these in order to support the positive environmental, social and economic impacts of the programme. These guarantees are also important also to give factories the confidence to take on debt, as typically they take a conservative approach given the uncertain nature of the industry and reluctance to invest over the longer term.

Provision of garment manufacturing facilities as collateral in loan agreements – as is typical of commercial loan agreements, collateral is provided by the borrower (garment factories) in the form of their manufacturing facilities. This provides the bank with sufficient confidence that they can recoup outstanding amounts owed in the event of loan default.

**The exit strategy employed**

Timeframes for exit

The exit strategy for banks providing loans is straightforward, in that the repayment period for loans they provide is between 6-48 months, after which their financial return is secured. Whilst the bank is expected to engage in multiple loan arrangements over time, their financial commitment would not exceed the maximum period of their longest tenor loan (typically 48 months), meaning that at any given time they can exit the programme within 48 months without financial loss. This period may of course extend in the event of loan default from borrowers, to consider time to recoup the outstanding amounts via liquidation of collateral or other means.

Sustainability of conservation benefits following exit

Following the provision and repayment of loans, conservation benefits are retained over the long term by a continued push from the Retailers and Brands and Government Regulators for Garment Factories to maintain compliance with national regulations on pollution and wastewater management. This is achievable due to the long-term nature of the investments made in improving manufacturing processes, which enable factories to secure long-term reductions/elimination of pollutant discharge into the Büyük Menderes river. Water quality improvements and conservation benefits are then continually monitored by WWF (and other NGOs & research institutions) in alignment with their core mandates (and associated long-term funding).

**Innovative features of the investment model**

This Blueprint Model is innovative in that it seeks to develop an 'ecosystem' of the different actors throughout the supply chain aggregated at a river-basin level and aligns the goal of reducing pollution in the river basin with the commercial goals of garment factories and banks.

With guaranteed purchase orders from retailers and brands, loans can be provided on commercial rather than concessional terms to SMEs, which enhances the interest of the mainstream banking sector, and helps achieve scalability (and replicability).

Another innovative feature of this Blueprint Model is the concept of collectively pooling resources between Apparel Brands to fund feasibility studies, which then help Garment Factories in their shared supply chains to access loan finance to progress to cleaner production practices.

Finally, this Blueprint Model is focused on investing in 'grey infrastructure' to save 'green infrastructure' related to the environmental services provided by the Büyük Menderes river especially for cotton production. This is intended to secure the long-term future of cotton production in the region, which subsequently allows for the continued operation of the garment industry, providing a full-cycle solution.

**Replicability and Scalability**

Replication potential

WWF is currently working on replicating this Blueprint Model in the textile and apparel sector in Kanpur (India), Lahore (Pakistan), Yangon (Myanmar) & Shanghai (China). The model can also be replicated beyond the textile and apparel sector to any industry where:

- Pollution discharge into a river basin is causing ecological damage;
- There are NGOs, companies or other actors willing to invest in feasibility studies for upgrading machinery and equipment to reduce pollution discharge for individual factories;
- There are off takers willing to provide forward-looking purchase agreements for factories investing in this upgrading process; and
- There are banks present willing to provide loan finance at affordable rates (though not necessarily concessional) to factories to make these improvements based on these purchase agreements.

The model can also be applied in the context of reducing flood risk in river basins. For example, WWF is working in the Pantanal in Brazil to incentivise farmers in the river basin to establish sustainable commercial forestry plantations on their land to increase its absorptive capacity, thereby reducing flooding risk downstream.

**Acknowledgements**

*Prepared by Aaron Vermeulen, WWF NL (avermeulen@wwf.nl) and by WWF Turkey, with support from PwC UK.*

*A special acknowledgment to Shannon Cunniff (Environmental Defense Fund), Torsten Thiele (Global Ocean Trust), Esteban Brenes and Elizabeth Aceituno (WWF), and the CPIC Watershed Working Group for their valuable review comments.*