Polyester Microplastics in Textile; Identification, Quantification and Mitigation
Terms of References (ToRs) for Consultant

GENERAL
This document contains the Terms of Reference (TOR) for the Consultant, to be engaged by WWF-Pakistan (hereinafter called the Employer), for conducting a study on ‘Polyester microplastics in textile; identification, quantification and mitigation’ (hereinafter called the Study).

BACKGROUND
It is estimated that ‘polyester’ contributes to 50% of the fiber used in textile processes in Pakistan. In recent times, microplastics releasing from use of synthetic fibers has become a point of concern for the textile industry and sustainability decisions will soon be impacted by this. Globally, research is being conducted to better understand how microplastics leach into the environment, their fate and if there are ways to deal with the issue. Currently, the scientific community is not in agreement with a single definition of microplastics but the National Oceanic and Atmospheric Administration (NOAA) defines microplastics as “plastic pieces less than 5 millimeters [mm] long which can be harmful to our ocean and aquatic life.” This study is intended to shed light on sources and drivers of emission, pathways into the environment, and impacts of polyester microplastics as well as mitigation options to close knowledge gaps and inform policy decisions, as well as to foster more research and development in this domain.

OBJECTIVES AND SCOPE
The primary objectives of the study are to conduct a primary research exercise that would:

1. Sensitize the authorities and policy makers about the gravity and spread of the issue so that it is considered when reviewing or formulating relevant policies, rules, regulations, guidelines, and recommend best practices (if available)
2. Identify areas of further research and investigation for academia and researchers pertaining to monitoring, measurement, prevention, and control
3. Flag Wastewater Treatment Practitioners (Designer, Vendors, Operators etc.) that microplastics in industrial as well as municipal wastewater will demand due consideration
4. To aware consumers of their potential role in prevention and control (responsible buying and using behaviors)

The contents of the research study should include:

Identification, Quantification and Characterization:
There is evidence that microplastics are released from synthetic textiles along the entire lifecycle: from fibre and textile manufacturing, to garment manufacturing and finishing, to garment wearing (single wash of a common laundry load of polyester clothing) and washing, to final disposal of textile waste and wastewater.

The study should involve experiments that identify and quantify the release of microplastics during yarn, fabric, and textile design and manufacturing, pre-washing at factory level, during textile processes and then at consumer level (laundry). This exercise should help identify microplastic release hotspots from textiles.

Pathways and Drivers:
Identify the drivers of manmade fiber loss along the lifecycle.
Mitigation Measures:

- As such, several entry points exist along the lifecycle of textile products for the mitigation of textile-based microplastics pollution, from the design of products to end-of-pipe clean up solutions.
- Discuss options to mitigate polyester microplastics pollution originating from synthetic textiles.
- Best practices for maintenance and care to mitigate microplastics shedding, and technologies to prevent the microplastics emitted during laundry from entering wastewaters.
- Evidence has shown that parameters of textile washing process can greatly influence the degree of microplastics shedding of textiles. Therefore, the approach should focus on generally, mitigation interventions as far upstream as possible are recommended to minimize the emission of microplastics in the first place and to reduce the need for mitigation further downstream across different entry pathways into the environment. What opportunities are available (and in the pipeline) to mitigate microplastics shedding from textiles at the level of product design and manufacturing?
- What would be the costs of implementation?

DELIVERABLES

- Research methodology and experiment design
- Final report
- Two-pager summary of the report
- The research proposals should provide specific details in relation to how they intend to collect, store, transport, prepare and analyze samples, including measures to control for background contamination.
- Three dissemination sessions (seminars/webinars); for public sector; for academia and brands; and one for industrial representatives and wastewater treatment designers
- Training material/presentations to be shared with the Employer

EXPERTISE AND COMPETENCIES REQUIRED

Consultant / Team of Consultants must have doctorate preferably in fiber & polymer science with a background in textile engineering field possessing a minimum 07 – 10 years of research experience. International consultant will be highly preferred.

TIME FRAME
5 months