

# Waste Minimization and Environmental concern in Textiles Industry

Sanjeev Kumar Sahni

Department of Textile Engineering,

Jawahar Lal Nehru Govt. Engineering College, Sundernagar (Himachal Pradesh)175018, India

Email-id: sksanjeevkumar7070@gmail.com

**Abstract:-** *There is no doubt that industrialization leads to development and high living standard of the people these days but at the same time in the pace of development what we are doing is just exploiting our natural resources and damaging our environment in which we are living. To come out of this situation, development and environmental concern have to go hand-in-hand for sustainable development for the world. For that we need to arrange manufacturing process in such a way that cause least damage to the environment. Systematic approach to reduce the generation of waste at source leads to waste minimization. In other word, waste minimization prevents the waste from occurring in the first place, rather than treating it once it has been produced during manufacturing process.*

**Keywords:** - Sustainable development, Waste minimization, cleaner production, environmentally friendly

## 1. Introduction, which one is more important, Environment or Industrial development?

The extraordinary expansion of the global economy in recent years has also caused the explosion in consumption. While some of this growth in consumption is necessary for people to continue their lives, the rest is not. The application of a systematic approach to reducing the generation of waste at source is called waste minimization. The main environmental impact in the textile industry is manifested by the discharge of high amounts of chemical loads into the receiving environment. Other important elements are high chemical and water use, energy consumption, air pollution, solid waste and odour formation.

New precautions have begun to be considered both to maintain industrialization and to protect the environment. It has been shown that cleaning up after the pollution is more costly than cleaning up before the pollution and it is not possible to restore the degraded ecological balance after pollution.

General waste management for reducing water consumption includes attention to minor leakages and faulty valves problems to reducing number of process steps and reusing water for auxiliary processes. For reducing chemical consumption; control over dosing, chemical recovery and reuse and improving scheduling are highlighted. In this oral presentation, the environmental problems that textile has emerged have been examined and it has been explained that solutions for the problems can be made within the scope of sustainability and cleaner production. The concept of cleaner production has also been discussed in detail and the relationship with sustainability has been put forward.

### Environmental actions-

Cleaner production and sustainability have been offered as solutions to environmental problems. The concept of “cleaner production”, which is often used in many countries, has evolved into the concept of “sustainable production” in the last few decades in order to prevent possible future bigger catastrophes. Sustainable production has become widespread with the cleaner production concept used by many organizations. Cleaner production definition was made by UNEP (United Nations Environment Programme) in 1989 as “continuous application of an integrated, preventive environmental strategy towards processes, products, and services in order to increase overall efficiency and reduce damage and risks for humans and the environment”.

### Cleaner production applications-

Cleaner production applications can be classified into three main categories-

- a. Reduction of waste and reduction of resource consumption,
- b. Reuse and/or recycling,
- c. Product modifications.

### Practices for waste reduction at source-

**i. Administrative preventions:** It is one of the simplest methods of cleaner production and it is not costly because there is no investment and it can be put into practice immediately after determining the possibilities. Examples are the prevention of water, energy and other source losses such as keeping the water vents closed, optimizing chemical dosing, wasting equipment, etc. Moreover, focusing on the management and training of employees can also be done under this heading.

**ii. Better process control:** Within this heading; temperature, time, pressure, pH, process speed etc. are to be checked to see if they are optimum in terms of welding consumables, production, and waste production, and to make appropriate changes if necessary. This part requires more complex monitoring and management than administrative measures.

**iii. Material substitution:** This means that the productivity of the production is increased by the use of a higher quality material without compromising quality and cost. In addition, material substitution also means replacing existing materials with some more environmentally friendly materials. For example, replacing a dyestuff containing a hazardous chemical with an environment friendly one means that the purification requirements and costs that would be caused by the hazardous chemical substance are either eliminating or falling down.

**iv. Equipment modification:** Equipment modification is the development of present equipment to produce less waste and to ensure more efficient production processes. Examples include setting engine speeds, optimizing tank volumes, isolation of hot pipes, and so on.

**v. New process technology:** Because this method involves the use of more modern and efficient technologies, it requires a higher initial investment cost than other methods. However, with the developments of quality and savings the investment can be repaid in a very short-dated and with this application the company can more easily switch to more up-to-date and modern production processes. Such applications also provide improvements in product and production quality.

**Reuse/Recycling:** Reusing rinse water from one process to another cleaning process is an example of on-site recycling or reuse. It involves collecting waste and reusing it in the same or different parts of the production. Non-preventable wastes can be recycled or vend as an offshoot. This includes the creation of by-products, the sale of waste to consumers or other firms after collection of waste. For example; waste yeast, which is released in the brewery, can be reused as animal feed, fish production and food additive substance.

**Product modification:** One of the basic headings of cleaner production to reduce the pollution caused by products is to change product characteristics. Changing the product requires that the product and its requirements be reviewed again. Reducing the weight and the thickness of the products, designing that allows the product to be more easily recycled, changing the packaging are examples of this approach. The main point of view in the change of packaging is that the protection of the product is guaranteed by the minimum amount of packaging material.

## **Tools and methods for cleaner production-**

The choice of which tools are used to determine the use of cleaner production opportunities according to their application areas depends on the problem in operation and the work to be done. Single or multiple tools can be used based on nature of the problem.

**Environmental impact assessment (EIA):** This is a procedure, which provides that environmental effects are taken into account before making decisions. EIA includes identification of the positive and negative effects of the planned projects on the environment, determination of the measures to be taken to forestall and decrease these negative effects, and monitoring the implementation of the projects.

**Environmental management system (EMS):** It aims at the management of activities that are linked to each other, have an environmental impact or have potency. Phases of this system; environmental policy, planning, implementation and operation, control and correction process, management inspection. It provides a mechanism to firms for thinking about the environment, deciding what to do and planning how to do it, actually applying it, and correcting deviations in the plan.

**Life cycle assessment (LCA):** It also named "life cycle analysis", "life cycle approach", "cradle to grave analysis" or "eco balance", includes an assessment of aspects of a product system that are generally

relevant to the environment at entire phases of its life cycle. In other sense, it is the cluster of means and methods that have emerged to aid in environmental management for sustainable development.<sup>14</sup> The LCA can be used to systematically analyze and to prevent/mitigate negative impacts on the environment caused by the goods and services from production to disposal, and to determine resources used throughout their life cycle and to improve opportunities.

### Sustainability-

Sustainability was described as “meeting the needs of today’s needs without compromising the ability of future generations to meet their own needs”. In this regard, sustainable development can be identified as a balance between man and environment, programming the life and development of today’s and future generations in such a way as to enable them to meet and develop the needs of future generations.

Key components of sustainability consists of; “continuous support for human life, long-term protection of biological resource stock and agricultural systems productivity, stable human populations, limited growth economies, emphasis on self-confidence, ongoing quality in the environment and ecosystem”.

### Textile sector and its environmental impacts-

The textile and apparel sectors play a significant act a part in the economy of developing countries. The textile sector, with approximately 45 million employees, represents India’s largest employment group. It contributes 2% to the GDP of India. The sector contributed 15% to the export earnings of India in 2017-18.

The acceleration of industrialization, the ever-increasing population of the world and the parallel reduction of clean water resources, the rapid increase in energy costs and environmental problems, the enormous sanctions of the laws related to the environment made it necessary to develop and use for environmental processes and chemicals, as it is in other sectors in the textile industry, which is at the forefront of the sectors that generate a great deal of clean water, energy consumption, and wastewater (Table 1). Along with resource consumption, the waste production also shows a rapid increase.

**Table 1** Basic contaminants of textile wastewater.

Type of finished textile product	Dyes, g/kg textile product	Auxiliaries, g/kg textile product	Basic chemical compound(g/kg textile product)
Polyester fibres	18	129	126
Fabrics from synthetic fibres	52	113	280
Fabrics from cotton	18	100	570
Dyed fabrics from cellulose fibres	11	183	200
Printed fabrics from cellulose fibres	88	180	807

## **In summary, the following areas may adversely affect the sustainability of the textile industry-**

- i. Use of toxic chemicals**
- ii. Water consumption**
- iii. Energy consumption**
- iv. Waste production**
- v. Air emissions**
- vi. Transportation**
- vii. Packaging materials.**

## **Conclusion-**

The textile industry emits a wide variety of pollutants from all stages in the processing of fibres and fabrics. These include liquid effluent, solid waste, hazardous waste, emissions to air and noise pollution. Waste minimization is important because it: reduces operating costs; reduces risk of liability; reduces end-of-pipe treatment; improves process efficiency; enhances public image; protects health and environment; and improves employee morale.

Sustainability is much more than a trending word at a certain time. The three key elements of sustainability are; economic and social development, environmental protection, and each one each one should be considered in relation to the others. Sustainability is very crucial because it maintains people quality of life with protecting diversity and ecosystems in the world with various ways; protecting natural resources, providing energy savings, decreasing waste quantity, investment in the future and economy with recycling/reusing.

Increased textile consumption due to improvements in the world population and improvements in living standards along with the environmental effects of the textile, require the improvement of the environmental performance of this industry. In this sense, the concept of sustainability has become a matter of concern in the textile sector.

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## **Corresponding Address-**

Sanjeev Kumar Sahni

Department of Textile Technology

Jawaharlal Nehru Govt. Engg. College Sunder-Nagar Himachal Pradesh India

Pin: 175018

E-mail: [sksanjeevkumar7070@gmail.com](mailto:sksanjeevkumar7070@gmail.com)

Mobile No.: +91 98177-77919