Indian Textile Industry and Its Impact on the Environment and Health: A Review

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ABSTRACT

Continuous development and automation has improved the production of Indian textile industry. As a result, more and more raw materials demands have adversely affect the environment. In this study the effects of Indian textile industry on environment and human health are reviewed and concluded that textile mechanical process mainly affects the environment of the workplace by the way of producing heavy noise and cotton dust. While fiber formation and chemical processing has vast negative impact on outside world that pollutes land, water, air and emits hazardous byproduct which indirectly promotes acid rain and global warming.

KEYWORDS

Chemical Processing of Textiles, Environmental Pollution, Fabric Formation, Fiber Production, Sustainability, Yarn Formation

INTRODUCTION

The textile industry, as a part of manufacturing sector has been one of the important sectors to contribute towards country’s economy. It contributes 14% to the industrial production, 3% to the gross domestic production, 8% to the total excise revenue collection, 17% to the country’s export earnings and most importantly it provides direct employment to over 35 million people in India (The Manufacturing Plan, 2015; Textile and Jute Industry, 2015). Today textile industry has been globalized and to sustain in the global market overall growth of the Indian textile sector becomes factor of utmost importance. However, the growth should not be in the expense of environmental degradation. The environmental sustainability will need to be factored into India’s textile manufacturing growth plans.

The growth of textile sectors is enabled and facilitated by increasing use of material leading to manifold impacts on the environment (The Manufacturing Plan, 2015). The environmental degradation by way of pollution of land, air, and water occurs during the procurement and use of natural resources, industrial processes and activities, and the product use and disposal. So, the objective of this study is to investigate the impact of Indian textile industry on the environment and human health. In the present study, an extensive review of literature has been carried out to find out the environment and health impact of Indian textile industry.

IMPACT OF FIBER FORMATION

In textile industry, fibers used are mainly of two types i.e. natural and manmade. Natural fibers are cultivated naturally and manmade fiber, marketed as synthetic fiber, are regenerated from natural resources or produced from chemicals.
Natural Fiber Production

The cotton fiber which has the largest share in Indian textile industry is considered to be renewable, biodegradable and environment friendly and has significant advantage throughout its life cycle (About Cotton Sustainability, 2015; Myers & Stolton, 1999). But the cultivation of natural fibre stresses heavy consumption of fertilizer, pesticide and fungicide. The study has revealed that cotton cultivation consumes only 3% of world’s farmland but uses about 25% of the total world’s pesticide (Yates, 1994; Lee, 2014; Ballikar, 2013; bex, 2012; Textiles, Leathers and the Environment, 2015; Cotton and the Environment, 2015; Kumar, 2015). Further, to prevent stain on cotton fiber, several deadly chemicals like defoliants have been used to the cotton plant before harvesting to remove the leaves from the plant (Saunders & Grayson, 1984). Previous study found that roughly 65% of the chemicals were insecticides, 20% were herbicides and 14% were defoliants and growth regulators, while fungicides and others comprise only 1% of the total toxic chemical (Kumar, 2015). Same study concludes that amount of cotton fiber required for making a T-shirt and a pair of jeans consumes over 0.5 kg of toxic chemical. The water required for irrigation during cotton cultivation exceeds profusely for same amount of synthetic fiber production (Bex, 2012). This presents that cotton cultivation destroys natural resources by intoxicating water and exhorting toxic chemicals in the environments that unconditionally deduce cotton firming as the dirtiest and environment unfriendly cropping in the world (Yates, 1994; Lee, 2014; Ballikar, 2013; bex, 2012; Textiles, Leathers and the Environment, 2015; Cotton and the Environment, 2015; Kumar, 2015).

Environmental and Health Effect

Application of fertilizer, herbicides, pesticides and other chemicals in the cotton fiber cultivation leads to emission of carbon dioxide (CO₂) and sulfur dioxide (SO₂) higher than polyester fiber production (Rana, Pichandi, Parveen & Fangueiro, 2014). It is well known that carbon dioxide is the primary greenhouse gas and responsible for global warming whereas sulfur dioxide is the major precursor of acid rain which acidifies soil, water and air. Again oil extracted from cotton seeds often used in daily house-hold cooking contain chemicals that is some far from benign (Imhoff, 1999) and poisons over 25 million people every year, creating severe health problems (Kumar, 2015; Myers & Stolton, 1999).

Remedies

Recently efforts have been made to find substitutes for conventional cotton cultivation for avoiding the use of precarious chemicals. Nonconventional cotton, marketed as naturally colored cotton, green cotton and organic cotton, which is grown without use of heavy water, fertilizers, pesticides and other chemicals, may be the substitute for conventional cotton. Further processing of these fibers would demand less or no chemicals for dyeing and finishing (Robbins, 1994; Page, 1999; Kadolph, 2007). Transgenic cotton (modern technology generated cotton), which is less prone to any insect and fungal attack, may be another option for environment friendly production of cotton (Myers & Stolton, 1999).

Synthetic Fiber Production

Nylon and polyester, mostly used textile fiber after cotton in India, synthesized from polyester byproduct (Lewin & Pearce, 1998). There is a common perception that they are hazardous to the earth as well as the human life although none of them contains any unsafe compound however, their production leads to release nitrous oxide including acidic gases such as hydrogen chloride (Hannah, 2011; Sabita & Tripathi, 2014; Textile World News, 1991; Science News, 1991). In a study, conducted by Science News (1991), it was proved that annual increment of nitrous oxide in the atmosphere was 0.2% and one tenth of 0.2% comes from mass production of nylon and polyesters. This amount was very large because the atmospheric lifetime of nitrous oxide is 150 years.
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