

# An Analysis of the Corporate Managers Awareness towards the Environment Sustainability in Apparel Industry

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**Abstract**—This paper focuses on Sri Lankan apparel manufacturing industry in relation to Global Warming by reviewing the industry contribution to increasing levels of atmospheric Carbon Dioxide (CO<sub>2</sub>) which is the governing factor in global warming. The ultimate objective of this study is to review the Apparel sector organizations in Sri Lanka to determine the extent of fossil fuel burning the sector is responsible and the pragmatic carbon offsetting steps taken by the organizations with commitment. The findings reveal the extent to which the fossil fuel burning is effected and the attitude of the corporate sector in pursuing avenues to reduce the use of fossil fuel. It highlighted that there is indeed a relationship between carbon emission and the burning of fossil fuel used in the generation of electricity. It was also revealed that in order to control the emissions effectively the awareness at corporate level was inadequate. Further, this paper attempts to develop a model of the effect of greenhouse gas in relation to carbon off-setting and carbon neutrality levels. Currently there are around 270 apparel factories in Sri Lanka and 50 apparel companies were selected.

**Index Terms**—apparel industry, global warming, carbon off setting, fossil fuel, carbon neutrality

## I. INTRODUCTION

Businesses are always under competitive pressure catering to a changing market place. The market is global thus competition is in global. In present day manufacturing context where all businesses are facing equal competition only the most efficient will survive. It is encouraging to note that, today most businesses have begun to focus their attention on Global warming, climate change and energy consumption because which are the focal points in ecologically sustainable businesses. In early years of human existence there has always been a strong bond between human life and earth and its environs. With the industrial revolution this balance of mankind and environment started to crack showing

disrespect to long term damage caused by our own selfish acts. However, the detrimental effect of this action of man has now begun to show up in human life with increasing health issues and in the environment, through climate change issues. A desperate attempt to arrest this situation is being pursued now by organizations through green and eco – friendly manufacturing techniques. For the past decade an increasing number of Apparel and Textile companies around the world have turned their attention to environmental sustainability. Many of the world's leading industries have taken a harsh look at the environmental impact originating from their individual operations and have set themselves challenging targets to eliminate or to minimize the damage done in long term perspective.

Textile and Apparel sector is one of the energy intensive sectors of the Sri-Lanka. Today the pressure to reduce energy consumption will come from the twin drivers of reducing fossil fuel burning which effect to reduce carbon emission and cost competitiveness. Because energy is required for raw material production, cloth manufacturing, services, heating, lighting, ventilation, transportation and cleaning. As far as apparel sector energy consumption within the corporate boundaries is around 10% from the total cost. Apparel sector consume energy from several sources, electricity is the core energy in equipping this sector. Under the World Trade Organization (WTO), which need to comply with that all textile and clothing products with local and international environmental standards? Therefore Sri-Lankan textile and clothing industry is focusing to comply with these standards to accept their products in international markets. Therefore stake holders in local or international should be responsible to improve the environmental performance of the industry. Finding a carbon emission create by entire life cycle is a task and require more details, Therefore this research attempts to find out amount of green house gas emission and carbon off setting program within the corporate boundaries in textile and apparel manufacturing in Sri-Lanka.

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Global warming has become familiar to many people as one of the most important environmental issues of our times. These activities are currently leading to the release of about 7 billion tons of carbon as carbon dioxide into the atmosphere annually. This paper attempts to highlight and educate all stakeholders of this aspect of the industry, ever so important indeed for the entire country and the nation, having achieved the topmost position of its economy. Today's garment factories no longer look like traditional factories with high walls and large roofs and a tall chimney emitting black smoke to broadcast to the people near and far that there is a factory in the vicinity. Eco Friendly concepts have been incorporated to the architecture with modern designs like soothing pastel colours, more open spaces to invite fresh air, clean and hygienic work places and rest areas for employees and beautifully laid out gardens, so much so, that one can mistakenly identify a modern garment factory today to a star class hotel. What is more important is how this conceptual change has changed the employee perception and the society as a whole.

Over the past decade an increasing number of companies around the world have been turning their attention towards environmental sustainability issues of its operations. The Textile and Apparel industry of Sri Lanka, in long term perspective, has set them a challenging task to minimize the environmental damage originating from the industry. Today, the businesses are faced with the difficult task of having to cater to a changing market amidst tough competition under uncertain economic climate. Manufacturers supplying apparel products to a sophisticated and demanding global market are now looking to achieve the competitive edge by adding value to the product through compliances, Corporate Social Responsibility (CSR) activity and also by adhering to Green concept processing techniques.

#### A. Textile and Apparel Industry

The most striking point is that it confirms that Sri Lanka no longer depends on Tea, Rubber & Coconut, and the islands three traditional exports that has been the case for hundreds of years in the past. Agricultural exports today account for only one third of the Industrial exports. Textiles and Garments have accounted for a stunning 40% of the total exports thereby occupying the leadership of the country's export sector. Globally textile and apparel industry employs more than 25 million people. The annual world demand for textile and cloths is approximately 1.3 trillion US Dollars. When considering the entire life cycle assessment or the product life cycle assessment of this industry, crude oil is used in all stages like the manufacture of raw material and synthetic fiber, the weaving and garment stitching process, transportation, user phase and the disposal phase. Crude oil being a unsustainable material ends up effecting the eco system badly impacting heavily on the environment. Important and encouraging feature of the industry today is its commitment and dedication towards steps taken to mitigate environment pollution that naturally emerge from industrialization. Today the impact that Textile and Clothing industry makes on the environment and the

whole society makes environment related aspects like life cycle, water pollution, high energy usage, solid waste disposal and effluent treatment even more important than before.

Understanding of global warming and corporate sector attitude towards offsetting of emissions and focusing towards Sustainability is essential for a business to predict the future of the Organization. Proactive investigation and anticipatory approach by the corporate level members in apparel sector organizations have to be encouraged to protect the society and the environment in future. Therefore Impact of Green House Gas emission so important on Corporate Climate Change Policies in Apparel sector Organizations. Today the pressure to reduce energy consumption will come from the twin drivers of reducing fossil fuel burn that helps to reduce carbon emission and to be cost competitiveness. As 10% of the total cost of the industry is dependent on consumption of energy, stake holders locally and internationally should make a conscious effort to improve the environmental performance by way of reducing energy usage.

Global warming has become familiar to many people as one of the most important environmental issues of our time. The accumulation of carbon emission in the environment is recognized as a major contributor to the problem of Global warming caused by greenhouse gas effect. Adaptation of green management practices and carbon initiatives required for off-setting as part of an Organization policy that helps to develop major strategies is likely to carry on well into the 21<sup>st</sup> century. The objective of this study is to answer the following Questions, What is the Corporate Sector attitude towards emission reduction in Apparel Sector Organization in Sri-Lanka? And what is the corporate sector awareness towards energy (electricity) reduction for minimizing fossil fuel burning? , Is so important.

## II. LITERATURE REVIEW

An extensive literature review was carried out to identify the effects of fossil fuel burning and its adverse input towards increasing carbon emission, Life Cycle Assessment in products, climate change and green house gas effect in Apparel sector Organization in Sri -Lanka. Since the industrial revolution, the burning of Fossil fuels could be the major contributor to increasing carbon dioxide in the atmosphere from 280ppm to 390ppm. The climate globally is constantly undergoing changes due to a variety of factors [1].

The rise in sea level, increased acidification of the ocean and irreversible dry-season rainfall reduction in several regions are the other illustrative impacts of emissions. Scientists predict that over the present century a rise of carbon dioxide concentrations from the current levels of about 385 parts per million by volume (ppmv) to a peak of 450-600 ppmv over the present century. There has been anthropogenic global warming of 0.58C over the past century, mostly after 1980 and a rise of 1.4-5.88C has been predicted over the present century [2]. Owing to the thermal expansion of the warming ocean alone, global

average sea level may irreversibly rise at least 0.4-1.0 m, if concentrations exceed 600 ppmv and 0.6-1.9m if it exceeds 1,000 ppmv. Though the necessary nature of the link between economic growth and energy use or between energy use and emissions is still being researched, it is well recognized that most scientists consider it likely that if the atmospheric concentrations of carbon dioxide (CO<sub>2</sub>) and other so-called greenhouse gases continue to rise, the earth's climate will become warmer. Accordingly, climate change analyses necessarily involve emissions forecasts spanning several decades and often a century or more. The Intergovernmental Panel on Climate Change (IPCC) was established in 1988 to inform international negotiations on climate change.

Other than emissions changes in the earth's orbit is another factor for climate change. Everything appeared quite normal up until about 1950 where instead of following the cycle of upward and downward trends, the levels increased beyond any point in history and continued upward. April 2010 (set) yet another record of atmospheric CO<sub>2</sub> at 392 ppm was recorded. Carbon dioxide is a naturally occurring gas, a by-product of burning fossil fuels and biomass and a result of land-use changes and other industrial processes. It is the principal anthropogenic gas that is thought to affect the Earth's radioactive balance [2].

Green house gases in the upper atmosphere are leading to changes in climate, and also the temperature of the earth surface. As the global temperature rises by, with considering to above mentioned fact the economical and ecological requirements vary by the region. Cotton trees are known to function as natural spongers for absorbing carbon dioxide from the surrounding. The most important factor is carbon dioxide sequestration in soil. Carbon dioxide is a naturally occurring gas, a by-product of burning fossil fuels and biomass and a result of land-use changes and other industrial processes. It is the principal anthropogenic gas that is thought to affect the Earth's radiative balance [2].

Life cycle management improves the performance and efficiency of operations, enhances stake holder's relationships, strengthen corporate credibility and enhance share holders values [3]. If any type of Organization should need to improve their product which they can introduce Life Cycle Management for businesses to enhance sustainability performance in their supply value chain [4].

Carbon footprint' is a term used to describe the amount of greenhouse gas (GHG) emissions caused by a particular activity or entity, and thus a way for organizations and individuals to assess their contribution to climate change. Understanding these emissions, and where they come from, is necessary in order to reduce them. In the past, companies wanting to measure their carbon footprints have focused on their own emissions, but now they are increasingly concerned with emissions across their entire supply chain. Supply chain GHG emissions, which include those associated with processes not controlled by the company itself, can be measured at

either the company level or the level of an individual product [5]. Measuring the carbon footprint of products across their full life cycle is a powerful way for companies to collect the information they need.

The major environmental impacts of the sector today arise from the use of huge energy consumption and toxic chemicals: The sector's contribution to climate change is dominated by the requirement for burning fossil fuel to create electricity for heating water and air in laundering. Toxic chemicals are used widely in cotton agriculture and in many manufacturing stages such as pre-treatment, dyeing and printing. Waste volumes from the sector are high and growing in UK consumers send 30kg of clothing and textiles per capita to landfill each year [6]. Especially take into consideration of life cycle approach the extensive use of water in cotton crop cultivation – can also be a major environmental issue as seen dramatically in the Aral Sea region.

This paper emphasizes the need for Apparel organizations to think beyond the corporate boundaries and involve to protect the environment by minimizing green house gas emission. In this context industry should not only focus on operational level emissions but think beyond to offer the society products that are enriched with true green concepts. To name a few are especially designed green factory buildings, water conservation projects, green supply chain etc. If the industry can develop and promote organically grown cotton to replace part of conventional cotton used, it will help to protect the soil from being contaminated with harmful artificial fertilizers and pesticides and preserve the existing soil as living organisms that will result in healthy plant propagation and also not pollute the natural water table [7]. For a long time environmentalist, scientist and weather forecasters has evidenced this harmful accumulation on earth surface.

McKinsey Q. (2007) stressed that but so will a more systematic approach that brings "creative destruction" to clear away market barriers and to put a price on carbon. Companies must consider their strategic options regarding climate change under the increasing pressure of the Kyoto Protocol, which came into effected in 2005. Since then, a number of businesses have adopted a more constructive stance that acknowledges the reality of climate change and their responsibility for addressing the issue [8]. McKinsey Quarterly (2007) survey of more 2,000 executives paid special attention to the gap between high levels of corporate awareness and limited actions. This gap implies that the core business case for action is weaker than claimed by the respondents. Notably, 70 percent of executives see climate change as important in corporate reputation and brand management, but relatively few companies appear to be translating the importance they place on climate change into corporate action. In addition, 51 percent of executives based in North America considered the issue of climate change in corporate strategy to be very or somewhat important, whereas the corresponding statistics for European executives was 65 percent [8].

Today fashions are growing more rapidly than ever before. We are buying clothes more and more. Our clothes are getting cheaper, at the same time we are buying clothes more rapidly and we're buying more of them, at the same time greenhouse effect is becoming more threatening and the Sri-Lanka is facing a crisis in disposing of its waste. Fig. 1 illustrates the energy usage and Green House Gas emission in clothes. High energy consumption and Green house gas effect happen at the user phase.

A. Conceptual Frame Work

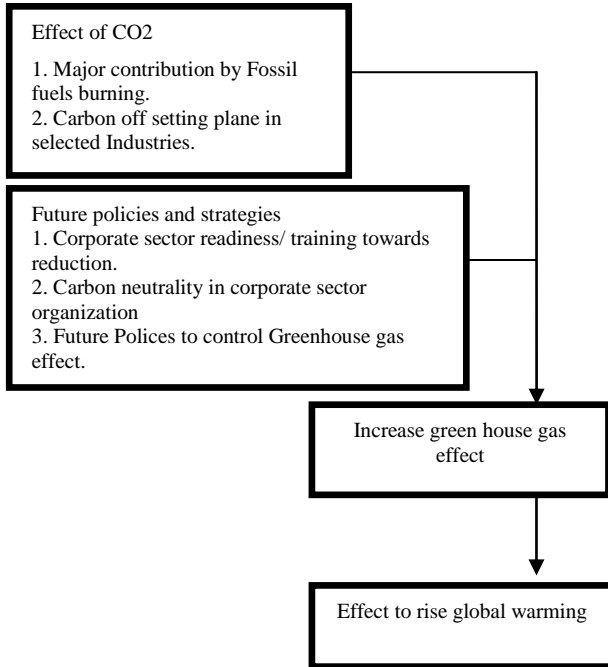


Figure 1. Conceptual Frame Work

The results of the present study provide some valuable information that could be used for successful implementation of any environment friendly (Green) industry. The research includes the testing and hypothesis. The above conceptual frame work was created based on the research objectives and the problem statement. There are five independent variables:

- Major contribution through the burning of Fossil fuel.
- Carbon off setting plan of selected Industries.
- Corporate sector readiness/ training towards reduction.
- Carbon neutrality in corporate sector organizations
- Future Polices to control Greenhouse gas effect.

The above five variables directly contributes to research problem. It creates the phenomenon of Global warming. Researcher considers global warming as the Dependent variable. The above are clearly mentioned in the conceptual frame work as independent and dependent variables.

Through this paper the researcher stresses that point 1 and 3 as the most critical and key factors that take place in practical phenomenon and discuss which are in the analysis.

III. METHODOLOGY

A comprehensive literature review was carried to identify the factors that have given prominence for carbon emission. Detailed discussions and interviews were carried out with the experts in the industry to gather their views to identify and verify the factors identified. In the first step, questionnaires, interviews, emails, observational studies and literature were used as data sources. Questionnaires were filled by executives, managers and directors of apparel industries who were responsible for sustainability development projects and environmental related activities of their respective organizations. The feedback on the questionnaires was obtained through email or by visiting the company. The interviews were conducted when the companies were visited and sometimes there were possibilities for observational study as well. The results from this methodology of study helped to gain an overall understanding about carbon emission and carbon off setting activities of the apparel industry. Currently there are around 270 apparel factories in Sri Lanka Therefore there is no reliable evidence on the current population size of the apparel factories in Sri Lanka. Among the ones in operation a sample of 50 apparel companies was selected representing various types of garments being manufactured and in different geographical areas. Collections of returns were completed in June 2013. Total 50 questioners were distributed among each industry out of which 40 valid questionnaires were returned (see Table I).

TABLE I. RESEARCH SAMPLE AND COLLECTED VALID QUESTIONERS

Type of the Sector	Issued	Issued Companies	Valid Questioners
	Sub companies	Questioners	
1.Hirdramany Group	23	8	5
2.Brandix	40	10	5
3.MAS	26	10	6
4.Hela Clothing	6	3	3
5.Orite Apparels	12	5	3
6.Eveden Timex	1	1	1
7.Concord Apparel	4	2	1
8.Jacqueline Clothing	1	1	1
9.Textured Jersey	1	10	5
10.GP Garments	1	1	1
11.YKK	1	5	1
12.Gethma Apparel	3	3	2
13.Cludia International	1	1	1
14.JJ Mills	3	2	2
15.Bam Holdings	3	3	3
Total	126	64	40

IV. DISCUSSIONS

In this Analysis a total of 40 usable samples were obtained. This sample consists of Extra Large, Large and Medium size Organizations with mix of Combination. This implies that the respondents represent the whole view of Apparel sector. Return from the research reveal

that in Table II is arranged according to the Mean values from maximum to minimum questions asked on the subject of corporate sector readiness towards emission reduction.

TABLE II. DESCRIPTIVE STATISTICS FOR CORPORATE SECTOR ATTITUDES FOR EMISSION REDUCTION

Description	N	Min	Max	Mean	Std.
Big challenge in future	40	3	5	4.60	1.062
Go green is the new trend	40	3	5	4.40	0.744
Adverse effects of emission	40	1	5	4.30	1.091
Sufficient amount of money for training	40	1	5	3.43	1.174
Relationship between carbon emission and global warming	40	1	5	3.35	1.189
Top management is not interested	40	1	5	2.28	1.552
Carbon foot print	40	1	5	2.18	1.318
Attitude towards carbon emission	40	1	5	2.00	1.062
Valid N	40				

According to that arrangement, it clearly mentions that three factors which highly effect to green house gas emission in Apparel Organization. Mean 4.6, "big challenge in future" that's indicate all respondents fluctuate within agreed and strongly agreed levels. Standard deviation of 0.632 is also clearly explained that all respondents' ideas fluctuate within very close tolerance. According to above figure, Sample responses vary among 3.97 to 5.22. That's indicate that All respondents attitudes towards "Big challenge" is a positive one, that's mean all agreed Impact of Green house gas emission will be a big problem in future. The second highest mean is 4.40 which indicate the "go green is the new trend". Which also foaling within the Agreed and strongly agreed level. Standard deviation 0.744 is also clearly explained that all respondents' ideas fluctuate within very close tolerance. According to above figure, Sample responses vary among 3.656 to 5.144. That's indicate that All respondents attitudes towards "Go Green" is a positive one, that's mean all agreed to statement of Go Green is a new trend in businesses and 85% of respondent fall within -agrees and strongly agrees levels. Third highest is 4.33, it comes under the "adverse effect of green house gas" of green house gas emissions. This is foaling within the Agreed and strongly agreed level. Standard deviation 1.091 is also clearly explained that all respondents' ideas fluctuate within very close tolerance

According to first row in Table II it depicts the mean, Standard deviation, and min max values on the subject of "Adverse effect of emission". According to above figure, Sample responses vary among 3.20 to 5.391. That's

indicate that All respondents attitudes towards "Adverse effect of Green house gas emission" is a positive one, that's mean all agreed to statement of Adverse effect of green house gas emission. According to Table I it shows mean value 2.00 (minimum) on the subject of Attitudes towards carbon emission. This is foaling within the Disagreed level of scale. Standard deviation 1.062 is also clearly explained that all respondents' ideas fluctuate within very broad tolerance. Large standard deviation indicates the wide range of Ideas in different levels by respondent. This indicates that the fourth highest mean is 3.43 which indicate the "sufficient amount of money for training". This is foaling within the Agreed and strongly agreed level. Standard deviation 1.174 is also clearly explained that all respondents' ideas fluctuate within considerable tolerance. According to first row in Table II it depicts the mean, Standard deviation, and min max values on the subject of "Sufficient amount of money for training". According to above figure, Sample responses vary among 2.256 to 4.6. That's indicate that All respondents attitudes towards "Sufficient amount for training" is fluctuating in a broad range. The fifth highest mean is 3.350 which indicate the "relationship between green house gas and global warming". Which also foaling within the Agreed and strongly agreed level. Standard deviation 1.189 is also clearly explained that all respondents' ideas fluctuate within considerable tolerance. The sixth highest mean is 2.28 which indicate the "top management is not interested". Which also foaling within the Agreed and strongly agreed level. Standard deviation 1.552 is also clearly explained that all respondents' ideas fluctuate within considerable broad tolerance. The seventh highest mean is 2.21 which indicate the "I do not know anything about carbon foot print". Which also foaling within the Agreed and strongly agreed level. Standard deviation 1.318 is also clearly explained that all respondents' ideas fluctuate within a broad range. The eighth highest mean is 2.00 which indicate the "attitudes towards carbon emission". This also is foaling within the Disagreed and strongly Disagreed level. Standard deviation 1.062 is also clearly explained that all respondents' ideas fluctuate within a broad range.

#### A. Findings

##### 1) Corporate sector readiness (Training) towards carbon emission

A one way ANOVA was conducted to check whether there is a significant relation between corporate sectors readiness to training and green house gas emission. The omnibus *F*-test revealed a significant effect of group,  $F(12, 27) = 0.668$   $p = 0.766$  There are significant differences among the Corporate Sector readiness (Training) and Green house gas emission effect, at significance level 0.05. Typically, when a  $p = 0.766$  ( $p > 0.05$ ), fail to reject the null hypothesis, and instead conclude that the differences or relationships being studied are not statistically significant. That's mean there is a significant difference between, Corporate Sector readiness and Green house gas emission effect in Selected Apparel sector organizations.

## 2) *Burning fossil fuel for generating electricity*

A one way ANOVA was conducted to check whether there is a significant relation between fossil fuel burning and green house gas emission. The omnibus *F*-test revealed a significant effect of group,  $F(8, 31) = 2.284$ ,  $p = 0.047$ . There are significant differences among the Burning fossil fuel to generating electricity and Green house gas emission effect, At significance level 0.05. Typically, when a  $p=0.047$  ( $p<0.05$ ), Have a statistical evidence to accept the null hypothesis, and instead conclude that the differences or relationships being studied are statistically significant. That's mean there is a significant difference between *Burning fossil fuel* for generating electricity and Green House gas effect in Selected Apparel sector organizations.

## V. CONCLUSION AND FURTHER STUDIES

Furnace Oil is a non renewable resource used in generating electricity. The better renewable resource for electricity generation is through hydropower which is limited and weather dependant and therefore cannot be totally relied on. The combustion of furnace oil also contributes to increase the global carbon dioxide levels and a possible greenhouse effect which may lead to higher ocean levels and the loss of global land mass. In the Apparel Industry, electricity is used mainly for lighting, running of motors and air conditioning. More than the garments stitching process electricity is used in the production of its raw material, the textile and fabrics and therefore the manufacturing process of fabric should not be isolated when looking at apparel sector influence on GHG emissions. It is encouraging to note the recognition and preference given by the buyers to factories who make a conscious effort to reduce the use of electricity. Thuruliya factory of MAS group, Brandix green plant at Seeduwa, and Mihila under Hydramani are good examples for future following. As most global apparel factories are now located in tropical countries like Sri Lanka, Bangladesh, India, Indonesia, who are blessed with natural sun light, the proper designing of the factories commonly known now as green buildings make a major impact in the use of electricity for lighting and air conditioning. It is rather discouraging to note the slow pace of technological development of solar power which could have been a good alternative to furnace oil. Most employees are conscious of the cost of electricity only as a factor to reduce manufacturing cost to overcome stiff competition amongst factories and countries but not as a factor to improve environmental effect through the reduction of GHG. Though the apparel industry attach a lot of importance to employee training the attention given to propagate the knowledge about GHG effect is inadequate.

### A. *Short Term Recommendation*

#### 1) *Burning fossil fuel to generate electricity in apparel sector organization in sri-lanka and corporate sector awareness towards greenhouse gas*

As a short term strategy the industry must look at ways to reduce the consumption of Electricity within its own

factory premises. Sri Lanka is blessed with natural sun light all throughout the year and therefore for lighting all efforts must be directed at using natural day light during the day. Properly designed roofs that will allow sufficient lighting to work areas shall be a good simple start. Replacing the conventional bulbs with CFL bulbs and the use of proper reflectors to direct the light to the required point can be used in this exercise. Where air conditioners are used proper sealing of doors and windows and isolation on the roof will give good results. When not in full production planning production avoiding the peak hours where tariff charges are high could give good results.

An aggressive drive to educate all levels of employees through In house awareness programs must be initiated immediately. With current weather related disturbances experienced most people will be more interested in looking at this aspect of life more keenly than before. Therefore this will be an ideal time to disseminate the message among the masses in an organization.

As of anything to happen there must be a leader. Therefore every organization must appoint a CHAMPION to provide leadership to this program. It is encouraging to note that some companies have already appointed dedicated persons and such efforts have already shown good results. A mature person who has commanded a lot of respect during his long tenure in the company who is now to retire soon or already retired will be a good person to drive this program to success. Conducting poster competition among employees and their children perhaps can also be good strategy to awaken all to contribute to this good cause.

### B. *Long Term Recommendation*

#### 1) *Long term recommendation will cover the common objectives of cooperate managers awareness towards the environmental sustainability in apparel industry.*

For a long lasting discipline to embrace our lives it must start at a young age and therefore the companies who are affected must lobby to the Government to introduce the teaching of GHC effects in our lives as part of curriculum of primary school. If so by the time the young reach working age they will be fully aware and will know the repercussions that will follow.

At government level promotion and compelling of all people to grow more trees must be brought about through legislation.

Government must enforce strict regulations against cutting of trees. This can be done by tightening rules and regulations of the goods manufactured using wood as the base. Eg: reduce the use of paper/ every inch of wood used in the building of the Olympic stadium in the UK had to have FSC certificate.

Compel industries that contribute heavily to GHC to get linked to carbon free organizations.

Government must introduce certain regulations in the building approvals to compel new builders to abide to minimum eco friendly (Green buildings) designs to maximize the use of natural light and reduce the use of electricity.

Government must offer incentives like tax reductions to industries to upgrade their obsolete machines that consume more electricity.

Encourage the use of solar power wherever possible. At government level incentives must be offered to all industries including apparel to use solar power. Eg: pre heat water through solar trough technology to lessen the burning of furnace oil in the boiler.

Compel industries to get involved in plantation projects by offering state land free on long lease (99 years) that are not cultivated presently. Eg: grow rubber which is a Forest Cover tree in Moneragala & East districts. This will help such industries to negate their carbon foot print.

Some countries have indeed taken bold decisions like *Bike day* and so on to reduce the use of oil. Taking that as an example the apparel sector in Sri Lanka can set an example for the entire country by implementing a similar program like a *bike day / walk to work* for their employees. No doubt this will make a huge impact in the reduction of oil and more importantly will help to get the important message across to its employees.

*Eco city / Eco export processing zones* are further new ideas that already other countries have begun. Why not a dedicated zone for apparel, – *Eco apparel processing zones* that will have tree lined walk ways, open buildings, mini hydro power plant, and no vehicle allowed use roads etc. Eg: MASDAR CITY near Abu Dhabi in the UAE an ECO CITY expected to complete by 2025 that will have 50,000 inhabitants living in a complete carbon free environment.

### C. Further Studies

The researcher is indeed happy to have had that the opportunity to involve in this topic and believe that no other researchers have undertaken such a study previously. This paper is based on a research carried out research for the apparel sector Organization in Sri-Lanka. Researcher strongly believe that research dedicated to a particular sector shall encourage further researchers to carry out similar research for other important sectors in determining the impact of green house gas emissions of their respective operations. Would also like to place or record that to derive the fullest benefit out of my research

this study must be extended to cover the apparel sector organization in the whole of Asian region.

### REFERENCES

- [1] J. Manuel, P. Lorenzo, and L. R. Guez, "Factors influencing the disclosure of greenhouse gas emissions in companies worldwide," *Management Decision*, vol. 47, pp. 1133-1157, 2009.
- [2] IPCC. (2007). Climate Change: Synthesis Report for Fourth Assessment Report. London. [Online]. Available: [http://www.ipcc.ch/publications\\_and\\_data/publications\\_and\\_data\\_reports.shtml](http://www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml)
- [3] O. J. Hanssen, "Environmental impacts of product systems in a life cycle perspective," *Journal of Cleaner Production*, vol. 6, pp. 299-311, 1998.
- [4] Q. Zhu, J. J Sarkis, and K. H Lai, "Confirmation of a measurement model for green supply chain management practices implementation," *International Journal of Production Economics*, vol. 111, pp. 261-73, 2008.
- [5] D. Cormier, M. Magnan, and B. Van Velthoven, "Environmental disclosure quality," *European Accounting Review*, vol. 34, pp. 3-39, 2005.
- [6] H. L. Maclean and L. B. Lave, "A life-cycle model of an automobile," *Environmental Science & Technology*, vol. 32, pp. 322A-330A, 1998.
- [7] K. T. Trotma and G. W. Bradley, "Associations between social responsibility disclosure and characteristics of companies," *Accounting, Organizations and Society*, vol. 6, pp. 355-362, 1981.
- [8] Q. McKinsey, *Industrial Management & Data Systems*, vol. 111, pp. 961-978, 2011.



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She is employed in privet sector Organization as a Manager Research and Development. Latex Green manufactures Mattresses, Pillows & other bedding products in a factory located in a dedicated Export processing Zone. The company is world renowned as a manufacturer of bedding products using only Natural Rubber Latex. Almost many projects and research she handled wish to place emphasis on the following which were initiated by her that added so much value to the company.  
Initiated the establishment of GOLS standard (Global Organic Latex Standard) working with control union, a Dutch certified company.  
Initiated and played the main roll in obtaining the credential for Latex Green as the WORLDS FIRST COMPANY to be certified under GOLS.  
Introduce Organic Latex mattress to the international market.  
Presently doing the research of Life Cycle Analysis of Natural latex Mattress.