

A Study on Cruelty Faced by Silkworms in the Production of Silk

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Abstract: *Silk is the fiber that silkworms weave to make their cocoons which are the outer casings that protect them during the pupal stage. But most of the insects used by the silk industry don't live past this stage, because they are boiled or gassed alive inside their cocoons, which causes the cocoons to begin unraveling so that workers can obtain the silk threads. Some 6,600 silkworms are killed to make just 1 kilogram of silk. The CSB (Amendment) Act, Rules and Regulations have been notified by the Govt. of India to bring quality standards in silkworm seed production. The objective of the research is to create awareness on the cruelty faced by silkworms in the production of silk. The research method used is empirical research and simple random sampling method is used and the sample size is 200 responses and the sample frame is in and around Valluvar kottam. The independent variables are age, gender, education qualifications, occupation and locality. The alternative to this cruel practice is to use another method of obtaining silk called ahimsa silk or wild silk, it is a method of nonviolent silk breeding and harvesting. Wild silk moths are bred, rather than the domestic variety. Roughly 3,000 silkworms are killed to make a single pound of silk. That means that billions, if not trillions, of them are killed for this every year. In order to avoid this practice of killing silkworms we should use an alternative type of fabric or use wild silk.*

Keywords: Silkworms, ahimsa silk, weave, cocoon, fabric

I. INTRODUCTION

Sericulture, or silk farming, is the cultivation of silkworms to produce silk. Sericulture is mainly practiced in states such as Karnataka, Andhra Pradesh, Assam and Bodoland (Kokrajhar, Chirang, Baksa and Udalguri districts of Assam), West Bengal, Jharkhand and Tamil Nadu who are the major silk producing states in the country. Central silk board has been implementing a restructured Central Sector Scheme -Silk Samagra for development of sericulture in the Country, which mainly focuses on improving quality and productivity of domestic silk thereby reducing the country's dependence on imported silk. The CSB (Amendment) Act, Rules and Regulations have been notified by the Govt. of India to bring quality standards in silkworm seed production. Silk isn't the most animal-friendly textile. It's a luxury fabric and one of the most expensive in the world. But the silk industry is as exploitative and cruel today as it was centuries ago. Silk is still considered one of the finest fibers in fashion worldwide. The most expensive silk is mulberry silk, made from the cocoon of caterpillars that eat mulberry leaves over several weeks in their pupal stage. Silk production truly is to these sensitive animals. Silk is widely used in the textile and apparel industry to make garments, accessories, bedding, upholstery, and other household textiles. It has been a luxury and one of the finest fibers in the fashion world for thousands of years. The silk fiber is a versatile and smooth animal-derived product. Many clothing designers and fashion brands use silk to make lingerie, loungewear, sleepwear, shirts, dresses, blouses, suits, and more. Silk fibers come from several insects called silkworms. Most of the time, the silk of moth caterpillars is used for textile manufacturing. Other animals such as leafhoppers, flies, ants, wasps, bees, beetles, and spiders can also produce silk. Silk farmers feed caterpillars mulberry leaves to make cocoons over several weeks. More than 5,000 silkworms are necessary to produce just one kilogram of silk. It takes up to 2,000 cocoons to make a silk dress. Silk is made by spinning and weaving the cocoon fibers, the long threads that make up the inner structure constructed by larvae to protect themselves during the pupal stage. Cocooning begins in as little as 28 days from the time the silkworm eggs are

hatched, which generally takes between one or two weeks. In nature just like many other moths, silkworms go through the same steps of metamorphosis: egg, larval, pupal, and adult. In the silk industry, however, silkworms don't go past the pupal stage. Instead, they are killed by being placed in boiling water to preserve the cocoons' value, thread length, and quality. Silk production is very cruel to animals as it destroys hundreds of thousands of sensitive silkworms every year to harvest silk from their cocoons. They are killed in boiling water during their pupal stage to preserve material quality, thread length, and value. There is a lot of cruelty going on in the fashion industry. Silkworms eat the leaves from mulberry plants that require pesticides and fertilizers to grow. They are very hazardous if released untreated into the nearby environment. They pollute the air, soils, water sources, endangering ecosystems, and human health. There is another way to harvest silk without harming or killing silkworms. This method was developed in India, and it produces what's known as ahimsa silk. Sometimes it's referred to as ethical silk, peace silk or cruelty-free silk. Although ahimsa silk production includes many of the traditional sericulture practices, harvesting doesn't involve killing the worms. Instead, the worms are allowed to hatch from their cocoon, or sometimes the cocoons are cut open and the pupae is tipped out.

All animals deserve compassionate treatment, even insects. No animal should have to suffer to make beautiful, stylish, and affordable fashion. Aim of the research is to create awareness on the cruelty faced by silkworms in the production of silk.

1.1 OBJECTIVE:

- To create awareness on the cruelty faced by silkworms in the production of silk
- To suggest an alternative fabric to silk
- To study about the animal friendly wild silk
- To create awareness on the regulations for the production of silk

II. REVIEW OF LITERATURE

The fabric was one of the most valued commodities that traveled westward along the vast network known as the Silk Road. In that era, silk was worth as much as its weight in gold and was sometimes used as a form of currency. In some silk-producing countries, such as China, the boiled silkworms are eaten after cocoon harvesting (Nayak 2022). Although eating silkworms means less bio waste and provides some nutritional value, only a small percentage of the fabric industry's silkworms are actually consumed. However, insect-eating could become more commonplace sometime in the future, as global demand for sustainable animal-based food increases (Denecke 2020). This is thanks to its fibroin proteins, the triangularly shaped molecules found in the material. The molecular structure causes light to refract at unique angles, giving silk its unmistakable sheen and eye-catching appearance. Silk also holds great potential in the biomedical field. Because it's strong and antimicrobial, silk has a long history in medicine. Recently, it's even been explored for its potential in skin regeneration (Thorat et al 2019). Some must immerse their hands in vats of scalding water to palpate the cocoons. Children who wind the silk into strands often suffer from cuts that go untreated and can become infected. Many people who are troubled by the cruelty of conventional silk production have turned to purportedly cruelty-free alternatives called "peace silk" or "ahimsa silk". (Matthes et al, 2017.) Even silk producers who don't gas or boil the silkworms may cause them to suffer by providing them with inadequate food or forcing them out of their cocoons prematurely.

The animal-welfare group Beauty Without Cruelty India observed one producer of such silk consigning female moths to trays for egg-laying while the males were put into a refrigerator, brought out occasionally for breeding and then thrown away when they were no longer able to mate (Hawthorne; Kwasny, 2016). Indeed the silk topic brings out the dichotomous aspect of human nature. Recently with greater awareness of animal issues, there have been concerns voiced about the methods used in silk production. Efforts have been made to replace the traditional violent method with a more animal-friendly one resulting in what is known as Ahimsa silk. (Silverstone; Kwasny, 2015) The only truly cruelty-free options are those that aren't derived from animals. Fortunately, there are many luxurious animal-friendly fabrics available, such as polyester, Tencel, milkweed seed-pod fibres, silk-cotton tree filaments and rayon. (Muthu, 2014) If allowed to hatch, the pupae spend an extra 7-10 days in the cocoon, which starts to harden. This tends to result in lower silk yields and threads that are broken into multiple strands, which makes for a rougher fabric.

Since ahimsa silk is more difficult to produce, it tends to be more expensive than its conventionally farmed counterpart. (Denecke; Xunzi, 2013) Yet, it is gaining popularity and is seen as a viable alternative in the fashion industry. In the meantime, some fashion labels have ditched silk, but demand for the luxurious fabric hasn't completely dissolved. One of the reasons silk is prized is its ability to seemingly change colors and shades when viewed in different lighting. (Dahl, 2012).

She conveyed her enchantment with the fabric to the royal court who got taken in and started harvesting silk in large quantities. The lives of the animals hardly mattered, presumably because they were just considered to be insects not worthy of any ethical obligation, just as they are now. (Hill; Gardetti and Muthu, 2011) Silk is a fabric like no other. Historically, its unmatched beauty, durability and comfort was prized by the ranks of nobility. Roman and Arabian aristocrats in particular. The rarity of the fabric made it all the more precious. For more than a thousand years, how that silk was produced remained a well-guarded secret kept by ancient China, reluctant to let its monopoly go. (Major; Baller; Hawthorne, 2010)

That's because the process for making this type of product is much longer and more expensive than the traditional silk-making process. Instead of boiling the silkworms alive, most cruelty-free silk companies allow the silk fibers to come out naturally and use that to create the silk. (Chang; Singh; Drits, 2008) Regular silk, utilizing cruel and inhumane methods, takes about 15 minutes from start to finish. It is said that silk was discovered thousands of years ago in ancient China when a princess was sitting beneath a tree that had many cocoons wrapped in silk. (Johnson) One cocoon accidentally fell into her cup and she realized that the fine silk thread unwound itself when she extricated the cocoon. She took an immediate fascination for the fabric, regardless of the fact that the silkworm inside had been boiled to death. (Muthu; Silverstone, 2007) Compared to other forms of animal cruelty, silk production has not had the attention of animal welfare and rights activists it deserves. One principal reason is perhaps that it is easier to identify with a cute mammal or bird or even a reptile than an invertebrate. (Khan et al, 2006.)

People think, "It is only a worm," conveniently forgetting that the worm is the precursor to the moth which in essence assumes the same form as a butterfly, a creature that has been the center of human myth, folklore and poetry for millennia. Many of us would not wilfully harm butterflies but we do not mind crushing and hammering their cousin silkmoths to death. (Hill, 2005) There are also reports of the use of child labour in the silk industry. According to the non-profit organization Human Rights Watch, which has investigated India's silk trade, children – some as young as 5 years old – are forced to work inside the factories and workshops that produce silk thread. (Chase, 2004)

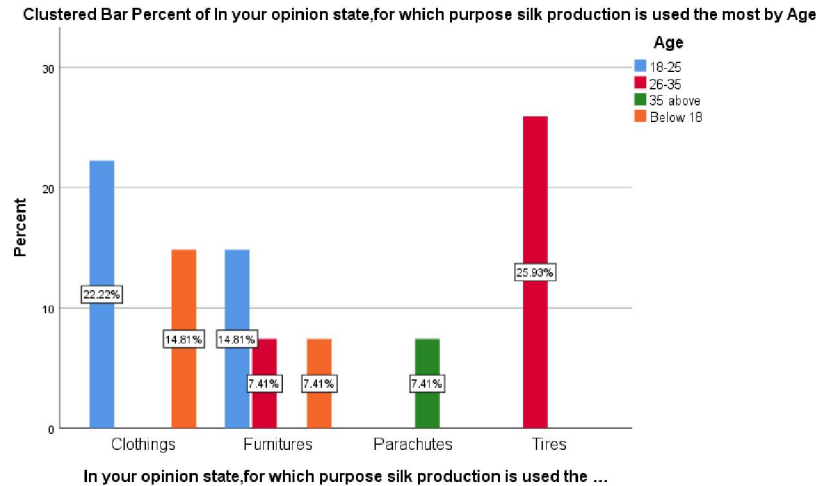
Anyone who has ever seen worms startle when their dark homes are uncovered must acknowledge that worms are sensitive they produce endorphins and have a physical response to pain. Humane alternatives to silk including nylon, milkweed seed pod fibers, silk-cotton tree and ceiba tree filaments, polyester, and rayon are easy to find and usually less expensive. (Major; Baller, 2003) Cruelty-free silk, on the other hand, can take up to two weeks extra time which is obviously more expensive (Johnson; Galbraith and Rowling) in terms of production and labor costs. Silk is the fiber that silkworms weave to make cocoons. To obtain silk, distributors boil the worms alive inside their cocoons. (Eid et al, 2002) Silk is not an inherently cruelty free product. And it's nearly impossible to make vegan silk but it can be made in an ethical and less harmful way which is what we will be doing with our new line. Companies like us that make or source ethical and cruelty-free silk are few and far between. (Eid et al.; Mohammad Ashraf & Bhat Madan Moha Khan, 1999)

III. METHODOLOGY

For the purpose of the study, empirical research is used. Simple random sampling method is used in this study to collect the samples. The total number of responses recorded are 200. The sample frame is Valluvar kottam. The statistical tool used is percentage analysis, which includes Independent variables are age, Qualification, Occupation, gender and locality. The dependent variables are on which purpose silk production is done for? and state the luxurious silk is more important than the life of millions of silkworms. The primary sources are taken from the general public in the form of survey methods. The information was collected from secondary sources from journal articles and books

IV. ANALYSIS

Figure 1:



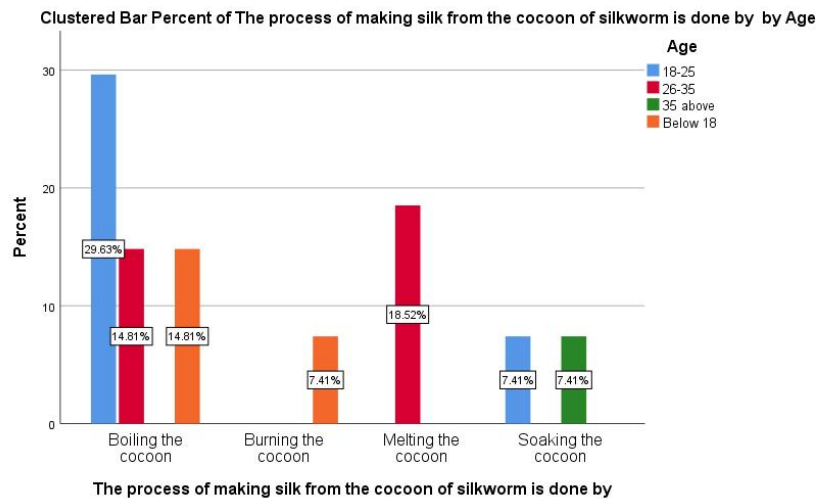
Legend:

The above graph shows that age group respondents were aware of the purpose of silk used

Result :

The above graph shows that age group respondents of 25-35 have rated tires and 18-25 age groups have responded clothings and 35 above have responded parachutes as the answer

Figure 2:



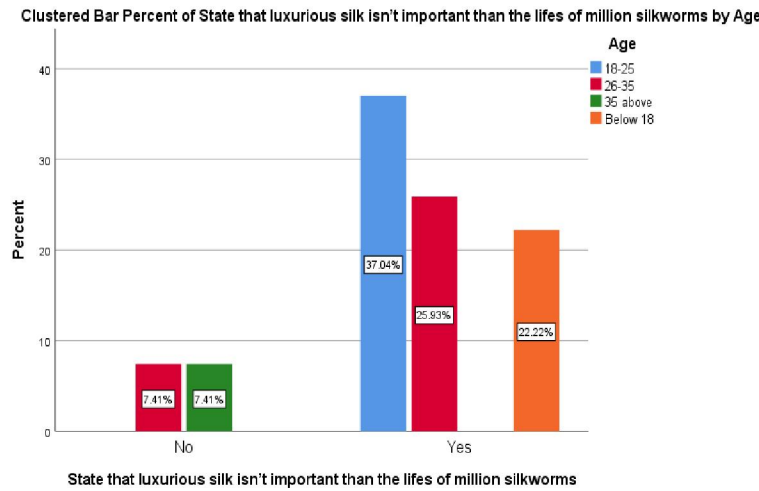
Legend:

The above graph shows that the age group respondents were aware of the process of manufacturing silk

Result:

The above graphs shows that the age group respondents of 18-25 have rated boiling cocoon as the highest response and 26-35 and below 18,some of them have rated the same

Figure 3:



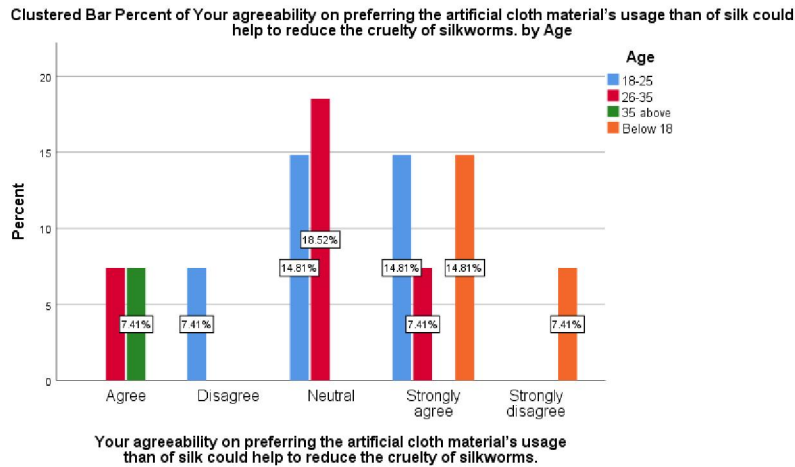
Legend :

The above graph shows that age respondents were agreeing that silk isn't important than the lives of million silkworms

Result:

Most of the age group respondents of 18-25,26-35 and below 18 have rated yes for the above statement

Figure 4



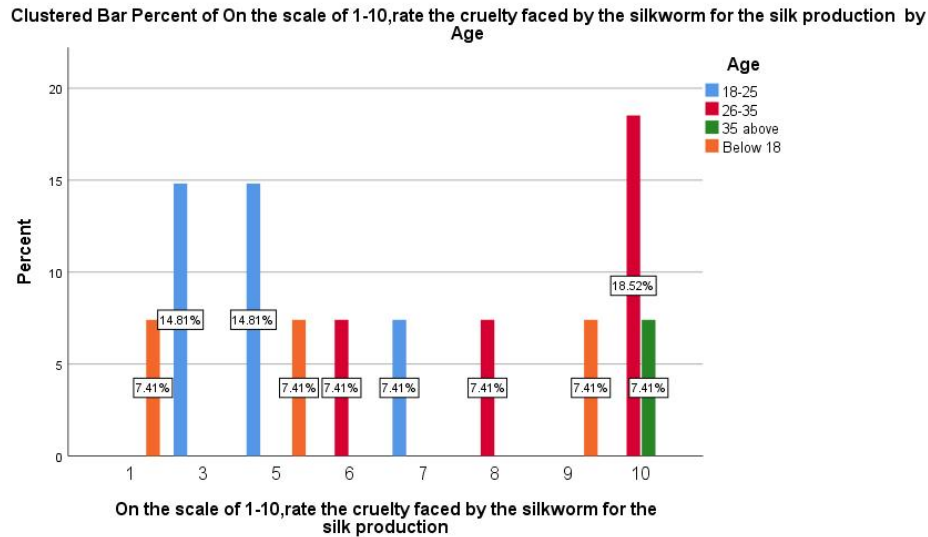
Legend:

The above graph shows that age group respondents were agreeing on preferring the artificial cloth material's usage than of silk could help to reduce the cruelty of silkworms

Result:

The most of the age group respondents of 18-25 and below 18 have rated the strongly agree and 18-25 have rated neutral on the statement

Figure 5:



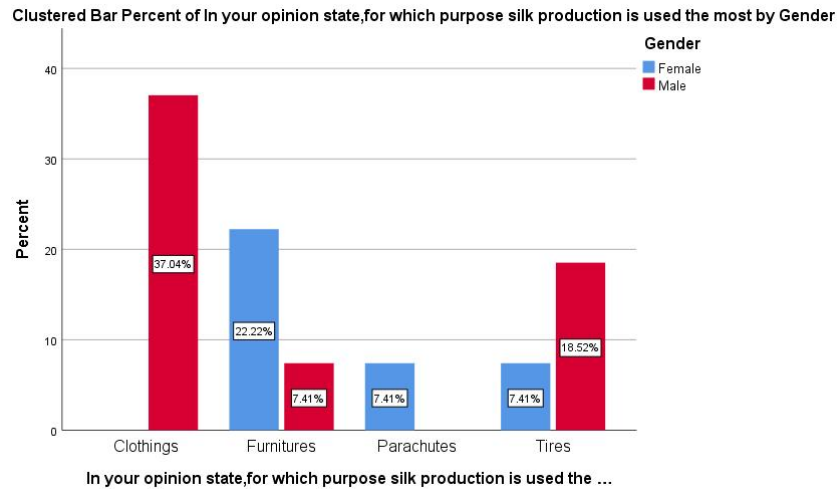
Legend:

The above graph shows that age respondents were aware of the cruelty faced by the silkworms

Result:

Most of the age group respondents of 26-35 have rated the highest of 10 scale and 35 above age group have rated the highest of 5 scale and they stated neutral

Figure 6:



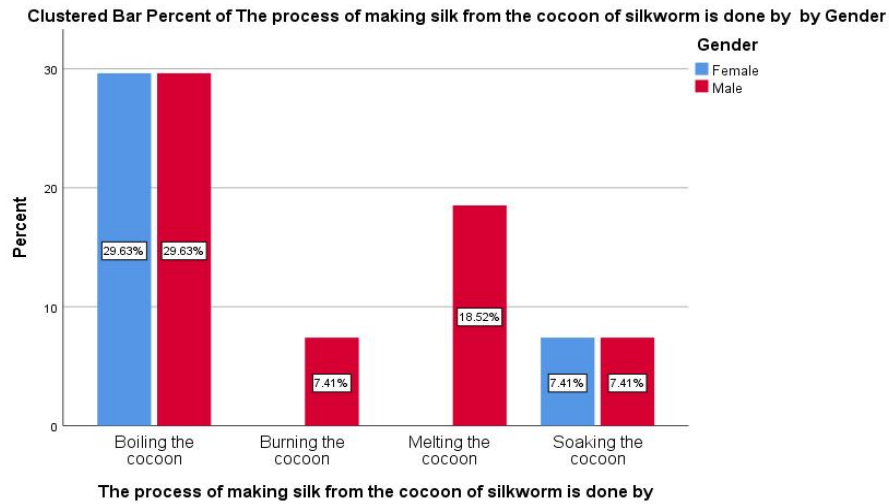
Legend:

The above graph shows that gender group respondents were aware of the purpose of silk used

Result:

Most of the gender groups respondents of male rated the clothings as the answer and some rated tires and female have rated furnitures as the answer

Figure 7:



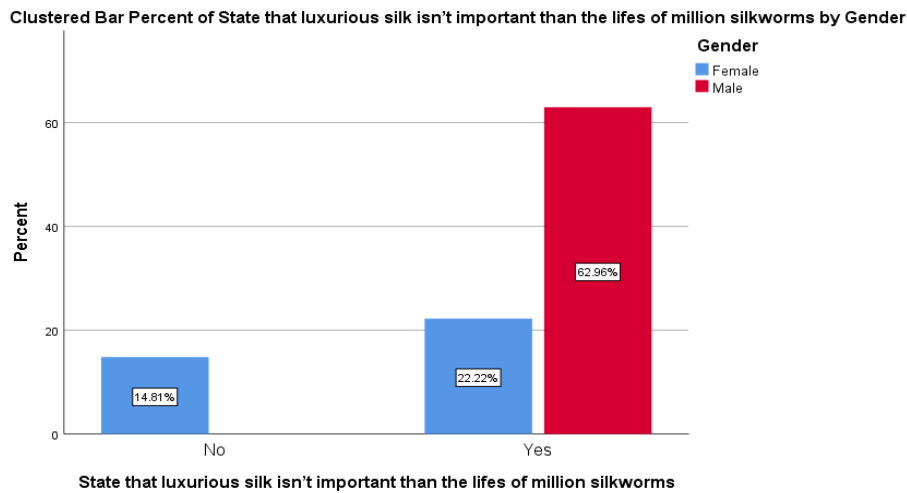
Legend:

The above graph shows that the gender group respondents were aware of the process of manufacturing silk

Result:

Most of the gender group respondents of male and female have rated the highest of boiling the cocoon as the answer

Figure 8:



Legend :

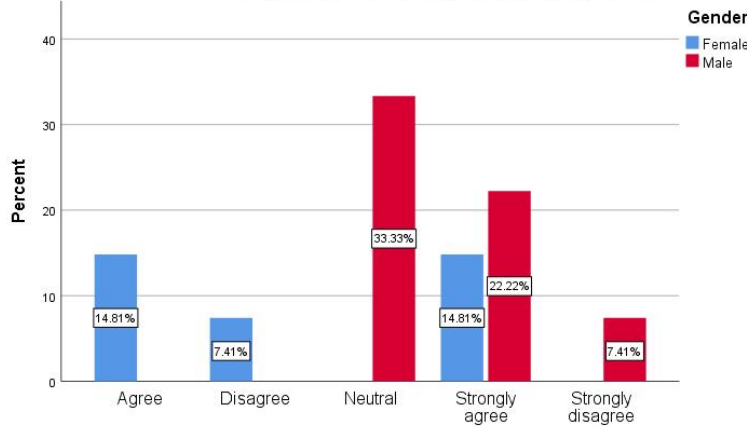
The above graph shows that gender respondents were agreeing that silk isn't important than the lifes of million silkworms.

Result:

Most of the gender groups respondents of male have rated the highest of yes and agreeing the statement

Figure 9

Clustered Bar Percent of Your agreeability on preferring the artificial cloth material's usage than of silk could help to reduce the cruelty of silkworms. by Gender



Your agreeability on preferring the artificial cloth material's usage than of silk could help to reduce the cruelty of silkworms.

Legend:

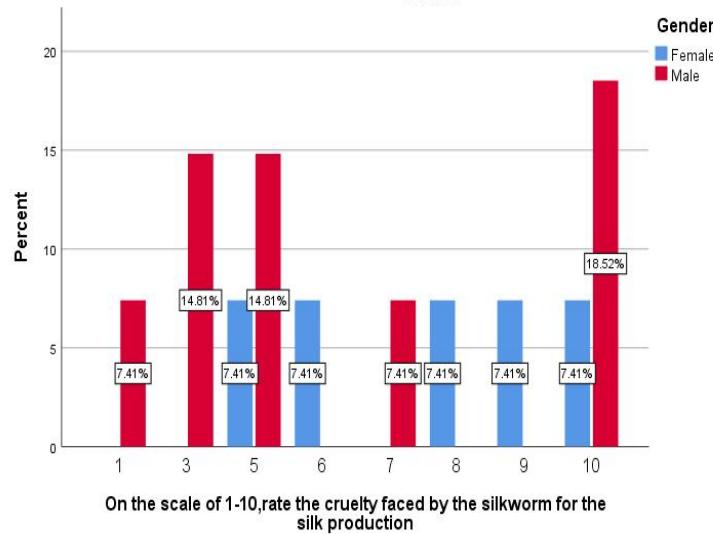
The above graph shows that gender group respondents were agreeing on preferring the artificial cloth material's usage than of silk could help to reduce the cruelty of silkworms

Result:

Most of the gender group respondents of male have rate the highest of neutral and strongly agree and females have rated agree and strongly agree and some of them rated disagree

Figure 10:

Clustered Bar Percent of On the scale of 1-10,rate the cruelty faced by the silkworm for the silk production by Gender



On the scale of 1-10,rate the cruelty faced by the silkworm for the silk production

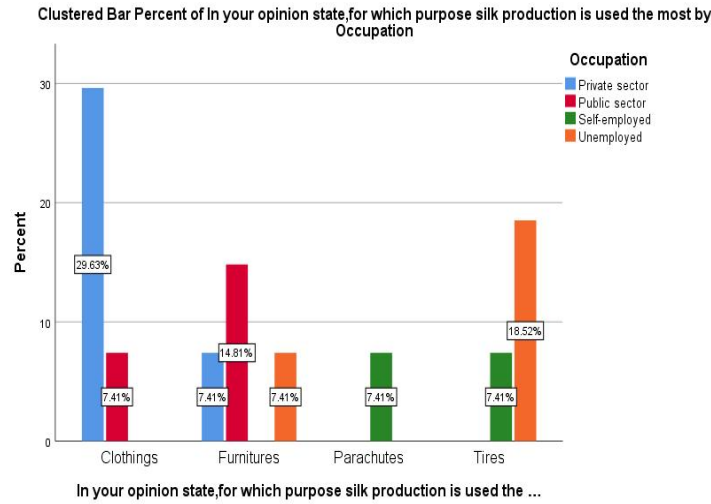
Legend:

The above graph shows that gender respondents were aware of the cruelty faced by the silkworms

Result:

Most of the gender group respondents of male have rated the highest of 10 scale as well as the least rating of 1 and female have rated 10 and some of them stayed in neutral

Figure 11:



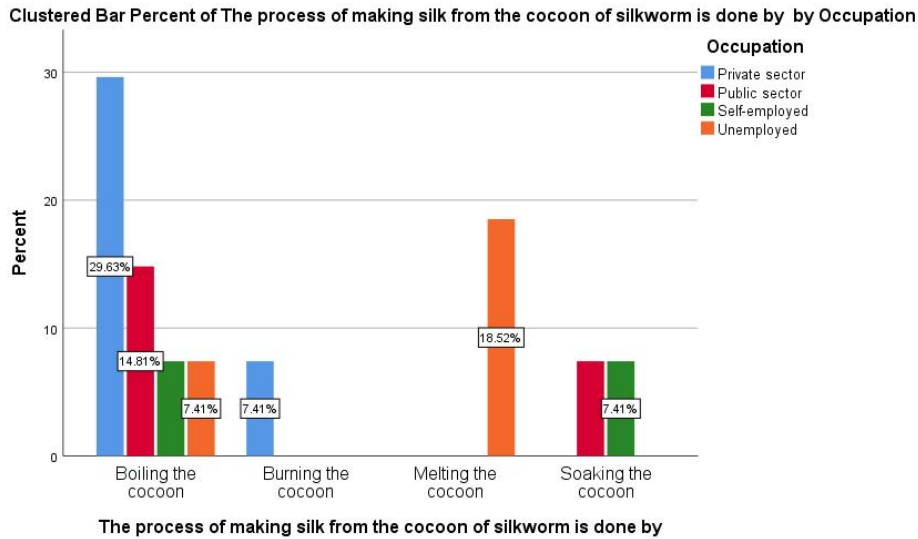
Legend:

The above graph shows that occupation group respondents were aware of the purpose of silk used

Result:

The most of occupation groups respondents of private sector have rated the highest of clothing as the answer and unemployed groups have rated the highest of tires as the answer

Figure 12:



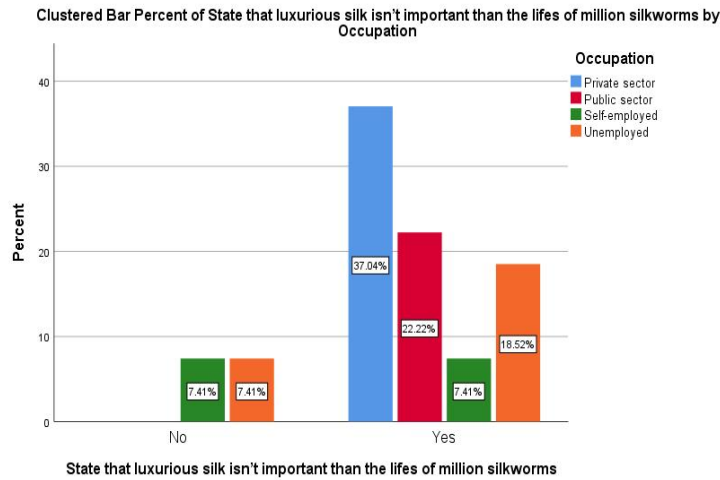
Legend:

The above graph shows that the gender group respondents were aware of the process of manufacturing silk

Result:

Most of the occupation group respondents rated the highest answer as the boiling the cocoon.

Figure 13:



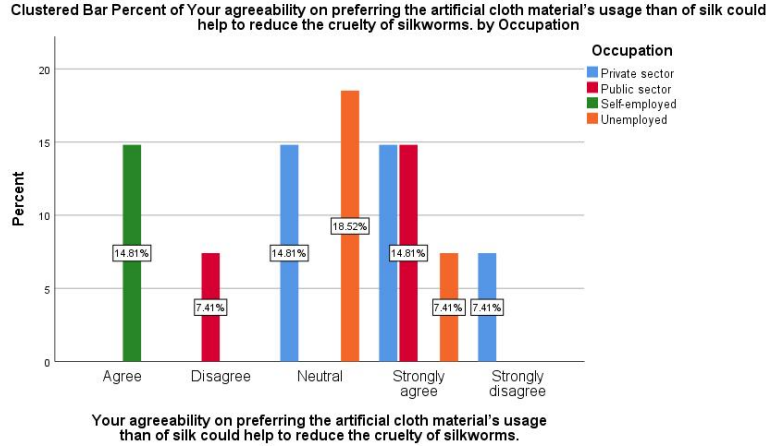
Legend :

The above graph shows that gender respondents were agreeing that silk isn't important than the lives of million silkworms.

Result:

The most of the occupation have responded the answer as yes for the above statement

Figure 14



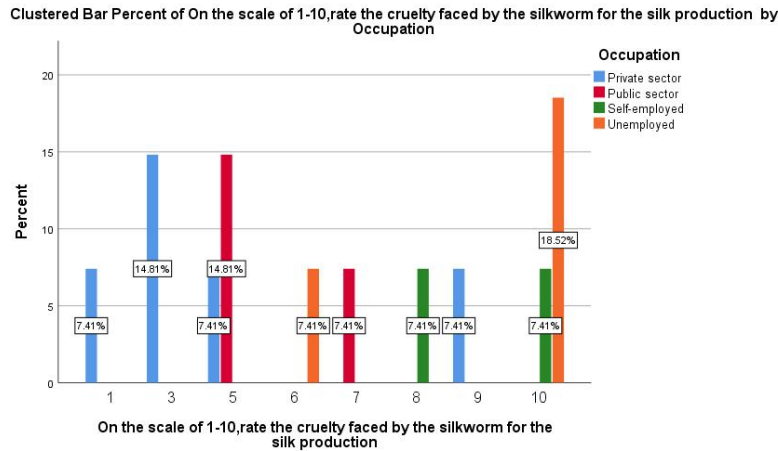
Legend:

The above graph shows that occupation group respondents were agreeing on preferring the artificial cloth material's usage than of silk could help to reduce the cruelty of silkworms

Result:

The most of the occupation groups respondents of private sector and unemployed have rated neutral and self employed have rated agree

Figure 15



Legend:

The above graph shows that occupation respondents were aware of the cruelty faced by the silkworms

Result:

The most of the occupation groups respondents of unemployed and self employed have rated the highest scale of 10 .

V. DISCUSSION

Figure 1 shows that age group respondents of 25-35 have rated tires and 18-25 age groups have responded clothings and 35 above have responded parachutes as the answer. Figure 2 shows that the age group respondents of 18-25 have rated boiling cocoon as the highest response and 26-35 and below 18,some of them have rated the same.Figure 3 shows that the most of the age group respondents of 18-25,26-35 and below 18 have rated yes for the above statement .Figure 4 shows that the most of the age group respondents of 18-25 and below 18 have rated the strongly agree and 18-25 have rated neutral on the statement.Figure 5 shows that the most of the age group respondents of 26-35 have rated the highest of 10 scale and 35 above age group have rated the highest of 5 scale and they stated neutral .Figure 6 shows that the most of the gender groups respondents of male rated the clothings as the answer and some rated tires and female have rated furnitures as the answer.Figure 7 shows that the most of the gender group respondents of male and female have rated the highest of boiling the cocoon as the answerFigure 8 shows that the most of the gender groups respondents of male have rated the highest of yes and agreeing the statement Figure 9 shows that the most of the gender group respondents of male have rate the highest of neutral and strongly agree and females have rated agree and strongly agree and some of them rated disagree.Figure 10 shows that the of the gender group respondents of male have rated the highest of 10 scale as well as the least rating of 1 and female have rated 10 and some of them stayed in neutral Figure 11 shows that the most of occupation groups respondents of private sector have rated the highest of clothing as the answer and unemployed groups have rated the highest of tires as the answer .Figure 12 shows that the most of the occupation group respondents rated the highest answer as the boiling the cocoon.Figure 13 shows that the most of the occupation have responded the answer as yes for the above statement .Figure 14 shows that the most of the occupation groups respondents of private sector and unemployed have rated neutral and self employed have rated agree .Figure 15 shows that the most of the occupation groups respondents of unemployed and self employed have rated the highest scale of 10.

VI. LIMITATION

The Major limitation of the study is the sample frame. The sample frame Collected through the general public in this major drawback is they are not responding in the proper way. The respondents of the general public are major drawbacks.

VII. CONCLUSION

Silkworms are killed for the production of silk and roughly 3,000 silkworms are killed to make a single pound of silk. Silkworms weave to make their cocoons which are the outer casings that protect them during the pupal stage. These cocoons are boiled and then they are. This boiling step also blunts a natural chemical substance known as sericin, which otherwise would cause the cocoons to harden, resulting in a fabric that's not as soft. The objective of the research is to create awareness on the cruelty faced by silkworms in the production of silk. The research method used is empirical research and simple random sampling method is used and the sample size is 200 responses and the sample frame is in and around Valluvar kottam. The independent variables are age, gender, education qualifications, occupation and locality. The respondents were aware of the cruelty faced by silkworms and then also they have the practice of buying it. The only solution is to provide an alternative to the silk fabric. The alternative to this cruel practice is to use another method of obtaining silk called ahimsa silk or wild silk, it is a method of nonviolent silk breeding and harvesting. Ahimsa silk is a process that allows the silkworm to emerge from their cocoon free and happy and complete their natural life cycle. The empty cocoons are then used to produce silk. By implementing an alternative fiber for silk or using ahimsa silk, the cruelty of the silkworms can be avoided. The research concludes that the luxuries silk fabric isn't important than killing the lives of thousands of silkworms.

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