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**SILK REELING AND HEALTH:  
LIFESTYLE AND QUALITY  
OF LIFE OF WORKERS**

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# **SILK REELING AND HEALTH: LIFESTYLE AND QUALITY OF LIFE OF WORKERS<sup>1</sup>**

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## ***Abstract***

*Silk reeling is an activity where mostly people of little education and skill learn reeling skills while being employed in the reeling units. Reeling is carried out in an environment of persistent air pollution. Workers allergic to the silk allergen (sericin and pupal allergens) suffer from respiratory problems and asthma, i.e. of occupational asthma. Non-occupational asthma victims may suffer exacerbations due to irritant effects of the silk occupation. Work-aggravated asthma follows mainly from the burning of biomass fuel, used in almost all the units. A substantial proportion of silk workers (38 per cent) suffer from some form of breathing problems, of varying intensities.*

## **Introduction**

In a country where poverty holds nearly one third of the population in its grip, these people still find it difficult to earn enough to satisfy the basic needs of existence, i.e. food and shelter. In such circumstances, finding employment and a suitable occupation to earn a living and sustain themselves is difficult when they do not possess sufficient education, and marketable skills. Silk reeling is an onerous occupation, which mostly poor people, with limited skills, undertake—though a small number of better-educated persons too have taken up reeling work. Once they are into this occupation, they often remain in it till they can work no more. What is remarkable is that more than one generation of workers from the same family takes up this work (Inbanathan et. al. 1998; also Inbanathan 1993). Sericulture is an agro industry which provides employment and income to about 7.3 million people in India (2000-2001). This includes employment in mulberry cultivation, silkworm seed

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production and rearing, silk reeling, twisting, dyeing, and weaving. In this paper we focus only on reeling, which is because of its observed effects on the health of workers. Roughly 2.73 million people are estimated to be involved in reeling activities in Karnataka (the largest silk-producing state in India), and 4.81 million in all sericulture activities in the state. Over the whole country, 3.92 million people are estimated to be involved in reeling activities.<sup>2</sup>

### **Reeling Technology**

Silk reeling is a process of drawing out the silk filament from cocoons that are boiled, and amalgamating them into a silk yarn of various thicknesses. In much of India, reeling is based on a relatively simple technology, which even people who are not literate can master. It is also an occupation that can be carried out by both children and adults. Three main types of technology are involved in silk reeling. These are the *charka*, cottage basin and multi-end. However, within these broad categories, innovations such as use of electricity in the *charka* and cottage basin technology have entailed some changes from the original manually powered *charkas* and cottage basins.

The simplest, and therefore quite inexpensive, is the manually powered *charka* (by turning a handle). Since it is less expensive to set up a *charka* unit, entrepreneurs with limited capital can also invest in these units, who usually operate with unpaid family labour. Two workers can carry out reeling with a *charka*, one to draw the yarn from the cocoons, and the other to turn the wheel with a handle. Often only women and children of the family who own the *charka* are engaged in reeling work in these units, thereby effecting considerable savings in operating costs (not having to pay them any wages), though other costs (such as health, and loss of education) which we will discuss below, are also mainly borne by them. Men in these families normally work only for short periods in the actual reeling work, and spend more time on buying cocoons from the cocoon market or a local farmer, and after the silk has been reeled, selling the silk yarn. Cottage basin reeling equipment is made of iron rather than wood, and is relatively much costlier. A minimum of four basins are made as one set. Cocoons are boiled in one location at a corner of the unit and then transferred to basins in front of each reeling worker (see Charsley 1982:63-66; Lakshminpathaiah et.al. 2000). The number of workers required is much higher than a simple *charka* and hence, family members would not be sufficient to run them, and hired labour is required. Roughly about seven workers are required for four-basin units. Multi-end units are mostly owned by the government. However,

there are a few privately owned units. There are 10 ends for each basin and the workers have to be well-trained to engage in the technology of multi-end units. The operational costs are also much higher than with the cottage basin and *charka* units, and this results in only a small number of units being in operation.

An important question that has to be examined is the kind of work that an individual takes up due to economic reasons, i.e. to earn a living, though he/she has to face a work environment which may result in health problems. What are the skills involved in the work, and what are the benefits that accrue through this work—in this context, reeling. The perceptions of the workers have also to be contextualized, and the occupation seen as one that is carried out in a potentially hazardous environment. This work (as reeling labourers<sup>3</sup>) leads to limited social mobility, in that workers have little scope for earning and saving, and working their way up the employment ladder (which in silk reeling is virtually non-existent). Reeling is rarely instrumental in providing for better education and training, acquisition of better jobs, and the possibility of upward social mobility. If significant benefits are not observed, or if the rewards are not sufficiently high to justify remaining in this kind of work—why do the workers not take up alternative work, or even migrate to another place?

This paper examines the problem of health among reeling workers. Issues that are considered include the implications of the technology that is utilized in reeling units, from the point of view of health conditions of the workers. While technology determines the overall workplace environment, i.e. noise, smoke and humidity, atmospheric pollution etc., there are also other conditions, which may be seen as social factors, which intervene in reeling activities. Taken together they have significant impact on the quality of life of the workers, which is discussed in the latter part of the paper.

### **The Study**

The study was carried out in Sidlaghatta town, in Kolar district of Karnataka.<sup>4</sup> Sidlaghatta is a large reeling centre and is known for the production of superior quality of silk. The study focuses on labourers, but also includes owner-labourers and small entrepreneurs as they are directly involved in silk reeling.

Sidlaghatta had a total of 2470 reeling units,<sup>5</sup> comprising 1457 (59%) cottage basin units, 877 (35.5%) *charka* units, 135 (5.5%) dupion reeling units, and four multi end units. The reeling industry in Sidlaghatta

had about 80% working in cottage basin units, followed by *charka* (17.7%), and 2.3% in dupion silk reeling.

The sample for the present study was 229, drawn from units located in different colonies of the town, and also different types of units based on the technology used. In order to have a proper balance, an almost similar number of male and female respondents were interviewed (112 men and 117 women). These respondents were administered the structured interview schedule, with questions related to different aspects of their socio-economic situation, health problems, and conditions of work. Also included were questions on respiratory problems, and the degree of breathing difficulties that the workers faced. The International Union against Tuberculosis and Lung diseases questionnaire (see Jarvis and Burney 2000) was used with modifications (Kannada language) for the present study. The number of workers in *charka* reeling were 23 men (20.5%) and 12 women (10.3%), in cottage basin units 78 men (69.6%) and 91 women (77.8%), and in dupion silk units 11 men (9.8%) and 14 women (12%). All of them were in the same economic category. In terms of size of units, the *charka* units were small units where the families who owned them were also the reeling workers. Dupion units were also small units. Cottage basin units were larger, which had several hired labourers working in them.

There was also a section of the study that involved clinical tests on 57 persons working in reeling, from the larger sample. A proportion of workers who had indicated health problems including breathing difficulties were examined, with clinical indicators, blood tests, and chest x-rays. As respiratory problems were seen to be a significant health problem among the reeling workers, an allergy prick test was conducted to establish whether they were allergic to silk-worm-derived allergens. The prick test was performed by placing a small droplet of the silk antigen, a droplet of histamine solution and a droplet of buffered saline on the volar surface of the forearm of the subjects, and gently pricking the superficial layer of the skin with a 26 gauge fine needle through the droplet. The spot was inspected after 15 minutes for the presence of a wheal and the area of the wheal was recorded. The skin test was regarded as positive or negative according to standard criteria employed in prick tests and the reaction was interpreted as positive or negative (see Chan-Yeung et. al 1985: 53-57). The positive skin prick tests to a given antigen indicates the presence of abundant antigen specific IgE antibodies in that given subject's serum. Normally, histamine elicits a 4 to 8 mm wheal reaction (called positive control) and the saline solution elicits no reaction (called negative control).

A positive allergic reaction to any antigen should be above the diameter of the positive control wheal in order to be immunologically significant.

A control group of 86 was selected for study, from a village (Hosahalli) in Tumkur district, without any sericulture activities, particularly reeling, in the immediate environs, i.e. within a radius of five kilometres. The sample had 67 men and 19 women. In a very general sense, this group was comparable to that of reeling workers, in that, economically they were similar to the reeling workers. The control area being some distance away from any sericulture activity was an essential requirement, since in contrast, Sidlaghatta town had reeling activities in most parts of the town, and smoke and silk allergens would certainly find their way from the reeling units into the atmosphere. Comparing these two groups, one which was in reeling and the other some distance away from any sericulture activity, was intended to highlight the impact of working in reeling units, and ascertain whether the silk exposed population had a higher incidence of asthma than the control population. Housing was an important means by which we could identify roughly the economic condition of the people comparable to the reeling workers, *kaccha* and semi *pucca* houses i.e. poor housing (essentially huts).

**Table 1: Reeling Workers and Villagers of Hosahalli**

	Reeling/Sidlaghatta N=229	Control village Hosahalli N=86
Illiterate	145 (63.1 %)	40 (46.5 %)
Housing, kaccha house	140 (61.1 %)	67 (77.9 %)
Own house	97 (42.4 %)	82 (95.3 %)
Mean size of family	4.3	4.8
Religion	Muslims 119 Hindus 108 Christians 2	Hindus 84 Muslims 2

## The Health of the Workers

### Work Environment

The work environment of a reeling unit is of particular importance in the health of the workers. Those using the traditional and simple *charka* are usually very small units, and have the *charka* located in one corner of the individual's single room home. Cooking food, boiling cocoons and reeling

activities are all carried out in the same space, with poor ventilation and lighting. Larger units (cottage basin) have independent locations (separate room in a house, or even a location away from the living quarters of the owner's family) for reeling activities, with a large room where the basins are set up for reeling. Boiling of cocoons is done at one corner of the reeling unit. Ventilation in the larger units is usually better than that of the smaller units, though the scale of operation makes this environment smoky and dusty as well, though to a lesser extent than in a small unit. In virtually all units the fuel used is bio-mass, which is usually agricultural waste, or wood pieces. Ovens for the most part are the open type, of very low technology, where the poor quality fuel and design of the oven ensures that considerable smoke is emitted into the working atmosphere, and the ovens are also of low efficiency. Recently introduced ovens, designed by Tata Energy Research Institute, are considered technologically superior, and save on fuel, and they are also more efficient in use.<sup>6</sup> However, this is not the kind of economically priced oven that everyone can afford, and only the larger units have availed of this technology.

### **Socio-economic Conditions of Workers**

There are two aspects to the health of workers. One is the social conditions and situation that they are in, and the other is the health of workers—assessed through objective clinical tests and indicators. Both are evidently inter-related, and therefore it is preferable to see them together, rather than one or the other separately. The foremost social condition that we should emphasise is the poverty of the workers. Reeling is not an activity which is carried out throughout the year by all the units. The bigger units with greater finances are able to function virtually all through the year, regardless of cocoon prices. On the other hand, smaller units do not run when cocoon prices rise beyond a point, since the entrepreneurs cannot sustain the additional costs, and the price of raw silk may not rise at the same rate (if it rises at all) as the cocoon prices. Many units are closed from time to time due to the high price of cocoons. Thus, workers, whose wages are on a daily rate (even though they are usually paid at the end of the week), do not have much left over to carry them through days when they do not have work. Wherever possible, and when the owners of the reeling units are able to raise the capital, workers are given advances against their wages, an interest free loan to tide over difficult times. However, owner-labourers do not have such capital, even to support themselves. When cocoon prices rise, very often the owner labourers stop their own reeling enterprises, and take up work as hired labourers in other, bigger units. The other main reason for workers not going to

work was a more personal and individual reason, such as illness. Together (see Tables 2 and 3), they accounted for a significant loss of working days, and wages to the workers.

**Table 2: Reasons for stopping work**

	Reasons for stopping work									
	Closure of Unit	Unfavourable Weather Conditions	Unfavourable Prices	Raw Materials not available	The Owner Incurred losses	Illness	Others	Maternity	Not stopped	Total
Male	42 37.5%	1 0.9%	5 4.7%	3 2.7%	2 1.8%	18 16.1%	4 3.6%	0	37 33.0%	112 100.0%
Female	47 40.2%	1 0.9%	2 1.7%	3 2.6%	1 0.9%	29 24.8%	7 6.0%	1 0.9%	26 22.2%	117 100.0%
	89 38.7	2 0.9%	7 3.1%	6 2.6%	3 1.3%	47 20.5%	11 4.8%	1 0.4%	63 27.5%	229 100.0%

**Table 3: Number of days worked in a year<sup>7</sup>**

Number of days worked in a year						
	0-150	151-200	201-250	251-300	300+	Total
Male	1	15	54	22	20	112
Female	3	34	49	20	13	117
Total	4	49	103	42	33	229

An outcome of the workers' poverty is their poor nutrition, where a significant proportion of the workers have only two meals a day, which is also suggestive of a weak constitution. In our study, 63 women (53.8%) and 43 men (38.4%) stated that they had two meals a day, and the remaining workers ate thrice a day. Clinical tests indicated that a substantial number of women workers were anaemic (15 out of 20 who had blood tests showed signs of mild anaemia), a factor which could also be related to their nutrition. In an all-India survey, it was revealed that 51.8% of Indian women had anaemia (of whatever degree) while Karnataka had 42.4% of women with any anaemia (NFHS-2, India, 2000: 252). The proportion of women with anaemia was higher among poorer women (low standard of living index): 51.3% (NFHS-2 India, 1998-99, Karnataka:158).

### Health Problems

The prevalence of health problems reported by the workers are indicated below in Table 4. To provide a comparative picture, figures from the control group in Hosahalli are also indicated.



**Table 4: Prevalence of health problems and gender (Sidlaghatta) N=229  
Comparative figures for control group (Hosahalli) N=86**

Health problem	Sidlagatta		Hosahalli	
	Male N=112	Female N=117	Male N=67	Female N=19
Breathing problems (including asthma)	27 (24.1%)	49 (41.9%)	8 (11.9%)	4 (21.1%)
Cough	34 (30.4%)	61 (52.1%)	10 (14.9%)	7 (36.8%)
High Blood Pressure	7 (6.4%)	1 (0.9%)	1 (1.5%)	1 (5.3%)
Eye problems	11 (9.8%)	20 (17.1%)	2 (3%)	1 (5.3%)
Headache	17 (15.2%)	35 (29.9%)	1 (1.5%)	1 (5.3%)
Skin problems	9 (8.0%)	21 (17.9%)	Nil	Nil
Tuberculosis	3 (2.7%)	5 (4.3%)	Nil	1 5.3%
Backache	14 (12.5%)	28 (23.9%)	3 (4.5%)	4 (21.1%)
Diabetes	1 (0.9%)	Nil	2 (3%)	Nil

As respondents reported several health problems being present simultaneously, the total percentage does not add up to 100.

Respiratory problems, as the reeling workers indicated, were the most significant health problem that they faced. This included ailments which the workers suffered off and on, such as chest congestion, wheezing, and cough. Respiratory problems encountered in the reeling units were of two kinds, one which could be classed under occupational asthma, ".....variable airflow limitation and/or bronchial hyper-responsiveness due to causes and conditions attributable to a working environment and not to stimuli encountered outside the workplace," and the other, work-aggravated asthma, which is, "....concurrent asthma worsened by non-toxic irritants or physical stimuli in the workplace." (Martin 2000<sup>8</sup> ; See also, Chan-Yeung and Malo 2000).

In the reeling units, when cocoons are boiled to soften the sericin gum holding the silk together in the cocoons, and extract the silk yarn, sericin and pupal allergens are released into the atmosphere. The allergen laden steam inhaled by the reeling workers causes breathing difficulties in those allergic to this chemical (sericin) or pupal allergens. Our study observed that a significant proportion of reeling workers suffered from asthma. Tests later conducted on a smaller number than the whole sample indicated that some of them were allergic to this allergen. However, sericin/pupal allergens are not the only cause of respiratory problems in the reeling units. As will be discussed, the number of workers who showed an allergic reaction to the silk allergen was less than the total number of those who experienced respiratory problems. We should note here that not all those who showed an allergic reaction to the silk antigen invariably develop asthma. There is also a latent period between first contact with the allergen, and the actual development of asthma. The time may vary from person to person, from weeks to years, and is due to the need for the person to first become 'sensitized' to the allergen and then build up an immune response, and only then will the person 'react' to the allergen. However, being sensitized does not mean that they develop asthma, and, some people with asthma do not show signs of sensitization (Jarvis and Burney, 2000:23). The causes for reeling workers to develop respiratory problems is related to several factors, which we have discussed below.

Analysing the data, 42% of women indicated that they suffered respiratory problems at various times. This is higher than the number of men who reported similar problems (24%). On the indicators in the questionnaire related to respiratory problems, women consistently showed a higher degree of respiratory problems than men.<sup>9</sup> Details of their responses are given in table 5.

**Table 5: Indications of respiratory problems**

Indicator	Reeling Workers (Sidlaghatta) N=229		Control Group (Hosahalli) =86	
	Female %	Male %	Female %	Male %
Cough on exposure to dust in reeling unit	43.6	22.3	NA	NA
Cough on exposure to dust outside reeling unit	23.1	13.4	10.5	10.4
Persistent cough	40.2	20.5	10.5	7.5
Woken up with attack of wheezing	30.8	13.4	10.5	4.5
Breathing difficulty after strenuous activity	38.5	23.3	5.3	7.5
Breathing difficulty at rest	18.8	13.4	10.5	6.0
Stopped work due to ill health during past year	25.0	15.0	Nil	Nil
Wheezing stops when away from reeling work	28.2	13.4	NA	NA
Had wheezing at any time	32.5	15.2	10.5	4.5
Needed hospital admission for breathing difficulty	23.1	13.4	10.5	9.0

Why women workers should be more prone to developing respiratory problems is not certain since they encounter the same environment as the men. Some evidence may be available to suggest that women during the reproductive years (15-49 years) may have a higher asthma rate than men in the same age group. Also, hormonal factors may be connected in some way with airway behaviour (Becklake and Kauffmann 1999). Almost all the women reeling workers in our sample were within the age group mentioned above.<sup>10</sup> While the higher prevalence of respiratory morbidity among silk exposed women compared to men is difficult to explain, it is possible that young girls are exposed to the silk environment for prolonged periods of time. In fact this may be for many years from infancy to adulthood. Further work is required to elucidate this in greater detail.<sup>11</sup>

Different patterns of asthma and other respiratory ailments have been observed among the workers. First, is of those who have breathing problems, or attacks of asthma, only during work. These include those who are allergic to silk allergens (i.e. occupational asthma). They also include those who are affected by inhaling smoke from the use of biomass fuel. Among the 57 who were tested (clinical), 32 had occupational asthma, and 10 had non-occupational asthma (or work aggravated asthma).<sup>12</sup> The control group which we had in this study indicated that 12 per cent of the men and 21 per cent of the women had respiratory problems from time to time. While the reeling units had indicated a significant number of persons as having some respiratory problems, the comparison with the control group clearly suggests that there is a strong link between respiratory problems and work in the reeling units. While the figures for the control group are much lower than for the reeling workers, it should also be pointed out that asthma in the general population as revealed in a study in North India has been found to be 3.94% among urban men, 3.99% among rural men, and 1.27% in both urban and rural women (Jindal et. al. 2000). Thus, our control group too has indications of a higher rate of respiratory problems than the study in north India suggests. The reeling and control group data are also at wide variance, and far higher than the north India study's figure for women. A factor which occurs in the control group's lives is that biofuels are freely used and could be suggestive of the reason behind the higher proportion of village people who suffer respiratory problems, and particularly women in comparison to men.

From the description of the reeling workers themselves, their respiratory problems usually began with wheezing and cough (mild), which over a period of time progressed into severe cough and periodic wheezing. While respiratory problems could start virtually anytime, our study indicated that workers complained of these problems only after working for some years in reeling units. However, even within those who showed symptoms of such problems, women were likely to have had respiratory problems earlier than men who worked in reeling units (see table 6).

**Table 6: Years of silk reeling done when wheezing started N=229**

Years of reeling when wheezing started										
	One year	Two years	Three years	4-5 years	10 years	15 years	20 years	Above 20 years	None	Total
Male	1	4	3	5	4	0	2	2	91	112
Female	9	5	6	4	11	1	2	2	77	117
Total	10	9	9	9	15	1	4	4	168	229

While they are in the early stages, the symptoms can be controlled and avoided if those who suffer such problems were to stop working in silk reeling units, and ideally, move away from the neighbourhood of reeling activities (not just stopping work at reeling units). Under such conditions, the breathing problems would stop. However, few workers stopped working in reeling units when such breathing difficulties began. After this becomes a chronic asthma, leaving reeling work may reduce the symptoms, but it is unlikely that they would get cured totally. There is no indication of significant benefit from being away from silk reeling units once they finished a day's work and then reporting for work the next day. The benefits of being away from reeling was found to be noticeable, as reported by respondents, following a relatively long break from reeling work, as when a reeling unit was closed for weeks. However, there are several factors which influence the intensity of asthma. Being some distance away from the reeling work is certainly of some help, since the allergens as well as work environment are not in the immediate vicinity of the worker. However, if the worker is not working in the reeling unit, but lives only a short distance away from units which are in operation, then the beneficial effects of not working in the reeling unit are much less. Since many reeling units are in operation in Siddlaghatta, living in Siddlaghatta itself has some negative effects on the respiratory systems of residents of the town. The workers themselves are more concerned with the lack of income when they are ill and cannot work, or when the unit is closed, rather than only the health problem as such.

In the cases where respiratory problems were severe, as with 42 workers (15 men and 27 women), they had to be admitted to hospitals for treatment. On the basis of their problems, they also indicated that activities such as talking and sleeping were affected by their cough—more so in the case of women. While they were usually helped by

medication, a few stated that even medicines did not entirely relieve them of the problems of cough, which was more severe particularly during the early hours of the morning. Even during the day, when cough was the problem, it caused them to be tired out much more quickly than on the days when they did not have severe cough. Lack of sleep too exacerbated the problem of tiredness. Women were more greatly affected in their household work or shopping for provisions for their homes. A factor responsible for the severity of respiratory problems and which leads to hospitalization is that very few workers took any maintenance doses of medication to prevent asthma attacks. They chose to either consult a doctor, or take medicines, only when the symptoms became severe.

A contributory factor to respiratory problems among men is the high proportion of tobacco smokers. Since men who smoked often chose to deny that they smoked, their answer to the question on whether they smoked was somewhat unreliable.<sup>13</sup> However, by asking the women about smoking, we elicited the response that they did not smoke but their husbands did, and thus, we were able to at least infer that most of the male reeling workers smoked. In keeping with their economic condition, we observed that most of those who smoked, used beedis, rather than cigarettes—which would also lead to a higher degree of respiratory problems (see Chhabra et. al. 2001). Tobacco smoke was directly inhaled by the men, but living as they do in small quarters/houses, passive smoking could be a problem also for the women and children who lived in the same house. However, we should also add that notwithstanding the number of men who smoked, the number of women who had respiratory problems was noticeably higher <sup>than</sup> the men.

#### Biofuel use

Other than those who were allergic to the silk allergen, there is also the high probability that many of the workers were affected by inhaling the smoke from biomass fuel use. Most of the reeling units use biomass fuel, and there is considerable evidence to suggest that *this fuel* is related to respiratory problems in a number of cases. Research on the use of biomass fuel for cooking indicates that women, who are the ones who spend more time on cooking food, using simple stoves and biomass fuel (wood, cow dung, crop residues) are more likely to develop respiratory problems (Parikh et.al 1999; Vijay Laxmi et.al 2003). Epidemiological surveys on the use of biomass fuel suggest that at least four major types of illness, including asthma and **chronic bronChitis**, have been linked with biomass fuel [(Islam (nd); Parikh et.al., (nd); Behera et.al., 2001; Albalak

et.al., 1999; Qureshi 1994; Pandey 1984; Padmavati and Arora 1976; ICMR Bulletin 31 (5), 2001] although it may aggravate asthma rather than being the cause of asthma [(Behera and Jindal 1991; Mishra (nd)]. Cooking/boiling in reeling units is essentially the same—i.e. similar fuel is used, which are low on the energy ladder, and simple stoves. While these studies have estimated the effect on women who spend several hours every day in front of the stove, in small and poorly ventilated houses, reeling units have workers spending several hours every day, for six days a week, and in the same environment as homes using biomass fuel. We should also note that a large proportion of women workers (52.1%) worked in the reeling units for over nine hours (see table 7 below). They were also responsible for cooking food in their homes, using similar fuel (biofuel), and thereby faced smoke from biofuel use for most of the day. Use of biomass fuel produces more organic compounds, for instance, benzene, formaldehyde, 1.3-butadiene, polyaromatic hydrocarbons and so on, which are related to their negative effects on health (Smith 2001; 2002).

**Table 7: Hours of work per day** **N=229**

Number of hours worked per day				
	1-5	6-8	9 and above	Total
Male	7 (6.3%)	50 (44.6%)	55 (49.1%)	112 (100%)
Female	6 (5.1%)	50 (42.7)	61 (52.1%)	117 (100%)
Total	13 (5.7%)	100 (43.7%)	116 (50.7%)	229 100%

### Other Health Problems

Among other health problems that were indicated, eye problems were frequently mentioned in the context of working in reeling units. Most reeling units are dark, and filled with smoke and dust, which makes visibility poor. Further, working with thin strands of silk yarn, which are drawn from the cocoons, is also a factor in increasing eye strain. There is also an indication that use of biofuel may contribute to eye problems, through the smoke that is emitted while burning this fuel (such as eye irritation and watering), (see Vijay Laxmi et. al., 2003). In the control group, with the predominant number of people (men) being agricultural workers, eye strain/problems was not listed as a significant problem,

although, since a slightly higher proportion of women have indicated eye problems, it could be related to the use of biofuels for cooking.

Skin problems are a factor in the work of silk reeling labourers, but not in the control group (confirming that reeling work is the crucial factor). The conditions of work, involving continuously placing their hands in hot water (while reeling), or walking around on floors which are most often wet, cause fungal infections, and cracks in their skin. However, skin problems, though common among reeling labourers, is not a life threatening health problem, which respiratory problems/asthma could be in certain cases (see Pearce et. al., 2000).<sup>14</sup>

Backache, which a number of reeling workers had complained about, is related (among other reasons) to the posture and nature of work, involving sitting on a wooden bench for hours. While backache among women of the control group is not low, this is also a problem associated with posture, and sitting in front of a stove, and cooking food. In the case of silk-reeling women, the fact that they are also of reproductive age (15-49) may indicate that child bearing is a possible factor in their backache [which could be similar in the case of the control group women also] (see Russell et. al., 1993).<sup>15</sup> Men of the control group who are mainly agricultural workers did not indicate this problem to the same extent as reeling workers or women. While a much smaller proportion of men of the reeling group (as compared to women reeling workers) indicated that they had backache from time to time, the reproductive function could be a factor that made for the difference in the prevalence of backache among men and women reeling workers.

### **Lifestyle and Quality of Life**

The problem which we need to consider is the overall quality of life indicated through the lives and life styles of the reeling workers. There are two issues which we need to discuss. One is that the reeling workers have health problems of varying degrees of intensity. We have considered respiratory problems in greater detail since a significant section of the reeling workers suffers from them, and also, because this has a noticeable bearing on their life-styles and quality of life (essentially a 'good life') [Brock 1993; also Koch 2000]. Second, in the context of the reeling workers, a crucial factor is that they live in acute poverty and deprivation. Since the lives of silk reeling workers involves both poverty as well as problems of health, we have continued our discussion with a broader conception of quality of life than only a consideration of ill health.



As an indication of the poverty in which the workers live, the families of reeling workers need several members' incomes to support the family in a minimal degree of subsistence. The income of one member of the family is generally inadequate to support the family (even a small family). Each worker can earn about Rs. 35-45 a day as wages (at the time of the study in 1997-98, but even in 2001 when a follow up review was made the wages had not increased to any significant extent). At an average of 20 days a month that a worker can earn a living through reeling, this works out to Rs. 700-900 a month. Since most units are closed for parts of the year, only 31 per cent of the workers stated that they had not stopped work for any reason during the year.

In reeling work, it is not just men and women (adults) who work at reeling—children do so too. Reeling is an occupation which does not have varying wages for men, women and children. Thus, children who are reeling workers earn the same amount as adults, encouraging parents to send the children to work in reeling units. Considering their comparatively high earning capacity, children contribute substantially to the family income. Our sample had 52 per cent reporting that they had joined reeling units as workers when they were less than 15 years of age, and 22 per cent indicated that they were between 6-10 years old. This resulted in poor education levels of the workers, where women indicated a high level of illiteracy, with 76.1 per cent being illiterate. With only 24% of the women workers being literate, this compares poorly with the literacy rate for Karnataka, where 57.45% women are literate. The literacy level of reeling men (50%) is also much lower than the literacy rate of 76.3% for men in Karnataka (Census of India 2001). This shows that reeling work has a higher concentration of illiterate people than found in the general population. The obviously high levels of illiteracy among reeling workers, particularly women, affected their capabilities and choices. (on capabilities and choices see Sen 1993; Qizilbash 1996). Implied here is that the person cannot exercise his/her practical reasoning, and do what, in his/her perception, furthers his well-being (Nussbaum 2000). However, in the context of extreme poverty, the basic necessities, such as food and shelter, as well as being in reasonably good health, may be of utmost importance, in which case, they would take precedence over whatever else someone in a better economic condition may choose.

While there were more men who had a higher education, they indicated that they did not want to move away from this area (of Sidlaghatta) to find jobs, and they also considered it a possibility that they could make more money someday, as an owner.<sup>16</sup> Overall, however,

workers indicated that they took up silk reeling work because there was no alternative work available. Other reasons included the fact that often parents took advances against wages, and sent their children to the reeling units with the intention that they would help in repaying the advance. What is remarkable in this context, however, is that workers continued in reeling work, and not just over a single generation. Forty three per cent of our sample (54 men and 45 women) stated that their parents worked in reeling units too.

Workers are not ignorant of the possibility that their health could be affected. Among our sample 16 per cent of the men and 33 per cent of the women indicated that respiratory problems had resulted in loss of wages when they could not work. There was also the possibility that even when they went to work, their ill health, though not enough to prevent their going to the unit, prevented them from reeling a larger quantity of cocoons, and thus, affected their wages in any case (where piece-rate payments are made). We could not quantify this, but there are indications that reeling unit owners are particular about workers being able to produce some minimum quantum of silk yarn in the time that they work in the unit.

Living conditions of the workers depend on the places where they work, and whether in the living quarters which are provided by reeling unit owners, or if they are reeling labourers and owners, or whether they have their own homes (built through the advance taken from owners and incomes of several members of the family). Quarters provided by reeling unit owners are of extremely poor quality. Living areas of other workers are not very much better either. Only about five per cent of the workers have their own houses, small though they are.

### **Health Beliefs**

Health care of these workers is closely related to their income. With lack of resources being their main concern, the need to keep down 'medical' costs is of crucial importance. 'Folk remedies', preparations of some kind or the other, or even variations in their diet are tried out to keep the health problems under some control. For instance, some kinds of food are classified as hot<sup>17</sup> and some as cold. So if the ailment in question is hot, then something cold is required as an antidote. An important quality in favour of these folk remedies is that they are cheaper in comparison to allopathic medicine. However, if these remedies do not work, they dispense with them, and look for more effective medication, in this case, allopathic medicine.<sup>18</sup> Whether a worker continues with 'folk medicine'

or chooses allopathic medicine depends on the severity of the health problem, or impairment<sup>19</sup>, and also their tolerance levels. Considering their economic difficulties, their tolerance levels are invariably on the higher side, i.e. they are less likely to consult a physician (saving on doctor's fees), or taking medicines, unless the particular problem is fairly severe.

Despite the costs involved, most reeling workers sooner or later turn to allopathic medicine to control their health problems. Sharing of prescriptions is one of the means of reducing their expenses; so is getting medicines without a prescription at all. The use of corticosteroids to control respiratory problems is not rare, since these drugs have an immediate effect on the workers, and enable them to get to work. Medicating themselves in different ways is a means of keeping their working lives reasonably regular. But buying medicines is not always easy owing to their poverty. When some part of their income is spent on medicines, some other item has to be reduced. The balance between absolute necessities and their limited income has always to be effected. Thus, irregular medication is the normal factor in their lives. Steroids enable the control of asthma symptoms, and provide them with relief, and the means to function as normally as possible in the short run. They are not aware of the harmful side effects of steroid use in the long term.

Most workers believe that alcoholic beverages have medicinal properties. They have a calming effect, and reduce cough, enabling them to sleep. This belief is not only widespread, but women, who otherwise are not prone to consuming alcohol, consume a 'moderate' quantity of liquor as 'medicine'. Scientific studies have not given a categorical verdict on the effects of alcohol. Some indications are that moderate quantities of alcohol can dilate the airways which have been constricted due to asthma, thereby providing some relief to the person. Other evidence suggests that alcohol can work as an allergen and thus, aggravate or set off an asthmatic attack (see Guohual 2001). Workers do not wait for a medical opinion to crystallize, and continue to consume alcohol,<sup>20</sup> though the quantities consumed, in relation to their income,<sup>21</sup> negatively affect their lifestyle (through reduced food, for example, or finding that they have no money to support their children through school).

### **Social Support**

Despite their health problems, reeling workers have to continue work even with their impairment and disabilities since they have few alternatives in terms of their ability to earn a livelihood. There is very little 'social support' for the workers, and medical support is available only to the

small number of workers in government silk factories. For the large number of reeling workers, the entire cost of their health care, and loss of work and wages, have to be borne by them. Family and community support was also not something that they could always depend on. Family disruption and desertion are not unknown, where a man leaves his family and disappears. The wife has then to support the family, though their children also help if they are old enough to work in the reeling units. Problems of desertion are often exacerbated when the men had taken advance against their wages, and thus their wives have to take up the responsibility of repaying the advance, or working for the unit until it is. Such cases are rare, but were observed in our study. To the extent that reeling workers can meet their immediate needs, essentially of food and shelter, they consider that they have accomplished what is crucial to their existence. Their sense of well-being does not have the luxury of being able to take into consideration several capabilities that others may take for granted, but are rarely found among the reeling workers.

## **Conclusion**

We began this discussion by stating that the health of the workers in reeling is adversely affected by the technology involved in reeling. Essentially, while this technology uses open ovens, as well as biofuels, there is considerable evidence to suggest that a significant proportion of the reeling workers (also owners if they remain in the vicinity of the reeling activities) suffer from respiratory diseases, and asthma. A matter that obstructs the possibility of introducing superior technology in reeling equipment as well as the ovens used for boiling cocoons is the cost involved. While reeling provides a source of income to a significant number of people, it also depends on those who are less educated, and with few marketable skills. Thus, the cost of equipment as well as operating reeling units can be relatively low, encouraging even those with small capital to invest in reeling. Even those who set up larger, cottage basin units, can keep down the cost of hiring workers through the low rates of wages in reeling units. Using fuel which is essentially waste matter such as crop residues, or wood chips, is also cheaper to acquire. That such fuel also poses health hazards is much less appreciated, and certainly not by the workers themselves. While workers endure the discomfort which is caused by working in dusty and smoke filled units, they have no perception that respiratory problems are also related to the use of biofuel.

The comparison with a control group (Hosahalli village) where no sericulture activities were carried out confirms that silk reeling has a greater negative impact on the health of the workers. Agricultural labourers

and owner cultivators in this village displayed through their responses to the detailed list of questions that they were in much better health overall than the reeling workers. While there is no doubt that occupational health, and the allergic reactions to the silk allergens, are related directly to silk reeling, even across different ailments, the number of reeling workers who indicated that they suffered from these specific ailments was of a much higher order among reeling labourers than indicated by the people of Hosahalli village.

Whether it is 'occupational' or 'work aggravated' asthma, to the reeling workers the outcome is similar, in that they have to function with a high degree of impairment and disabilities. Poverty, which is the main condition in which they live, ensures that they have to work even if their health is precarious. Workers are well aware of the health problems associated with reeling. But they do not know of any other occupation and so continue in reeling. Further, there is no certainty that all workers will develop respiratory problems. Some workers work for years without any significant breathing problems (just over 60 per cent of our sample stated they had no respiratory problems). There are two factors that have to be noted here: the first is that there are no means by which one can predict who will ultimately develop asthma, and how long it will be before some workers do in fact develop asthma. Even for those who eventually do get asthma, it could have been after several years of working in reeling units. Second, while in the future and after years of reeling work they may or may not develop chronic respiratory problems or asthma, they can in the present context still earn a living from reeling. There is therefore the clear indication that they are willing to take a chance with their health, in the hope that they will not fall victim to asthma.

This leads us to a final issue that needs to be emphasized, and that is the reluctance of the workers to move away from reeling, either to another occupation in the same area, or to another town or area some distance from Sidlaghatta itself. Migration is an option that has been utilized only by those who suffered a severe form of respiratory disease, and those who could not work in the reeling unit or live in the same geographical area (such as Sidlaghatta in this case). Even to move to another occupation is not a serious option to most people, many of whom think that reeling is a much less strenuous occupation than agriculture, for instance. Thus, much as we think that reeling is an occupation which has significant and substantial harmful effects on the health of the individual, there are a sufficiently large number of people who believe that working in reeling units has many advantages.

## Notes

<sup>1</sup> The main study was conducted during 1997-1998, and completed in December 1998, with financial support from the Swiss Agency for Development and Cooperation.

<sup>2</sup> These are our estimates based on data (2000-2001) from Central Silk Board, Government of India, Bangalore.

<sup>3</sup> We have used the word 'labourer' and 'worker' interchangeably, though in some contexts it may have been desirable to make the distinction between hired persons—'labourers' as against family 'workers' who were not paid a wage. But this would prove somewhat confusing if we went back and forth with each term, and we have therefore refrained from making this distinction here.

<sup>4</sup> Subsequent field visits were made in 2001 and 2002. In the later visits, only a relatively small number from the earlier sample (15-20 persons) was contacted, to ascertain if any significant changes had occurred in the period after the study had been concluded in December 1998.

<sup>5</sup> The figures were from the Assistant Director, Department of Sericulture, who issues licenses to set up reeling units. It does not indicate the actual number of reeling units which are functioning at any given time—some units remain closed for various reasons at different parts of the year.

<sup>6</sup> "Biomass gasification for the silk industry: India", n.d. Tata Energy Research Institute, Delhi.

<sup>7</sup> While these figures have been mentioned, we should also note that they are based on the recollections of the workers, and may not be entirely accurate.

<sup>8</sup> Quoting the statement published by the American College of Chest Physicians on types of asthma (1995).

<sup>9</sup> Some indication exists that women in their reproductive years may have more respiratory problems than men, whereas in childhood, there is a greater prevalence of respiratory problems among boys than girls. (Jarvis & Burney, 2000, pp. 21-22).

<sup>10</sup> While our study did not go into details of women's health as related to being married and the number of children that they had, a study conducted in Mumbai City suggested that a much higher number of married women reported health problems than those who were not married. Further, the morbidity rates increased with the increasing number of children. The

study also found that those living in slums had a higher rate of illness than those who lived in better environment (Madhiwalla and Jesani 1997). We may also note here that the living conditions of most of the reeling workers closely resemble that of slums.

<sup>11</sup> Whenever we went to reeling units, women were often found keeping their infant children within the reeling units, or on their laps, while working. Some nursing women took time off to feed their infants, or as in some cases did not even stop work while feeding them. We expect that the health of the children would be affected in some way since they were within the reeling units for prolonged periods, but we have no further data on the health of the children.

<sup>12</sup> In an earlier clinical survey in reeling units, it was observed that 36.2 per cent of reeling workers suffered from bronchial asthma, and 16.9 per cent of the workers from asthma of occupational origin, and thus, 19.3 per cent of the workers had asthma of non-occupational origin (Harindranath et.al. 1985).

<sup>13</sup> The same applies to a question on whether they consumed alcohol—almost all workers denied that they consumed alcohol, though alcohol use, particularly among men, was high (information from other sources, wives, local doctors, reeling unit owners).

<sup>14</sup> There is some difficulty in relating asthma among reeling workers and the cause of death of workers. In a review of the details recorded in the Sub-Registrar's office, Siddlaghatta (record of births and deaths), on the cause of death, asthma was mentioned in many of the cases that were recorded. We made no effort to quantify such details since the mode of ascertaining the cause of death was on the basis of the observations of the family/relatives of the deceased—and not by trained medical practitioners. Often, the deaths occurred in the worker's homes, and no doctors had been called to treat someone who was clearly ill. 'Evidence' provided to support the conclusion that asthma may have been the probable cause of death was that the deceased had been from time to time on medication for asthma, and had occasional consultations with local doctors.

<sup>15</sup> While child birth was a possible factor in the backache problem of some women, the paper suggested that postural backache was the problem among the majority of the women who were interviewed or examined.

<sup>16</sup> More money cannot be made on the basis of being reeling workers, which was essentially a dead-end job. However, many workers had the ambition of owning a reeling unit, and not getting out of reeling entirely. On the occasional success stories of reeling workers, see, Mayoux (1993).

<sup>17</sup> As of now, these practices may not have scientific support. But such beliefs are found, and guide worker's actions, and hence are noteworthy.

<sup>18</sup> Pork was considered as 'cold' by these workers, and when their ailment was 'hot' then eating pork was a remedy. However, pork may be considered as a 'remedy' because the workers liked eating it, and needed justification to incur the cost of procuring pork.

<sup>19</sup> The distinction between impairment and disabilities is that impairment is a "specific loss of function, such as a decline in peak flow or FEV-1, it is a strictly medical determination. Disability is impairment plus all other factors that impact on a person's ability to work, such as skill level, education, job availability etc.; it is therefore based on medical and socioeconomic factors." (Martin, 2000).

<sup>20</sup> While we were discussing some issues of the health of reeling workers with a physician in Siddlaghatta, a worker who was present bitterly complained that the doctor had advised him to stop consuming alcohol. After he stopped consuming alcohol his asthma problem was much worse.

<sup>21</sup> Male workers who had been asked how much they spent on alcohol indicated that that the amount they spent on alcohol each day was about 50% of their daily wages.



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