URBAN PARTNERSHIP

8

BACKGROUND SERIES

Case of Public Interventions, Industrialization and Urbanization: Tirupur in Tamil Nadu, India

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The World Bank

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List of Abbreviations used

AEPC	Apparel Exports Promotion Council
BJP	Bharatiya Janata Party
BOOT	Build-Operate-Own-Transfer
CAD	Computer Aided Design
CEPT	Center for Environmental Planning and Technology
GoTN	Government of Tamil Nadu
ICICI	Industrial Credit and Investment Corporation of India
IKF	India Knit Fair
IL&FS	Infrastructure Leasing and Financing Corporation
JFM	January-February-March
KCL	Kirloskar Consultants Pvt. Ltd., Madras
KECTC	Kasipalayam Common Effluent Treatment Company
LMW	Lakshmi Machine Works, Coimbatore
MFA	Multi Fiber Agreement
MLD	Million Liters per Day
NIFT	National Institute of Fashion Technology
NSIC	National Small Industries Corporation
NTADCL	New Tirupur Area Development Corporation Ltd.
PPM	Percentage Particulate Matter
SIDBI	Small Industries Development Bank of India
SIHMA	The South India Hosiery Manufacturers Association
SITRA	The South India Textiles Research Association
SPV	Special Purpose Vehicle
SSI	Small Scale Industry
TACID	Tamil Nadu Corporation for Industrial Infrastructure Development Limited
TADP	Tirupur Area Development Plan
TEA	Tirupur Exporters Association
TEKIC	Tirupur Exporters Knitwear Industrial Complex
TEKMA	Tirupur Exporters Knitwear Manufacturers' Association
TIIC	Tamil Nadu Industrial Investment Corporation
UNDP	United Nations Development Program
UNIDO	United Nations Industrial Development Organization
USAID	United States Agency for International Development

1 Introduction

Cotton textiles, hosiery and garments together account for a major share of Indian exports; output is concentrated mainly in small scale enterprises. The knitwear industry in India is over a century old. It started from Calcutta, but rapidly spread to other parts of the country. Presently, the main centers where this industry is concentrated include: Tirupur (Tamil Nadu), Delhi, Calcutta, Kanpur (Uttar Pradesh), and Mumbhai. In Tamil Nadu itself, the industry is concentrated in many locations, and Tirupur is one of the clusters of such a concentration. Initially the industry produced mainly under-garments in hosiery for the domestic market. It is only in the last 15-20 years that the industry started manufacturing outer-wear like T-shirts, jerseys, polo-shirts etc. for exports.

The cotton hosiery knitting industry in Tirupur is restricted to the small scale[1] and cottage sector. The law defining this sector – and creating its right to monopolize particular forms of production was created during the early 1960s. Since then, no big or organized industrial units have entered this field. Whoever starts with a higher level of capital usually seeks to avoid the limit on capital size by dividing operations into two or three smaller units. Subsequently, the government raised the capital limit on small scale units to Rs. 30 million from Rs. 7.5 million[2].

The small industrial units require no registration. Therefore, no reliable estimates of the total number of units involved in the manufacture of cotton hosiery are available.

Table 1: Estimated number of knitting, processing and stitching units in India, 1996

Center	Knitting Units	Processing Units	Printing Units	Stitching Units	Total
Tirupur	1400 (58%)	700 (75%)	1200 (90%)	3000 (56%)	6300 (63%)
Calcutta	400	100	50	1200	1750
Ludhiana	400	100	50	500	1050
Delhi	100	20	20	350	490
Bombay	100	20	20	350	490
Total	2400	940	1340	5400	10080

Source: SITRA, 1996: 8

Today, Tirupur is the leading cotton hosiery manufacturing center in India. About 75 per cent of the cotton hosiery garments produced here are exported, mostly to Europe, North America and the Middle East. The exports constitutes mainly, of T-shirts, collar shirts, sweat shirts, sports wear, children's wear, fancy garments and night dresses. The remaining 25 per cent, mainly undergarments (vests, briefs etc.), are sold in the domestic market all over India.

[1] The investment criterion in India is the sole basis for deciding the size of an industrial unit. While the definition explains what a small scale industry (SSI) is, it is presumed that any firm with initial investment higher than that would fall under the medium and large scale bracket. In 1997, the Government raised the SSI limit to Rs. 30 million.

[2] The present BJP Government is planning to reconsider the limit and bring it down to Rs. 10 million. However, the garments sector has been lobbying to keep the garments sector outside this ceiling and favors the Rs. 30 million limit.

This paper offers a discussion of the evolution of the hosiery industry in Tirupur, its characteristics and operation, and the role of the private sector in the provision of infrastructure in the town.

It has seven sections. After the introduction, the second discusses the industry, history and change, output and markets. The production process of the hosiery garments, organization of production, and support activities for the industry in Tirupur are also discussed in this section. The next section discusses the location and change of the industry in Tirupur. Section four discusses various aspects related to labor in the hosiery industry in the town, which is followed by a section on the urban economy. Section six discusses governance, where an analysis of the New Tirupur Project is provided. The conclusions are provided in the last section of the paper.

2 The industry, history and change, output and markets

2.1 History and growth of the industry

The first hosiery unit in Tirupur was set up in 1893. It was the second town in India after Calcutta to start a unit in this industry. Even though knitting came to Tirupur in the 1920s, progress worth mentioning took place only after 1935 when the first hand operated hosiery firm was set up. Availability of good quality cotton in the surrounding region and hundreds of cotton yarn mills[3] were inherent basic strengths of the industry. The cotton market in Tirupur has been very strong since the beginning. Since agriculture was not flourishing due to poor rainfall, the industry served as an alternative source of employment. The low investment required in hand operated knitting machines, easy availability of raw material and yarn from the neighboring Coimbatore town helped entrepreneurs set up their manufacturing base.

The town lies roughly in the middle of a cotton belt some 50 miles wide and this partly accounts for the high concentration of ginning, weaving and spinning mills in the area. Thus Tirupur has long been a thriving center for the sale and processing of raw cotton and has for many years had a large exchange and market for cotton. The price of seed cotton for the whole of Tamil Nadu is fixed at the Tirupur exchange. The ready local availability of this raw material has helped to facilitate the development of the knitwear industry in Tirupur (Cawthorne, 1995: 44).

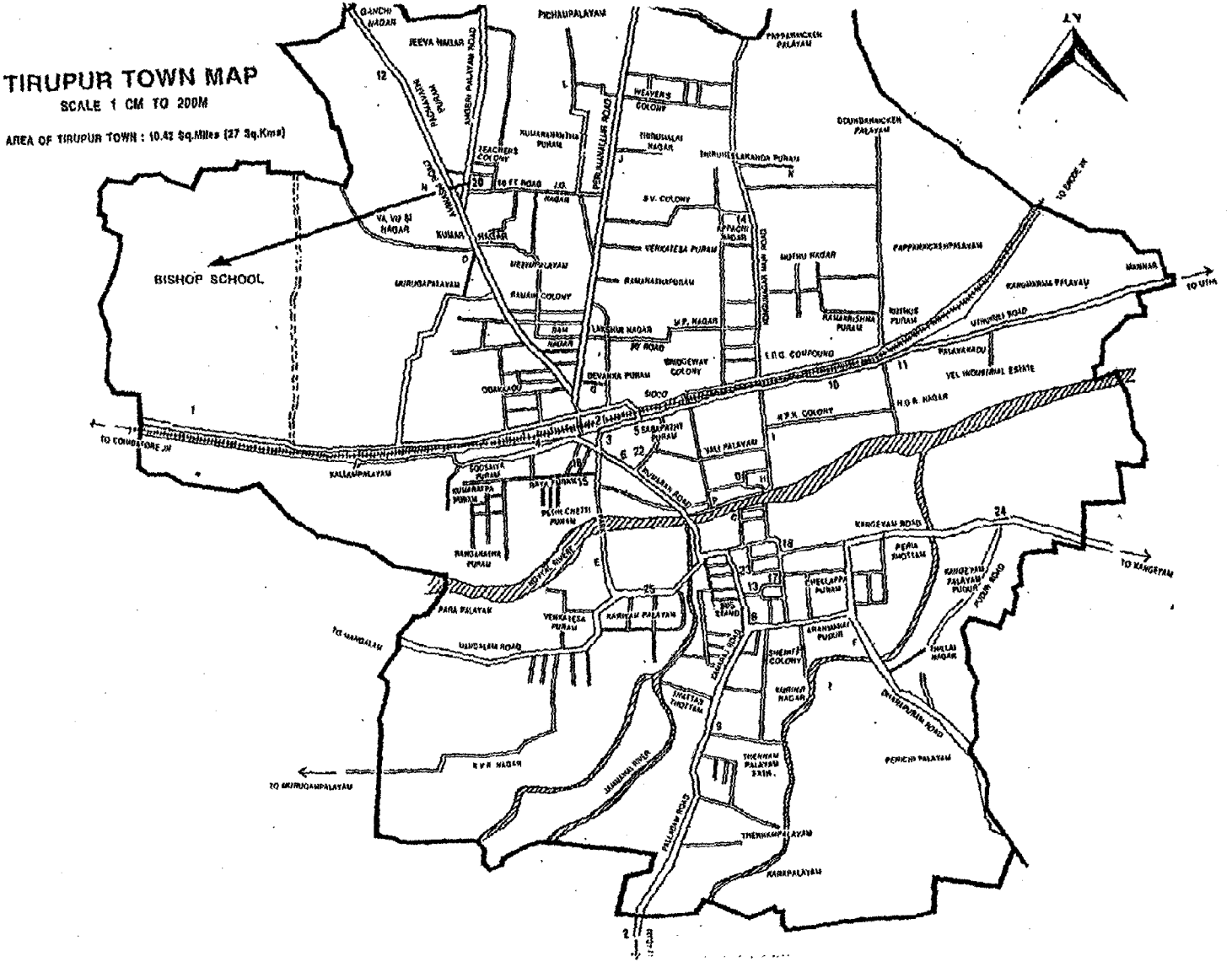
According to Roy (1998), in the 1950s, south India began to emerge as a major powerloom region. This was the time, when an investment wave began in Tamil Nadu. By then, the agrarian caste of Kongunad, the *gounders*, had also entered handloom weaving on quite an extensive scale, mainly as a strategy to supplement unstable returns from agriculture in an area perennially short of water. From the 1950s *gounder* capital and labor began to switch to powerlooms (and a little later, to knitwear in Tirupur). The industrial unrest in the 1960s in West Bengal saw the shift of industrialists to the small town of Tirupur to sustain the demands of northern markets.

[3] in towns like Coimbatore, Pollochi, Salem, and even Madurai

TIRUPUR TOWN MAP

SCALE 1 CM TO 200M

AREA OF TIRUPUR TOWN : 10.42 Sq.Miles (27 Sq.Kms)



Till the 1960s, this industry produced mainly the gray bleached vests (called banian[4] in Hindi). According to Krishnaswami, from 1962 onwards, there had been several factory level strikes for more pay and other benefits, and in some units the strike lasted for six to nine months. 'Many factory owners, especially those belonging to the *Chettiar*[5] caste, closed down their factories due to lower profits and went in for other industries' (Krishnaswami, 1989:1355).

The new entrepreneurs[6] (of the *gounder* caste) who entered the industry at this stage, started small units to avoid labor problems. They did so on the basis of capital derived from land or a surplus from cultivation.

Partly because of the *gounders*, and partly because the transport infrastructure in Tamil Nadu is well developed, the geographical distribution of Tamil Nadu powerlooms differ. from the rest of India. The cities here are mainly points of trade, whereas production is spread in rural and small-town clusters around these cores, and closely connected to them. According to Roy, five such clusters are especially important today:

(a) close to Coimbatore town, Palladam-Tirupur-Somanur-Avinashi towns;
(b) centered around Erode town, Bhavani-Kumararapalayam-Pallipalayam-Chinnamalai towns;
(c) Karur town and the nearby area;
(d) Salem town and the nearby area, and
(e) in the deep south, Rajapalayam-Aruppukottai-Virudunagar towns (Roy, 1998:900).

From the mid-1980s, textile exports surged. By far the larger part of this consisted of cotton garments, cotton fabrics, and cotton knitwear. About half of fabric-exports come from powerlooms, and by far the greater part of the fabrics used in garment exports also come from powerlooms. Until 1990, the home market determined the output of the powerlooms[7]. The early 1990s changed this. The world market became an overwhelming incentive for new investments, and there occurred a veritable explosion of capacity in cotton-based complexes, the most important being the Tamil Nadu clusters (discussed above). This has been a many sided revolution. First of all, the 1990s have seen phenomenal growth of cotton spinning in Tamil Nadu. Secondly, powerlooms making gray cloth mushroomed[8]. In unofficial estimates, which tend to be more reliable than the official, Tamil Nadu loomage expanded from 1-150,000 in 1990 to 4-500,000 in 1996 (*ibid.*, 903).

The knitwear industry accommodated more and more laborers from the agricultural sector to meet the demands of the new markets. In 1968, other items but mainly underwear began to be manufactured and in 1984 the first export consignment was shipped. For the first time in the history of the industry, women were employed and their number kept

[4] Hence the name Banian City for Tirupur (Plate 1).
[5] Trading and business caste
[6] This includes the *Gounders* who took over the production process from *Chettiars* after the strike
[7] Demand in India was largely shaping production. But by the middle of 1980s itself exports had started. So it would be more appropriate to state that exports began in the mid 1980s and picked up at the end of 1980s and early 1990s.
[8] This is the basic input for manufacturing hosiery garments

increasing. It is interesting to note that the employment of women in this industry coincides with orientation to export market (Krishnaswami, 1989).

The expansion of sub-contracting and the inflow of capital from agriculture helped the industry to grow rapidly, and the availability of work on sub-contract basis encouraged many people who had only capital to become entrepreneurs. Due to the low capital involved, many workers started sub-contracting units. The expansion of the existing market and the opening up of new markets inside and outside the country and accelerated the growth. Most of the *gounders* had been workers (unlike the *chettiars*), so they worked on the shop floor when there were labor shortages. Moreover, employers encouraged loyal workers to start sub-contract units, helped to manage capital for investment and gave contract work . Some employers closed their big units and started smaller operations in different localities and under different names in Tirupur

The role of a foreign buyer is thought by the existing producers to have been important. From the mid-1980s, an Italian buyer, Antonio Varenna[9], analyzed the potential in Tirupur. By the end of the 1980s, he was bypassing agents in Delhi and Bombay[10] to start sourcing from about four firms, finally on settling two.

Varenna made some important contributions to the Tirupur industry:

1. There were no processing units for ginning in Tirupur. He helped Tirupur entrepreneurs to develop processing units;
2. he brought in modernized techniques for dyeing and processing hosiery products;
3. he brought with him skilled technicians who could upgrade the product quality and manufacturing process.

During the mid 1980s, Varenna had an almost 80 per cent quota[11] of the Italian market, and almost all of it was being supplied from Tirupur[12]. However, later when stricter quota restrictions were imposed on India, Varenna exported goods from Tirupur to third countries, and re-exported from there to Italy. At the end of the 1980s, Varenna leftTirupur, and started integrated plants in Ethiopia using Egyptian cotton. However, he continued to source from India, and kept in touch with industrialists in Tirupur, until his death in 1996. Many industrialists in the town view Antonio Varenna as the father of direct knitwear exports from Tirupur. Italy is still an important destination for Tirupur exports, although it is now subsumed in exports to the European Union.

From the late 1980s the industry diversified quickly into other outer garments (besides T-shirts), namely cardigans, jerseys, pullovers, ladies' tops, dresses and skirts, trousers, nightwear, sportswear and industrial wear. According to Cawthorne, 'the value of Tirupur's garment exports increased 15 fold in1982-88... the town's percentage share of the total value of knitted garments exports increased from 14.8 % in 1982 to 29.1% in

[9] Initially Varenna was sourcing his products from agents in Delhi and Bombay. When he realized that these agents were sourcing from Tirupur, he moved to Tirupur, mainly to increase his margin.
[10] The dependent subcontractor model, according to Swaminathan and Jeyaranjan (1994:4).
[11] India had a specific export quota in the Italian market.
[12] Interview with Mr. Ponnusami, TEA Secretary, and a noted industrialist in the town, who has spent more than 30 years in the industry, and has been running his operations from Tirupur since the mid 1980s.

Plate1: The Banian City

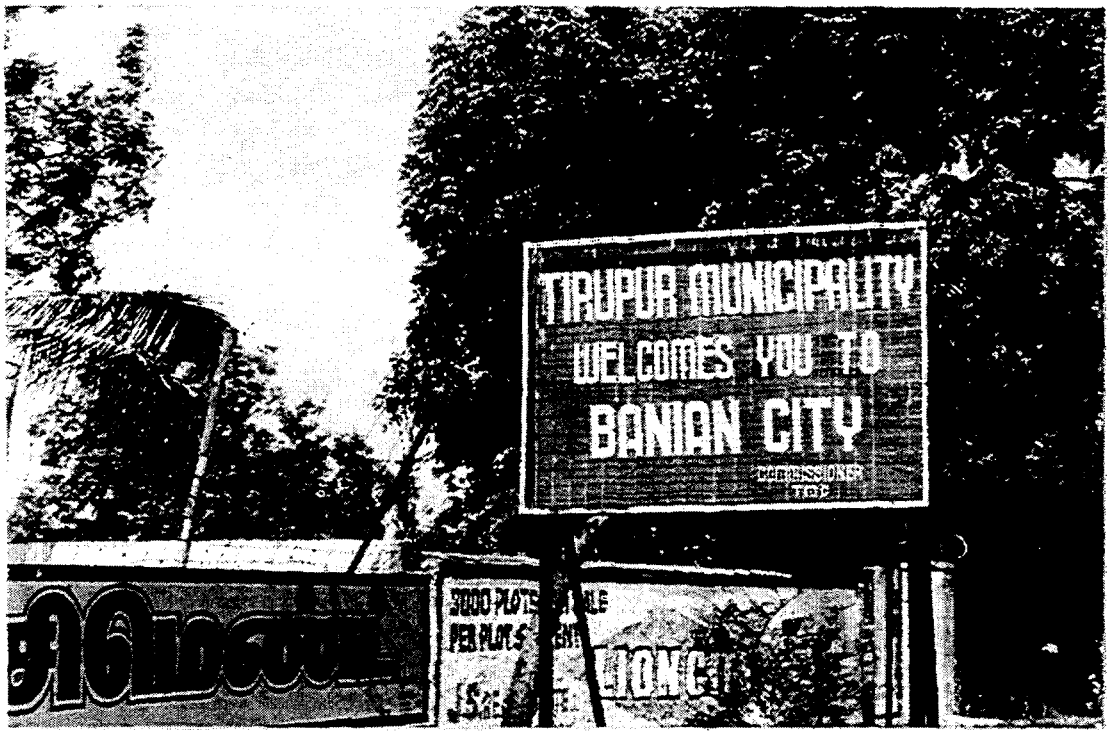


Plate2: Bleaching and dyeing plant in a processing unit, owned by an exporter

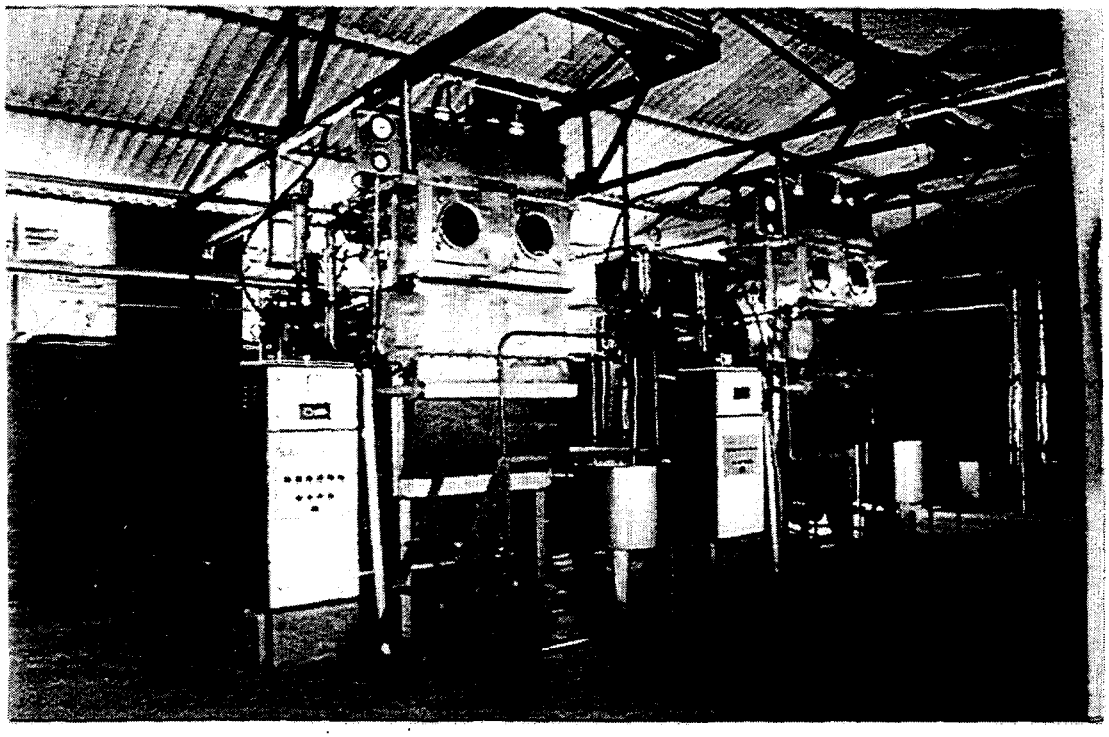


Plate 3: Changing colors of River Noyal, Tirupur

Plate 4: Dyeing unit

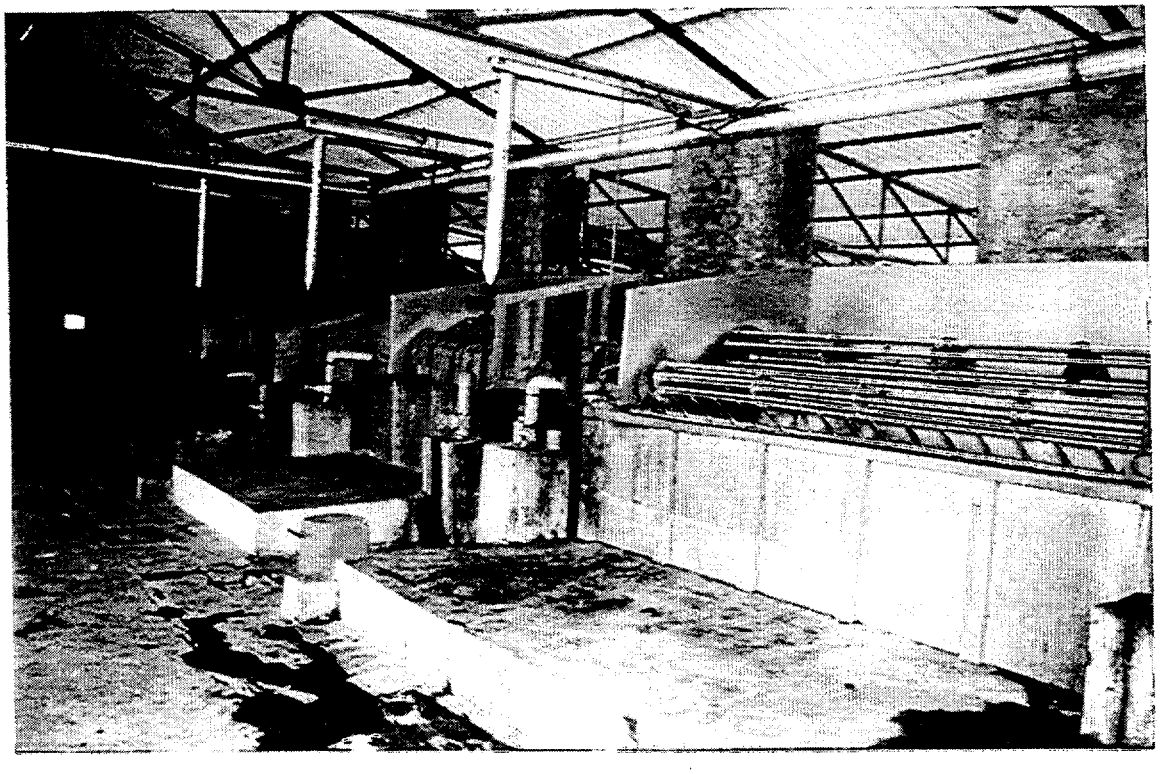


Plate 5: Modern effluent treatment plant of an exporter near TEK Industrial complex

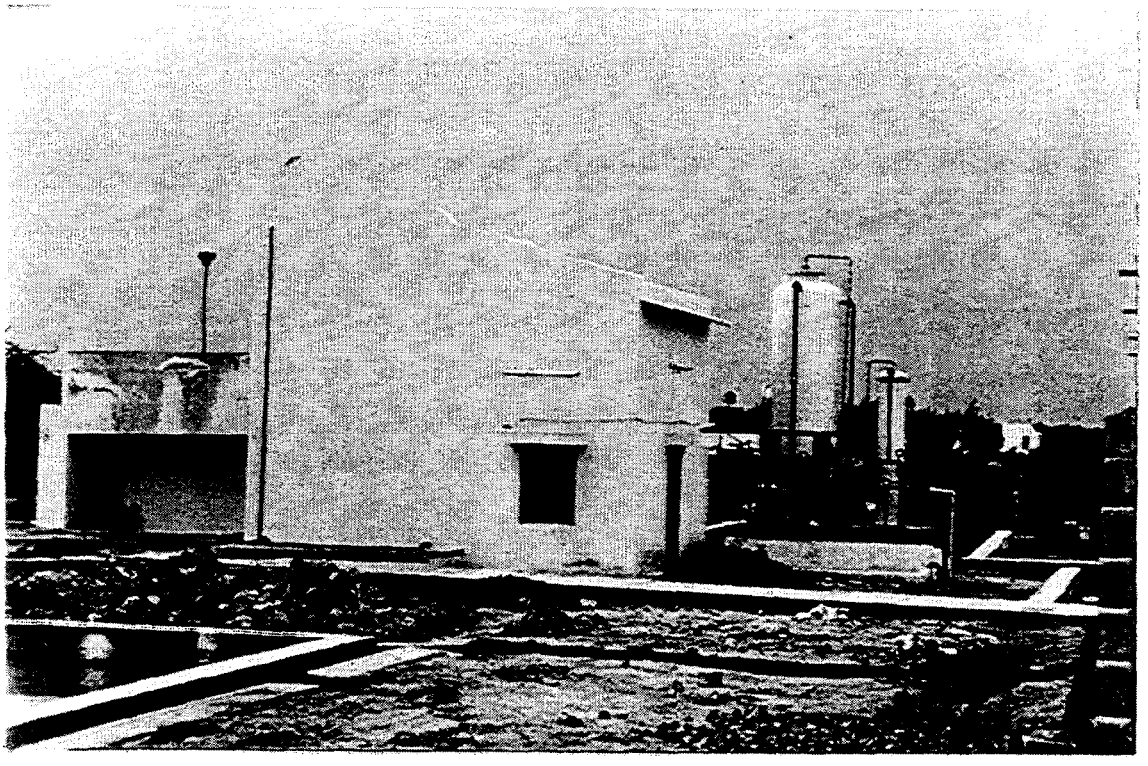
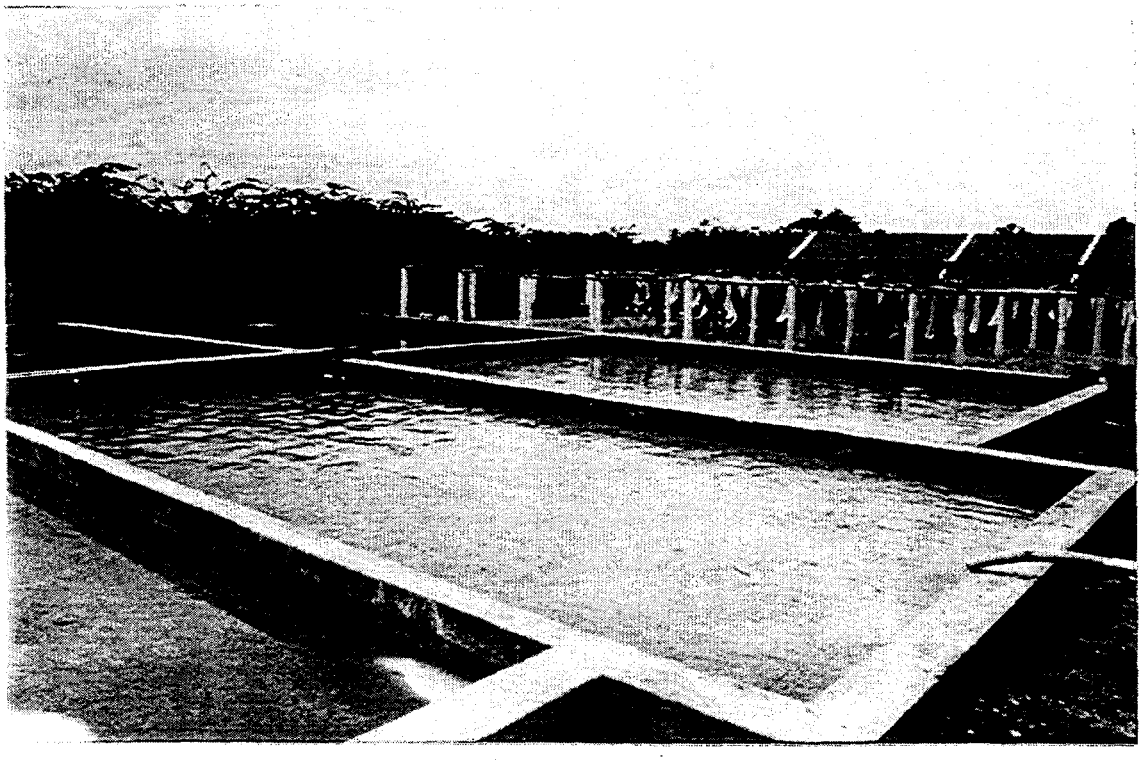


Plate 6: Environmental friendly: No discharge released into the river. The water is made to evaporate naturally



1988...the number of small scale enterprises (SSIs) tripled during 1975-85, annual turnover increased by over four times and employment in the in SSIs rose by almost six times' (Cawthorne, 1995:45).

Direct exports from Tirupur constitute about 38 per cent of the national export in this sector, but if the share taken and exported by agents in the four cities of Madras, Bangalore, Delhi and Bombay the share is about 70 per cent.

Table 2: Cotton knitwear exports from India and Tirupur, 1984-97

Year	All India		Tirupur Direct Exports		% of All India value
	Pieces, (Million)	Value (Rs. Million)	Pieces, (Million)	Value (Rs. Million)	
1984	49.54	892.22	10.42	96.9	11
1985	56.68	1048.9	17.21	186.9	18
1986	80.2	1593.8	28.87	374.8	24
1987	112.24	2838.5	39.17	744.9	26
1988	120.95	3581.9	45.91	1042.4	29
1989	165.6	5431.7	61.4	1673.9	31
1990	222	8512.4	88.87	2898.5	34
1991	243.3	11470.3	90.5	4294.8	37
1992	303	18946.9	133.9	7733.7	40
1993	413.1	28943.8	189.3	11624.3	41
1994	407	31513.7	196.4	13180	42
1995	436.64	37126.5	212.95	15456.3	42
1996	537.67	49577.2	257.36	18918.4	38
1997	632.41	58560	294.28	22140.9	38

Source: Adapted from TEA, 1998
Note: Direct exports from Tirupur are exports registered with AEPC, Tirupur office and directly exported by Tirupur based exporters.

2.2 *Production Process*

According to Krishnaswami, the organization of production is not uniform[13] in the hosiery industry in Tirupur. The production system technically comprises of four operations organized around different firms. These are:

(i) knitting of cotton yarn to make gray fabric;
(ii) bleaching and dyeing of gray fabric;
(iii) fabrication of garments and
(iv) printing and finishing.

Knitting

The cotton yarn obtained on the cones is mounted directly on the circular knitting machines manufactured either by several small firms in Ludhiana, Lakshmi machine works

[13] All the stages of the production process are not carried out in one firm, and there are various activities carried out by a number of firms.

Plate 7: Stitching unit at an exporter.

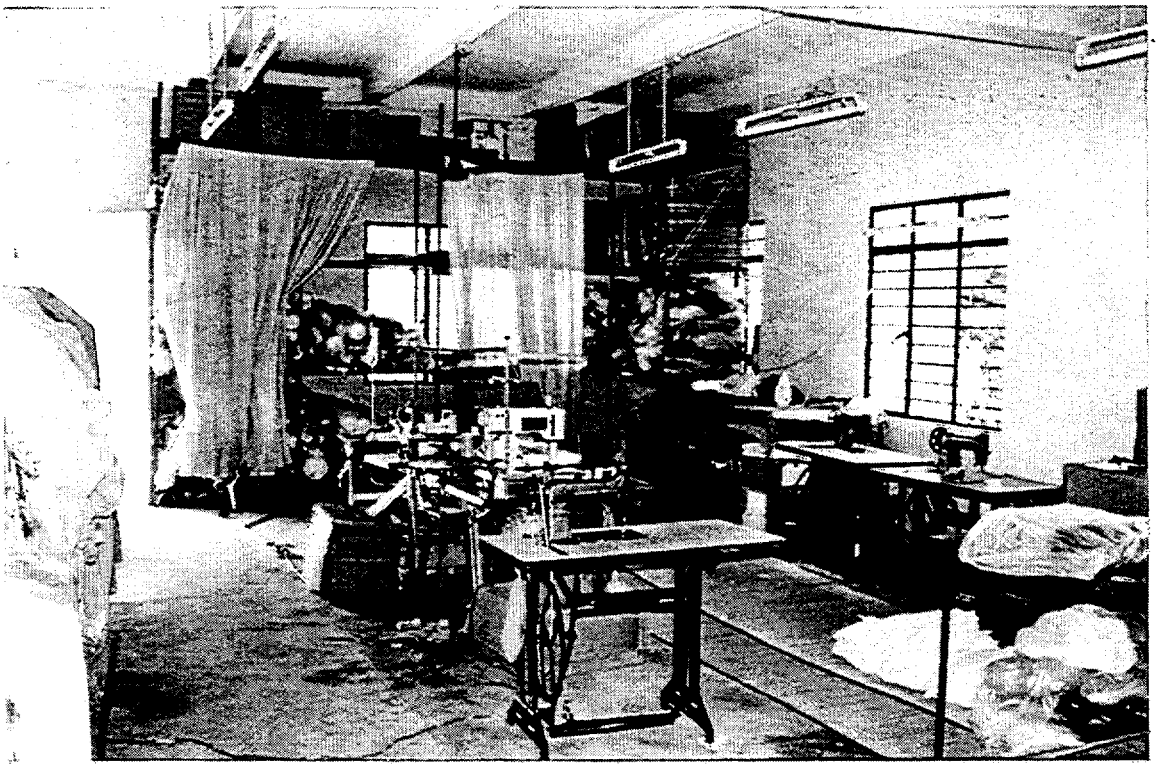


Plate 8: Calendering work in a processing plant

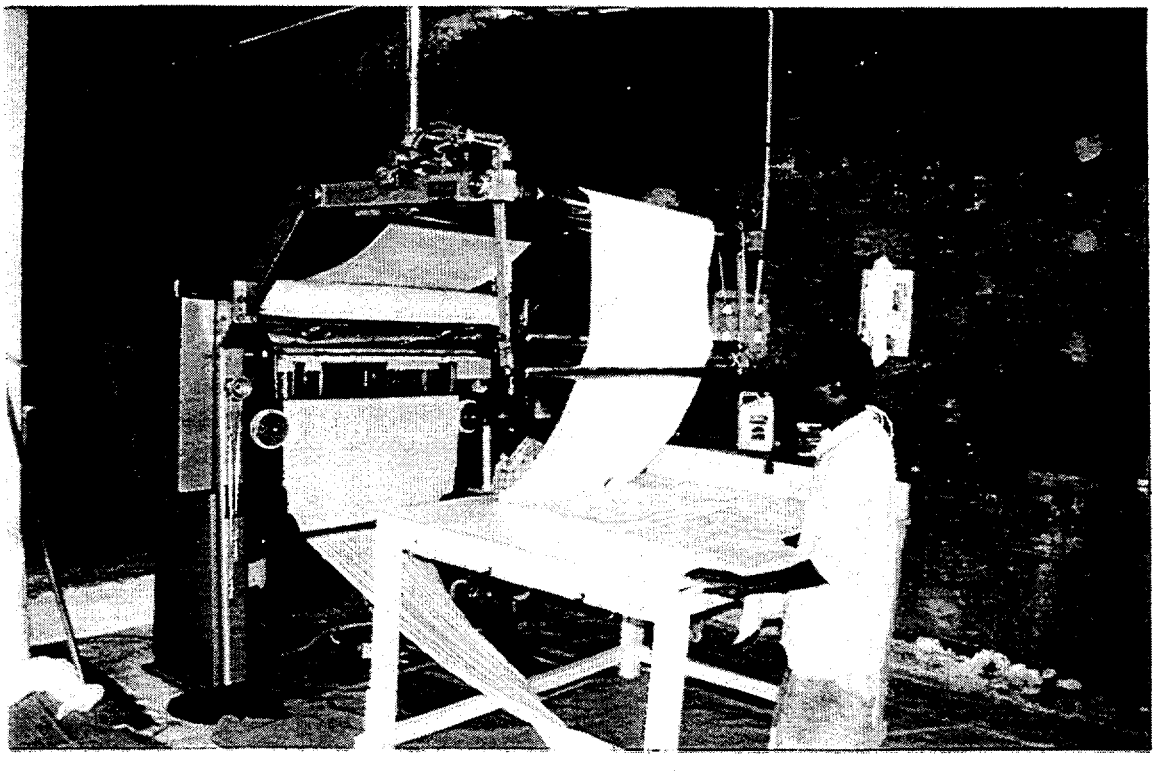


Plate 9:Printing process in one of the processing plants just outside Tirupur

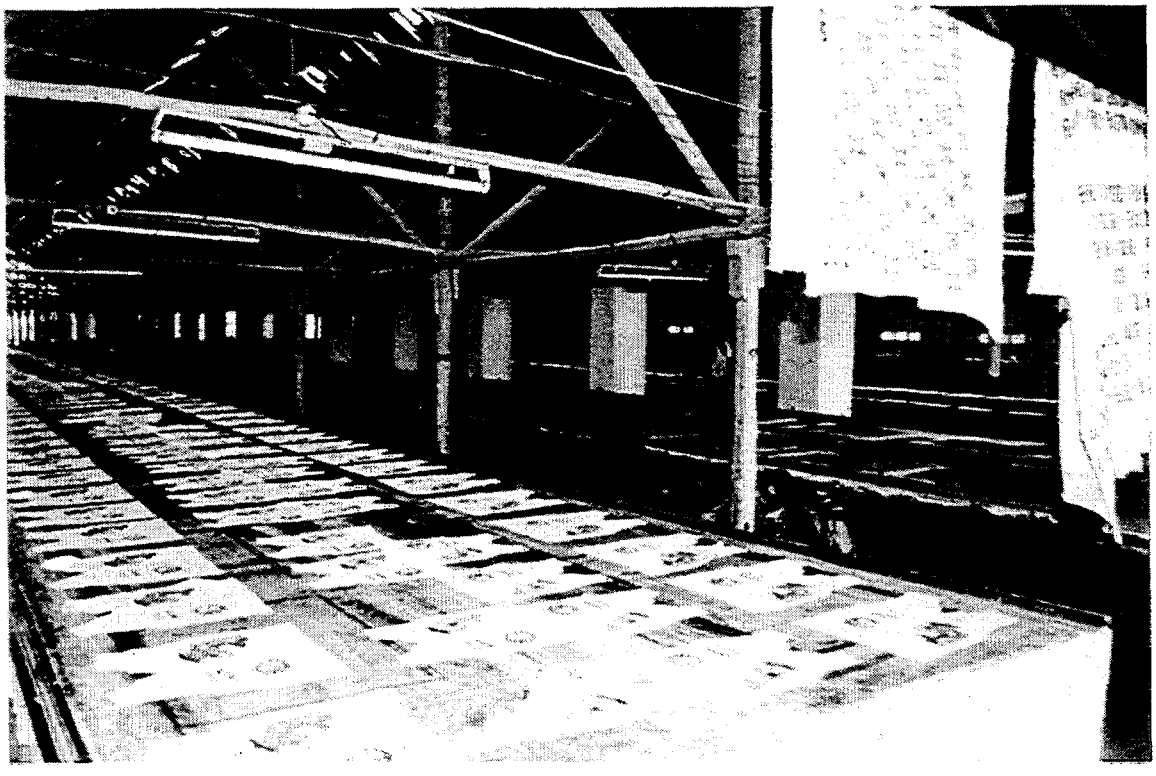


Plate 10: Garment exports: Tirupur style

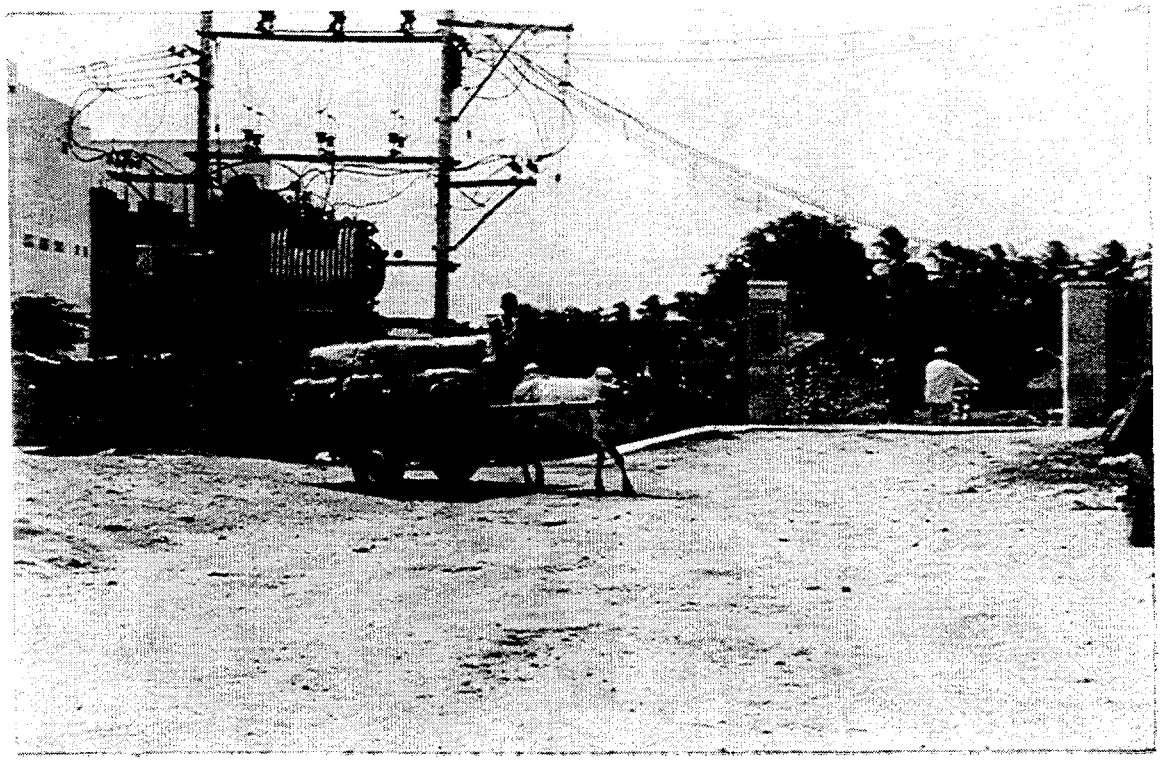


Plate 11: Signs like these to attract foreign buyers

Plate 12 : New bus stand in Tirupur

(LMW) limited, Coimbatore or elsewhere outside India, in that order of increasing flexibility of designs, speed and quality of output. Although Ludhiana made machines, especially the second hand ones, do not entail high capital investment for each machine, it is still not considered feasible or useful to set up a complete range of various sizes of knitting machines in one firm. According to one established exporter, there are about 2,000 knitting units that take up sub-contracting jobs. This, according to him, is the basic cause of subcontracting. While the low end producers of under-garments with no design requirements would use the Ludhiana made machines, the higher end ones producing patterns of designs (mostly given to them by the buyers) on the fabric would invest in the expensive but fast machines from LMW, or abroad. The cloth so knitted is marked in rolls, and forms the first part of the garment making process.

As mentioned above, knitting is the first process in this industry which is organized in three major ways:

i. knitting units which produce the cloth on contract basis for other employers;
ii. units which produce cloth for their own production of goods in their factories; and
iii. the units which produce for both their own production and on contract basis.

Bleaching and dyeing

Bleaching the gray color of the knit fabric is essential for dyeing. This process involves mixing bleaching powder in water through which gray fabric is made to pass (Plate 2). Almost sixty percent of the bleached fabric requires dyeing and it accounts for almost 10-15 % of the cost of finished garments. The most essential requirements for dyeing are getting the correct shade on the fabric, and that is why the skills of a dyeing master become crucial in the process . He mixes various dyes to get the correct shade. This hit and trial method of mixing to get the correct shade leads to a loss of dyes up to 50 per cent.

The major problem for bleaching and dyeing units is the severe scarcity of water . Firms buy water in tankers from adjoining villages. The scarcity of water itself has arisen due to the fall in the ground water level because of over drawing with the phenomenal growth of the industry. Secondly, the water available has become so polluted that its hardness, measured in salt content, has gone up to 1400 PPM when the required level is below 350 PPM. So it is unsuitable for operations. The State Pollution Control Board has issued notices for the closure of units which lack the necessary pollution control equipment. Many of the units have now undertaken to install of common effluent treatment plants (Plates 3-6). Eight are under way, covering 40 per cent of firms.

Fabrication

The process comprises of cutting according to the pattern and thereafter stitching. While cutting is done manually with the help of a pair of scissors or a small cutting machine, stitching is carried out on a sewing machine, manually or electrically operated (Plate 7).

Sophisticated indigenous and imported sewing machines are used not only for high speed stitching but also for the various stitching designs. This is the most labor intensive process.

The stitching and other processes according to Krishnaswami, are organized in the following four ways:

i. owners arrange the complete production process under their direct control, employing workers;
ii. owners rely on sub-contractors who own the finishing units;
iii. owners leasing out their stitching section to a worker on contract, while doing the rest of the process directly; and

iv. owners lease the finishing unit and rely either on sub-contractors of their factories or other sub-contractors for finishing work.

Printing and finishing

Printing is mainly done on the garments although it could also be done on the bleached fabric before stitching. There are many small scale printing units which undertake the work. However, it is important that before printing is undertaken, calendering (Plates 8 and 9) is done to ensure the surface of the fabric is smooth for printing. Calendering is the process of pressing the garment with steam. The ironing and pressing tasks are done by men only. This is followed by the last task, 'checking'. 'The checking work is primarily done by women' (Krishnaswami, 1989:1354).

2.3 Organization of production in Tirupur

Apart from knitting/stitching, dyeing/bleaching, printing and embroidery, there exist in Tiruppur a whole host of other ancillary and supporting industrial units. Small workshops thrive alongside factories, and the town as a hive of textile-related industrial activity. There are handloom weavers, ginning and spinning mills. 'There are bleaching and dyeing works, fabric making and garment workshops, screen printers, label makers, thread multinationals' suppliers, zip manufacturers and zip suppliers, button sellers, button dyers, *kaja* hole makers, packaging materials factories printing labels, manufacturing polythene bags and second-hand machinery shops' (Cawthorne, 1995:44). All these provide the necessary forward and backward linkage to the industry.

The industry provides direct employment to more than 100,000 skilled, semi skilled and unskilled workers. If those employed indirectly are included then the industry employs anywhere between 250,000 and 300,000 workers (Swaminathan; Jeyaranjan, 1994: 5). But these are only estimates, as many more remain unrecorded. Cawthorne explains, 'many very small producers, nearly all making garments for the local markets, exist, and are not recorded at all... there were various estimates of the numbers of such firms - anywhere up to 10 per cent of all units in the industry, but they would only account, however, for a very small part of the turnover' (Cawthorne, 1995:45)[14].

[14] The Editor of **Tirupur Guide** says, at present approximately 500,000 people are employed in the industry (which includes hosiery and processing units) in and around Tirupur.

Large integrated units belonging to the non-SSI sector combining all operations from yarn knitting to the finished product exclusively for exports are being contemplated only now. Designation of this sector as SSI masks the common ownership of otherwise spatially separate units of production. This common ownership includes the phenomenon of both horizontal expansion and vertical integration. Swaminathan, and Jeyaranjan comment that in Tirupur, 'it would be more appropriate to talk of large, medium, and small entrepreneurs rather than firms'[15] (Swaminathan; Jeyaranjan, 1994: 5).

The horizontal and vertical networking is complex and dense. Some patterns can be discerned. Swaminathan and Jeyaranjan(1994) group the entrepreneurs into three categories: namely, exporter-manufacturers, non-exporter manufacturers and merchant exporters. However, they further suggest that:

(a) in each of these categories there are large, medium and small firms;
(b) the exporter-manufacturers and the merchant exporters who dominate the scene control (formally and informally) a variety of enterprises spanning the industry both horizontally and vertically;
(c) the non-exporter manufacturer category includes both those producing for exporters (and hence strictly speaking subcontracting units) as also those producing exclusively for the domestic market.

The need to stick to delivery schedules and maintain internationally acceptable standards in quality, finish etc., has had its own impact on the manner in which production is organized. It has not led to all operations being brought under one roof. The large-exporter-manufacturers and merchant exporters teamed up with several enterprises covering different segments of the production process. The mutual exchange of information and assistance provided (if necessary) between the members of the team (in technology, market on the one hand, and expertise relating to the different processes on the other) enables each of the segments to operate at internationally acceptable standards of production.

Even those large enterprises which have all operations under their control need to rely on outside facilities to fulfill their orders on time. Hence vertical integration does not obviate the need to network with others outside their control. This allows Tirupur entrepreneurs to handle a wide range of small orders, even as small as 500 pieces[16].

In most cases, design were supplied by the buyer, and only recently have some larger Indian firms with CAD systems started designing. The establishment of TEA-NIFT

[15] A study by **Business India** (cf. Swaminathan & Jeyaranjan, 1994) reported that though there are many units in the town, it is unlikely that there are more than 500 families in the business- 'sister concerns', usually managed by close family relations are common. This practice received its biggest fillip with the introduction in 1972 of excise duty, which acted as a disincentive to expand production in any one unit beyond a given point. In order to expand production fresh units were set up, often in the same premises. In an interview with the author, the Editor of **Tirupur Guide** adds that he would think about 1000 families/individuals manage most of the show in Tirupur.

[16] An Assistant General Manager of SIDBI said that many Tirupur entrepreneurs go to Hong Kong when a deals between Chinese exporters and Western buyers take place. The Chinese take bulk orders, and "if the buyer wants 755, 500 pieces, the Chinese exporter agrees to give him 750, 000 pieces...and to take the remaining order of 5,500 pieces, there would invariably be a Tirupur exporter waiting to clinch the deal!"

(discussed in section 5.2) is primarily to increase the number of knitwear designers in Tirupur, but most producers at the moment depend on buyer designs,

Dyeing is one area which requires massive inputs of technology. It is also the most problematic because of the heavy pollution caused by the discharge of effluents from the dyeing plants. As noted earlier, the heavy demand for water that dyeing requires makes it expensive.

The latest in printing – for example, embroidery technology – has been installed but on a limited basis. The risk involved is considerable for individual entrepreneurs in investing in sophisticated machinery in dyeing, printing or embroidery. Given the great variety of fashions and designs in exports, any set of machines that cannot switch quickly between designs and fashions will spell disaster for those who have made specific investments. For example, major investments in the most sophisticated imported embroidery machines have been rendered obsolete with changes in fashion in printed fabrics.

The important aspects relating to the issue of technology are the following:

1. the latest machinery in almost all the processes of production is available in Tirupur itself, complete with spare parts and components;

2. the level of awareness of such machines is also high, coupled with the ability to decide what combination of the machines enables producers to stay competitive at the international level;

3. those interviewed were unanimous in their opinion of the ability of their workers to repair and maintain the machines.

Job-Working: Horizontal networking between and within firms

"Job working" is a term used by everyone in the industry to describe work (a "job") shared by firms specializing in different processes, within firms between different units specializing in different processes, or to refer to contract work organized through traders. These arrangements can be considered structurally, but they can also be considered as a social relation of production whereby owners of firms are able avoid problems associated with the direct control of large labor forces. Thus:

- "outcontracting" takes place between firms specializing in different processes and enables firms to make choices about the extent to which they vertically integrate parts of the production process

- "incontracting" has developed within some of the larger firms where an owner(s) employs a "job work contractor" for each unit. The contractor acts as a production manager who is also responsible for employing labor for a particular "job". This system again sets up process divisions, but this time within a firm'(Cawthorne, 1995:47).

Such "clustering" aids a tight-knit circuit in which there are many different possibilities to get work done between different firms – the production problem had many different solutions. Sometimes the different operations are carried out by different family members, so that between them they fabricate cloth, bleach and dye it and make up garments- a kind of hybrid situation in which issues of quality and trust are not problematic.

Table 3: Number and type of units in Tirupur according to various sources

	UNIDO		TEA		Tirupur Guide	
Type of units	Number of Units	Percent	Number of Units	Percent	Number of Units	Percent
Exporters	600	16.4	2500	71	615	11.5
Knitting & Stitching units	2000	54.8	—	—	3086	57.7
Dyers & Bleachers	600	16.4	600	17	650	12.1
Screen Printers	300	8.2	300	9	348	6.5
Embroidery Units	100	2.8	100	3	569	10.6
Packing Materials	50	1.4	NA	NA	83	1.6
Total	3650	100	3500	100	5351	100

Source: UNIDO (u.d.), TEA (1998), Tirupur Guide (1998)

The table shows some of the different estimates of numbers of units (we cited earlier SITRA's estimate of 6,300 units). Part of the problem in making such estimates that frequently firms split into separate units and yet remain functionally a part of the larger parent firm. This phenomenon has been called 'amoebic capitalism' by Cawthorne (1995)..

Innovative service enterprises have been set up by private entrepreneurs. These services are targeted at exporters, suppliers, manufacturers, buyers, importers and the retailers that help reduce risk, improve efficiency, provide inputs for cost control, implement and ensure compliance with mutually agreed quality systems. They include, for example, pre- and initial production checks, during production checks, final random inspection, status reporting, container loading supervision, damage survey, product consultancy, sourcing assistance, factory assessment and laboratory testing. This helps to bridge the gap between manufacturer and buyers and vest a greater degree of confidence in the marketing channels.

2.4 *Support structure for the industry*

Industry associations play a key role. There are many sub-sectoral industry associations[17]. For example, dyeing and bleaching units have a separate association. With firms inter-

[17] To name a few, the South India Hosiery Manufacturers' Association (SIHMA), Tirupur Exporters Knitwear Manufacturers' Association (TEKMA), Banian Cloth Manufacturers Association (BCMA), Tirupur Dyers Association, Tirupur Bleachers Association, Tirupur Steam Calender Association, Tirupur Screen Printing Association, Tirupur *Kaja* Button Owners Association, Tirupur Narrow Tape Manufacturers Association, etc.

related through common control, entrepreneurs may become members of more than one association. More than one association may be looking after the interests of the same category of members. The following are the main activities and the main industrial associations.

Those playing a quasi-judicial role in settling disputes:

A number of associations are called upon to resolve disputes. Some, such as the Tirupur Exporters Knitwear Manufacturers' Association (TEKMA) also seek to secure the settlement of inter-firm payments between members. The associations also take up a more pro-active role in wages, keeping in mind government regulations. After settlement, agreed wage rates then become the standard norm for the industry as a whole. Disputes between labor and management are also settled by them.

Those providing other services:

The South India Hosiery Manufacturers' Association (SIHMA) assists its members in getting loans and credit from banks and financial institutions. On the procedural front, assistance is also provided in getting the registration certificate of small scale industry, the Reserve Bank of India code and export-import licenses. It also files legal suits and extends legal representation to its members. SIHMA, in 1956 had 106 members; it now has 1200[18].

The Tirupur Dyers' Association conducts workshops and seminars to educate their members on the latest trends. It has taken an active role on the issue of pollution control by representing members to the concerned authorities. It is searching for technical collaboration in setting up the water treatment plants. It has also coordinated the setting up of eight common effluent treatment plants on behalf of its members.

Among these associations, TEA is the most dynamic. The role and importance of 'Tirupur Exporters Association' (TEA) needs special mention. Section 5.2 discusses in detail the role and activities of TEA.

Other Institutions:

There are a number of other key institutions which provide sectoral support. They include the South Indian Textile Research Association (SITRA), Apparel Exports Promotion Council (AEPC), Textile Committee and National Small Industries Corporation (NSIC). Besides, the nationalized banks and Tamil Nadu Industrial Investment Corporation(TIIC) are also involved in providing long term and short term financial assistance.

Apparel Exports Promotion Council (AEPC):

The AEPC was set up in 1978 by the Government of India to stimulate exports and to advise buyers, exporters and government. It regulates the textile quota system under the Multi Fibre Arrangment and bilateral trade agreements with importing countries. It

[18] Note from SIHMA, dated 24th July 1996

organizes trade fairs and trade delegations, and provides information to exporters on national and international regulations affecting the industry.etc.

AEPC (Tirupur) in collaboration with SITRA has established a small center called the AEPC-SITRA Knitwear Service Center. The main objectives of the center are:

- To impart the necessary training and skills to the people in the industry for the manufacture of knitwear products
- To provide testing facilities for quality improvement and standardization and
- To offer consultancy services to entrepreneurs

The center also regularly conducts an entrepreneur development program. The center also offers consultancy services in shrinkage control of knit fabrics, color fastness improvement in dyeing and printing, defect analysis and new projects.

2.5 Markets for the industry

Firms are highly segmented in terms of markets and the types of garment produced for different markets. There is a huge range in the quality of cloth used and therefore in the quality of the resulting garment. Typically, the very small firms use a coarse knitted fabric and, if dyed at all, poorly. On the other hand, firms with contracts from foreign agents must comply with the conditions of production (design, type of fabric, dyeing and finishing) which imposes its own quality control. Subcontracted work for international markets compels similar disciplines. Sometimes, medium-sized firms may undertake such outwork precisely because it gives them a chance to improve their knowledge of particular designs and gain experience of better quality fabrics. In between the small local markets and the international markets, many medium-sized and some of the large firms produce better quality garments for Indian markets[19].

However, historically, the domestic market for hosiery products has been for low quality and low value added products . The introduction of the concept of ready made garments including hosiery products is a comparatively recent phenomenon starting in the mid 1980s, and that too limited to the large cities. Outer wear garments such as jerseys, night dresses, sportswear made of knitted fabric do not form part of Indian dress, conventional or modern. Most of the well known brands in Tirupur are therefore related by domestic consumers to undergarments.

However, in exports, as diversification has become possible, firms have moved into producing higher value goods such as jerseys, pullovers, cardigans, ladies tops, dresses, children wear, sports wear, night dress, swim wear, bed linen, industrial wear and non-apparel products like gloves. But the bulk of the output remains in basic knitted undergarments, pre-eminently tee-shirts. Export markets covered most of the countries of European Union, North America, the Middle East and Japan. The unit value of this changing product mix has therefore increased over a period of time as also due to

[19] A large exporter suggested they were upbeat about the domestic market, as consumers were getting more aware of quality. This company had won a contract from a large multinational chain to produce its goods under license for the Indian market. The owner of the firm, believed that there would be many more such opportunities in India, and demand for high quality garments in the domestic market would continue to grow.

improvements in quality and swifter compliance to fashion changes. To keep a close check on the quality, some of importers and merchant exporters have stationed their representatives in Tirupur itself. This close interaction between market agents and manufacturers results, directly or indirectly, in product standardization, maintenance of quality and intense price bargaining.

A major problem in exports is the quota, regulated under the Multi Fiber Arrangement (MFA). The merchant exporters, based in big cities, are awarded quotas based on past performance. When Tirupur-based manufacturers wish to expand into exports, they find it difficult, since they have to either buy a quota allotment on the open market (at a price that eats into their future profit) or fight for a part of the small share reserved for new entrepreneurs by AEPC. Besides this, there exist common problems related to exports when buyers or suppliers are unable to meet their financial, technical or commercial commitments. This leads to cancellation of orders even after most of the processing has been completed. In Tirupur, this has led to the development of a separate market for export surplus items that are then bought at cheap rates by some merchants, specialized in this line of activity. These consignments are then sold in domestically.

Despite a strong export performance, the Indian cotton hosiery industry's share of the international trade remains insignificant (about 2%). The industry faces competition from Yugoslavia, Slovenia, Croatia, Turkey, Israel, Malaysia, Indonesia and the neighboring countries of Bangladesh, Sri Lanka and Pakistan. Second, the value added per piece, despite increasing, is still below international standards. Quality goods supplied by Tirupur are exported mainly under the brand names of the importers. However, some of the merchant exporters have recently taken the initiative of getting their own brands propagated.

3 Location and Change

Most of the hosiery industry is located in the middle of the present town, with the processing industry spread on the outskirts of the town where large areas are available. Many processing industries are concentrated just outside the TEA industrial estate in Mudalipalayam, as polluting industries are not allowed in that industrial area.

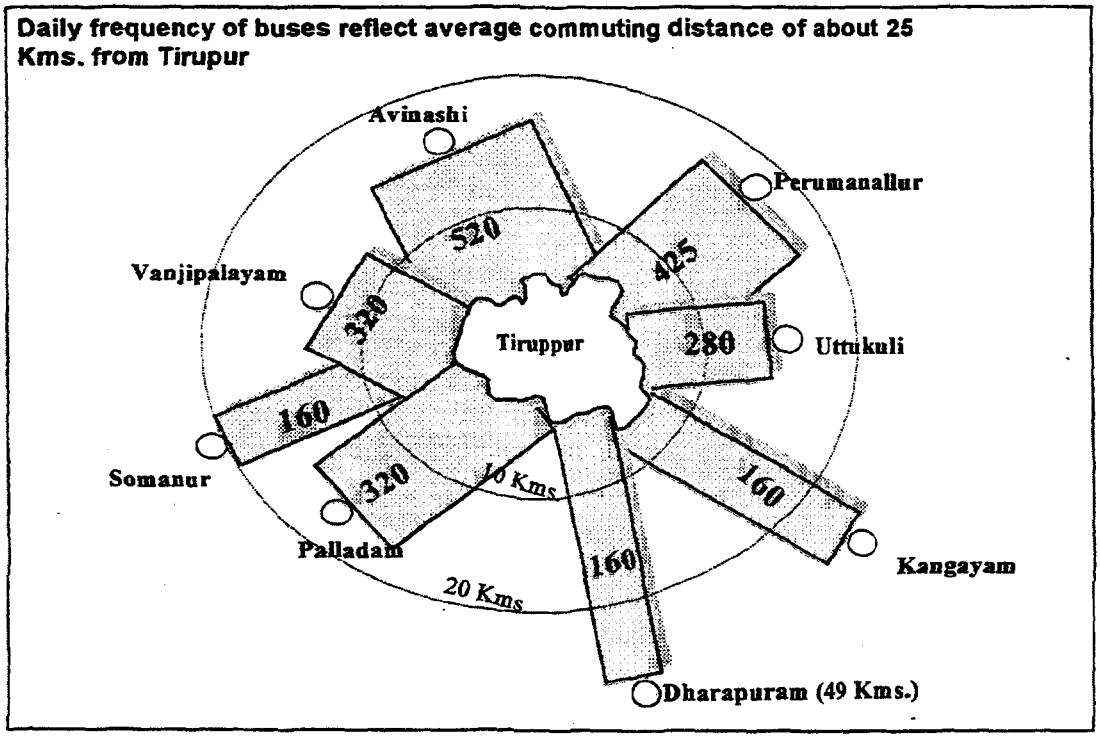
In recent years increasing land prices and rents in Tirupur town and severe congestion have led many industrial units to relocating to greenfield sites. This is especially true of integrated firms that only buy yarn from outside the firm, the rest of the production process, from knitting to packaging being done in-house. The growth of the industry is pronounced in the Vanjipalayam, Avinashi, Peremanallur, Uttukuli, and Palladam direction.

The area of influence of Tirupur for worker recruitment is around 25 kms., although in some instances, people from about 50 kms. also commute to Tirupur. The daily commuting pattern based on the number of buses[20] coming in and out of Tirupur from various directions also reflects this (Fig.1). Over recent years, workers from distant places

[20] Based on discussions with heads of various operational units of the State Transport Corporation and Private operators

(such as Madurai and Salem and other parts of Tamil Nadu) have settled in the town to work. To accommodate increasing numbers of daily commuters, a new bus stand has been built in Tirupur (Plate 12 & 13).

Fig. 1: Average daily commuting distance from Tirupur for workers

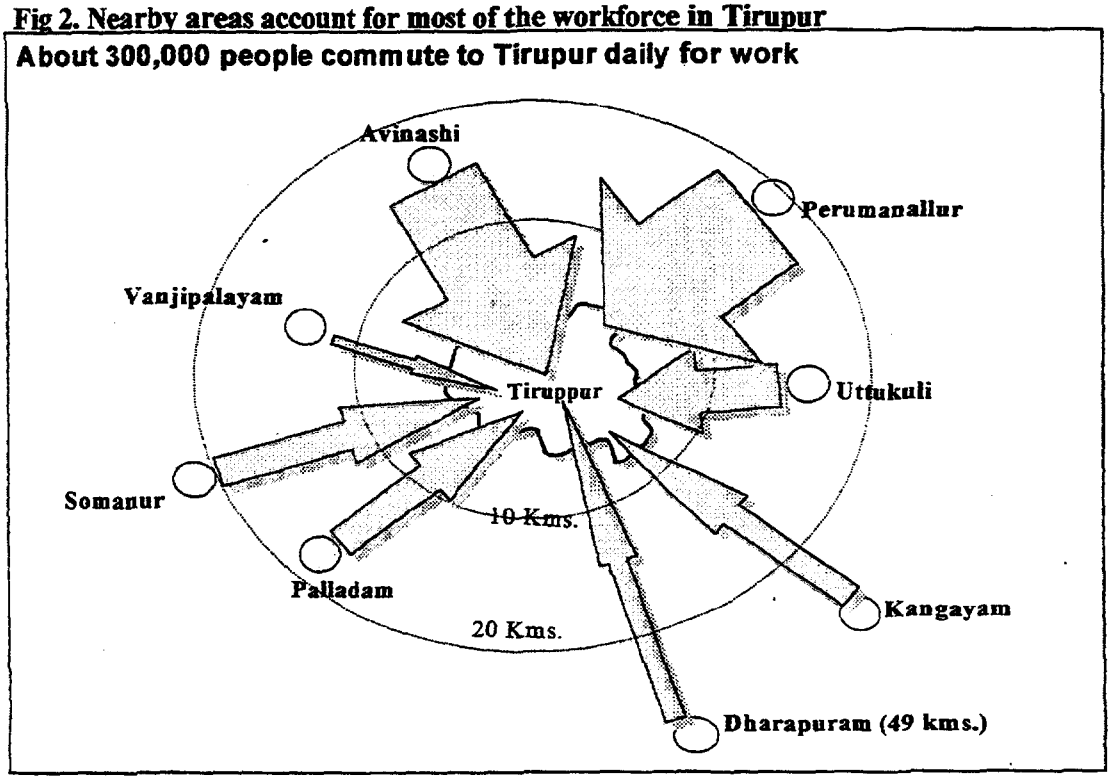


Note: Numbers indicate average daily number of buses from and to Tirupur for these directions

About 300,000 workers[21] commute to Tirupur daily from anywhere between 10- 50 kms. More than a third of these come from the direction of Perumanallur. The other major sources for workers in Tirupur include the Avinashi Mettupalaym section, and Somanur and Palladam area (Fig.2)

[21] Based on the discussions with professionals in the office of Tirupur guide

Fig 2. Nearby areas account for most of the workforce in Tirupur



Note: Arrows are proportionate to the size of workers coming in from each direction, with Perumanallur direction accounting for over one-third of the total

4 Labor

Tirupur is a town surrounded by villages, which specialize in dry land farming, and thus rely mostly on the monsoon for cultivation. Since a monsoon failure has become the rule rather than the exception for almost three decades, the survival of the rural population depends on the availability of work in three major cities, Tirupur, Erode and Coimbatore. Given the proximity to Tirupur, people tend to look for jobs there rather further away.

According to Krishnaswami, from each family of hosiery workers, 'at least two family members work in this industry... in many cases we can see four to five family members working in the same industry' (Krishnaswami, 1998: 1355). Almost every household on an average it seems has at least 2-3 people engaged in activity whose *raison d'être* is the knitted garments industry.

Garment manufacturing units (excluding household units) usually have at least 15 employees, and can reach a maximum of 300 persons. In processing units (excluding the household based ones), the minimum number of persons is usually around 25 and can go up to 300 persons.

There are no official figures available on the number of people employed in the industry in Tirupur. Based on discussion with industrialists, it is estimated that in all up to 500,000

people may be employed in the garments and processing units in and around Tirupur. Of these, professionals who publish the **Tirupur Industrial Guide**[22] estimates that 300,000 will be in hosiery, and another 200,000 in processing. About 200,000 people are supplied by Tirupur town itself to work in these factories, and another estimated 300,000 commute on a daily basis.

Table 4: Average size of garments manufacturing and processing firms in Tirupur

Garment Units		Processing Units	
No. of Persons	Percentage	No. of Persons	Percentage
0-50	50	0-100	50
51-200	30	101-200	35
201-300	20	201-300	15

Source: Interview with Editor of **Tirupur Guide**

Training for labor, supervisors and more skilled persons such as dyeing master has been made available from different institutions such as SITRA. However, informal ways of training through on-the-job experience, job rotation and working experience with different firms seems to be the main source.

The wages are paid generally on piece rates. A 12 hour (one and a half shift) six days working week is not unusual in firms when export commitments need to be fulfilled. This also provides workers with an incentive to earn more at the end of the day. When production schedules are especially tight, labor is called upon to work up to 16 or 18 hours a day. Women, young boys and girls are considered for less skilled jobs.

Opinion in industrially developed countries has shown an aversion to products made in firms employing child labor. The TEA has therefore taken up a proactive role and it is common to see sign boards on the gates of firms declaring the non-employment of child labor (Plate 11). This seems to have worked especially with the exporters. But it is common knowledge that child labor is still prevalent in Tirupur, although it has declined in the organized sector.

5 The city and the rest of the economy

The industry has brought great wealth to the town. Although there are no official statistics all agree that this is so and many treat the industry as a ready-made recipe to make money. Although there have been many failures too, it appears that people in Tirupur are not afraid of bankruptcies or failures.

A number of new schools have been founded in the town including the TEA Public school, (starting in1995). Earlier many parents encouraged their children to go to work rather than study. This is changing mainly due to: (a) many buyers now insist that they do not want

[22] They conduct an annual survey of industries in Tirupur. The investigators visit door to door recording the type of firm in operation. It includes however only those that have a name sign, or a rubber stamp.

products from factories that use child labor; (b) parents are becoming aware of the usefulness of formal education. Despite this, there are many households that still encourage their children to work, rather than go to school.

Another indicator of wealth in the city is construction activity, and the number of hotels built in the last seven or eight years. Many industrialists have diversified into other activities like this. A good example is the Poppys group, which is owned by a leading exporter and President of TEA (and Chairman of AEPC), which now has a hotel and fast food restaurants, apart from several retail stores.

The number of two wheelers (scooters and motor cycles) in the town has increased many fold in contrast to the past when most people used cycles. A manager in SIDBI referred to the number of jewelers shops that have opened in the recent years, as an explicit measure of wealth in the town, not only among entrepreneurs, but more significantly among workers[23] too.

However, success has also meant the town has grown beyond its means, and the infrastructure is under great stress. With a great shortage of water for drinking as well as for processing, over 40 per cent power shut down, abysmally poor road conditions, Tirupur a major challenge to urban management.

Some of this may change, when the newly constituted New Tirupur Area Development Corporation Limited (NTADCL) starts supplying water and providing sewage facilities in the town and in the nearby villages (this is section six).

5.1 Demographic growth of the town

The town's population has grown rapidly, exceeding 40 per cent in each decade since 1941, with cumulatively an almost fivefold increase between 1951 and 1991 (Table 5).

Table 5: Population growth of Tirupur

Year	Population	Increase from previous decade	% Increase
1901	6,056		
1911	9,429	3,373	55.69
1921	10,851	1,422	15.08
1931	18,059	7,208	16.42
1941	33,099	15,040	83.28
1951	52,479	19,380	58.55
1961	79,773	27,294	52.00
1971	1,13,302	33,529	42.03
1981	1,65,205	51,903	45.81
1991	2,35,661	70,456	42.65

Source: KCL; CEPT: 7

[23] and if the continuing trend is any indication, then many of these workers would become entrepreneurs themselves in the future.

Population density

Tirupur's population density has also risen over the past two decades. Currently the central area of the town[24] is densely populated with over 15,000 persons/sq.km.

The high density areas are concentrated in the centre, the low density regions on the outskirts. However, peripheral wards[25] though low density are only partially developed, so relative to the provision of services, they may be worse off than the centre.

Table 6: Population density in Tirupur

Year	Density (persons/Ha)
1971	42
1981	60
1989	79
1990	86
1994	98

Source: KCL;CEPT

- **Slums**

There are 99 slums in Tirupur on Government, Municipal and Private land, in addition to settlements on land owned by the dwellers themselves. There were about 32,353 slum dwellers enumerated in the 1991 census (13.7% of the 1991 population).

6. Governance

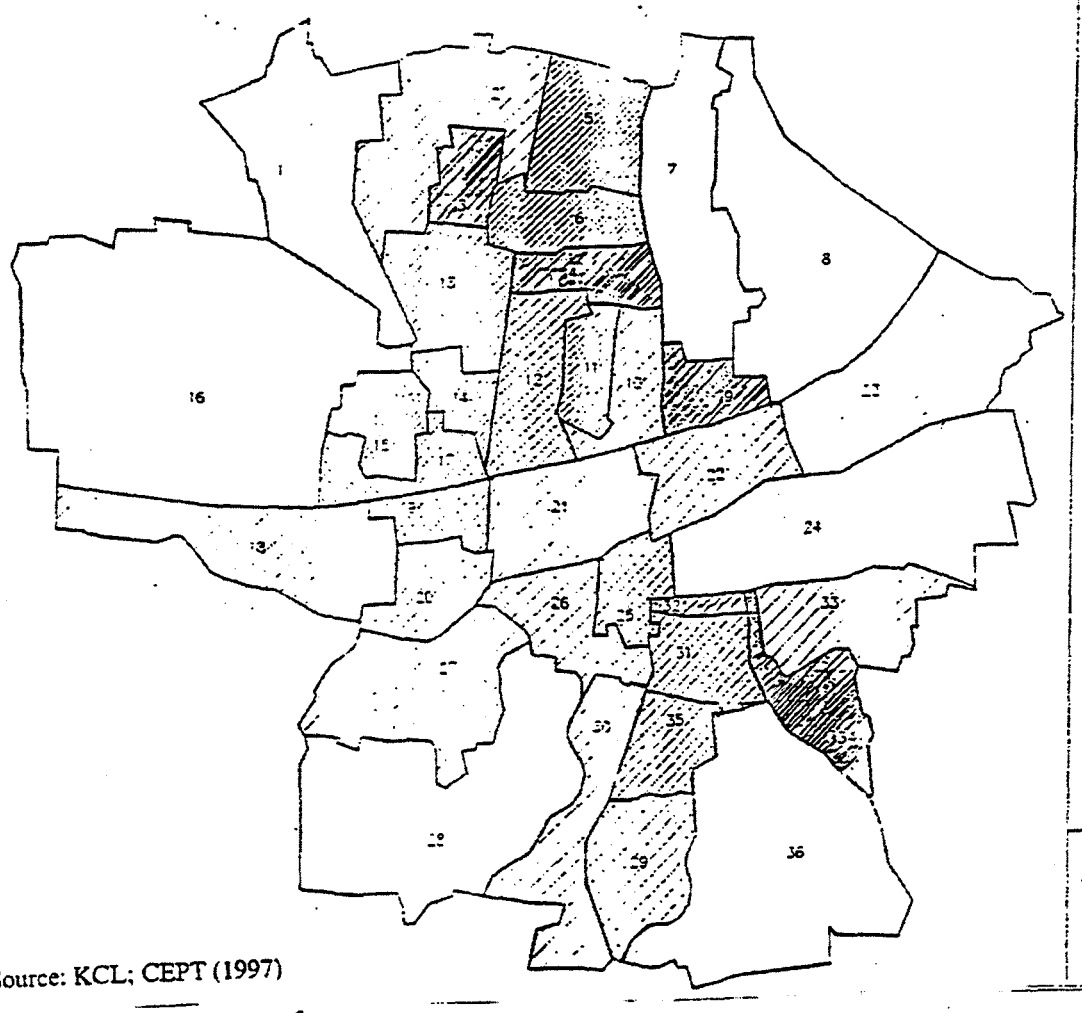
6.1 .Tirupur Exporters Association (TEA)

TEA was established in July 1990, with Mr. Sakthivel of Poppys Knitwear as founder-President. This is an association, exclusively for exporters of cotton knitwear who have production facilities in Tirupur. Today it has a membership of more than 350 .
In the last eight years TEA has undertaken an impressive program of work for the development of the knitwear industry in Tirupur and for the development of the town in general. Its achievements to date can be summarized below:

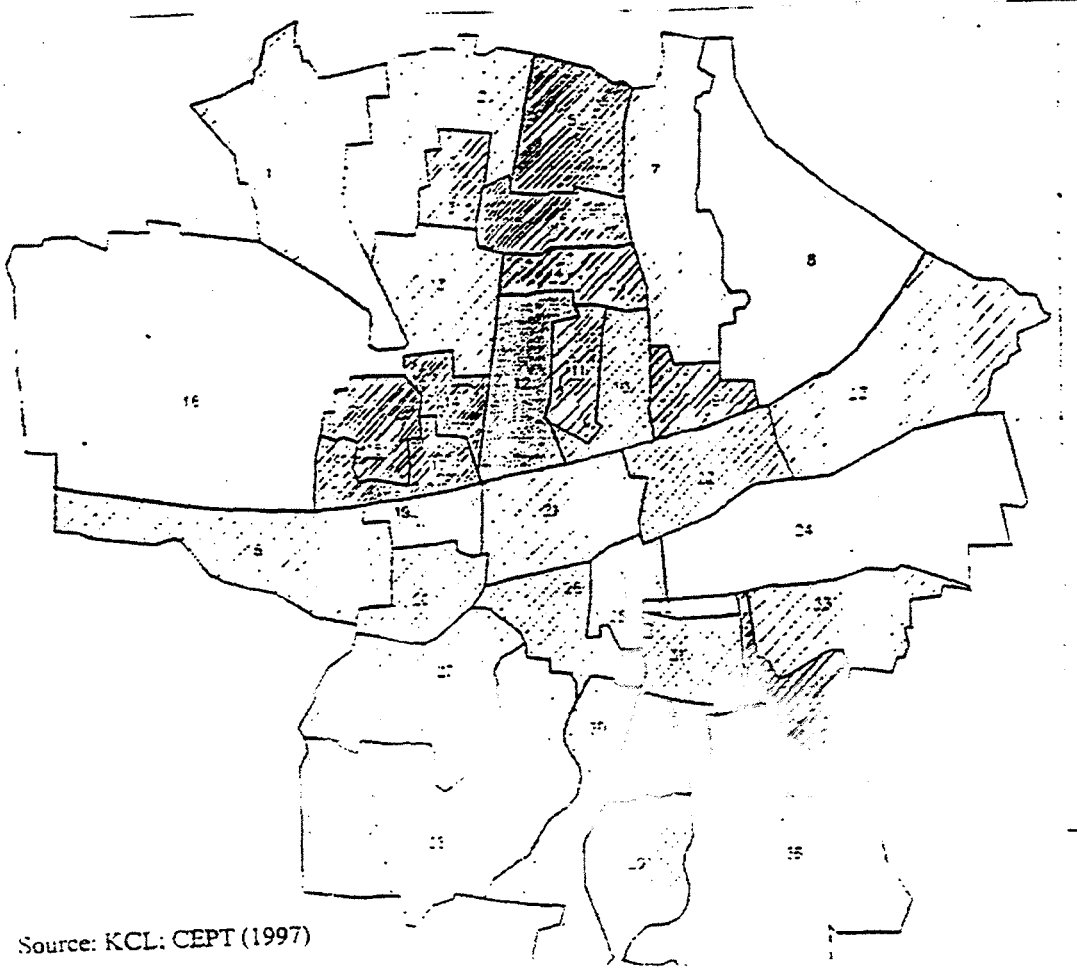
- **Industrial Complex**

TEKIC (Tirupur Exporters' Knitwear Industrial Complex) is a modern industrial park covering an area of 100 acres about 9 kilometers from Tirupur on the Uttukuli road (Plate 14). It now has 189 industrial factory units exclusively for the manufacture of knitwear for export. More than 95 per cent of the complex is now occupied. TEA claims that this is the

[24] wards 10, 11,12, 14,15,17,19
[25] like 1,7,8,24,36



Source: KCL; CEPT (1997)



Source: KCL; CEPT (1997)

Plate 13 : New bus stand in Tirupur: Plenty of space to handle traffic

Plate 14 : TEKIC at Mudalaipalayam on Uttukuli Road. This complex is entirely developed by TEA, 9 kms. From Tirupur

first and largest industrial estate in India to be initiated entirely by private enterprise. The park has wide roads, a 2000-line electronic telephone exchange and a power sub-station[26].

- **TEAKNIT Industrial Complex**

At the invitation of Kerala Government TEA started a knitwear industrial estate in Kanjikode, near Palakkad, Kerala state. This park consists of 50 production units and one large modern processing unit (TEAKTEX) with facilities for effluent treatment and disposal.

- **New Tirupur Development**

TEA along with TACID, and investment bank IL&FS has formed a joint venture company the NTDACL, to deliver infrastructure to the Tirupur area. Its immediate concern is to supply water, and provide adequate sewerage. In the long term, the project envisages provision of roads, housing and telecommunication services in the new town. The Tirupur Area Development project is discussed in detail under section six.

- **Container Freight Station**

In the absence of efficient cargo movement facilities, exporters were often faced with serious problems of delayed shipments and pilferage. In order to over come this problem, TEA jointly with Lee and Muirhead Limited, a clearing, forwarding and shipping agents has established a container freight station at Tirupur. This container terminal (TEA LEMUIR Container Terminals Pvt. Ltd., TLCTPL) has been functioning since August 1995[27].

- **TEA : education and professional training**

TEA has started a fully residential school in Tirupur (called the **TEA Public School**). The school has been in operation since June 1995.

In addition, TEA has, jointly with the National Institute of Fashion Technology (NIFT), started the **TEA-NIFT**, which has now entered its second year of operation. The Institute, exclusively for knitwear fashion, currently housed in the industrial area promoted by TEA. The institute is equipped with the latest machines and equipment to impart advanced training in all courses (Plates 15).

To finance the Institute, TEA provided Rs. 8 million; the investment bank, ICICI, Rs.10 million; with a substantial contribution from the World Bank (**Clothesline**, 1998: 86). The institute is currently offering the following courses (Plate 17 & 18):

- Three year diploma course (for students after A Levels), and is called Knitwear Technology Design Production and Marketing; and a
- One year certificate course in (i) fashion design and pattern making,

[26] Although still many of the exporters have to depend on their own power generation methods
[27] Note from TEA on Knitwear Industry in Tirupur (July 7th, 1998)

Plate 15 : CAD center at TEA-NIFT

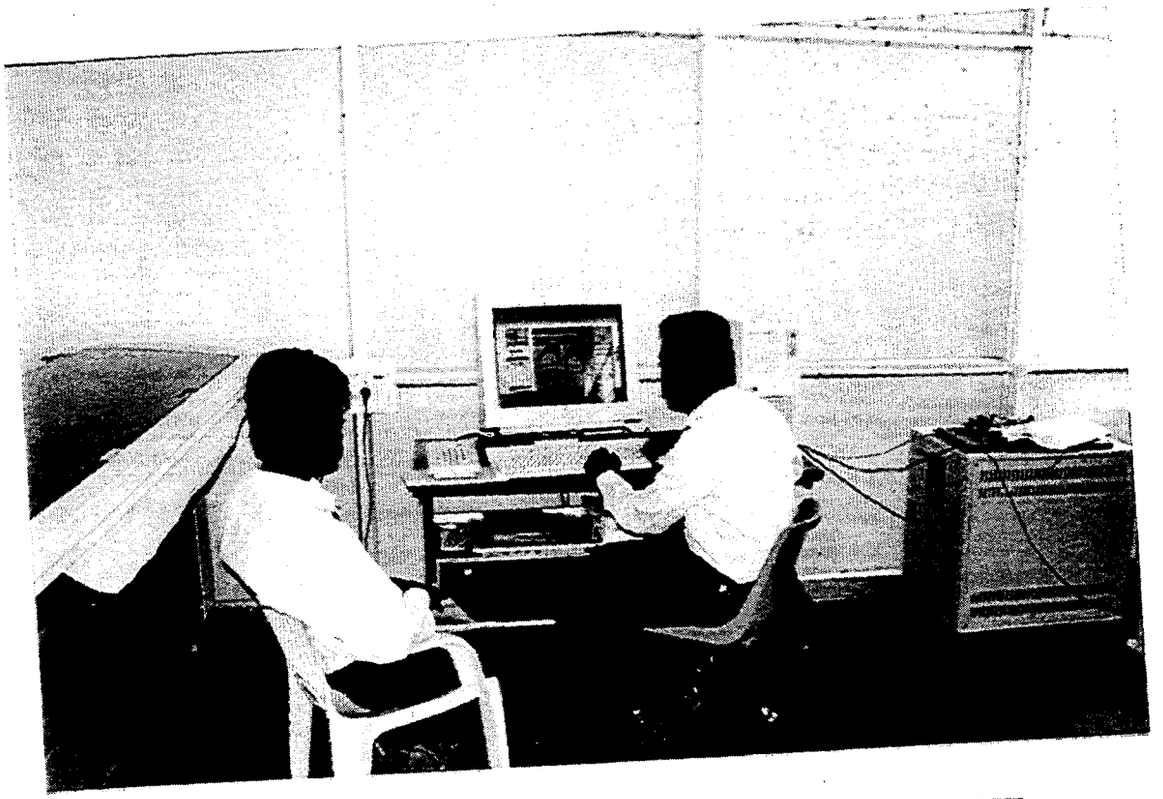


Plate 16 : Testing Center used by many industrialists in TEA-NIFT

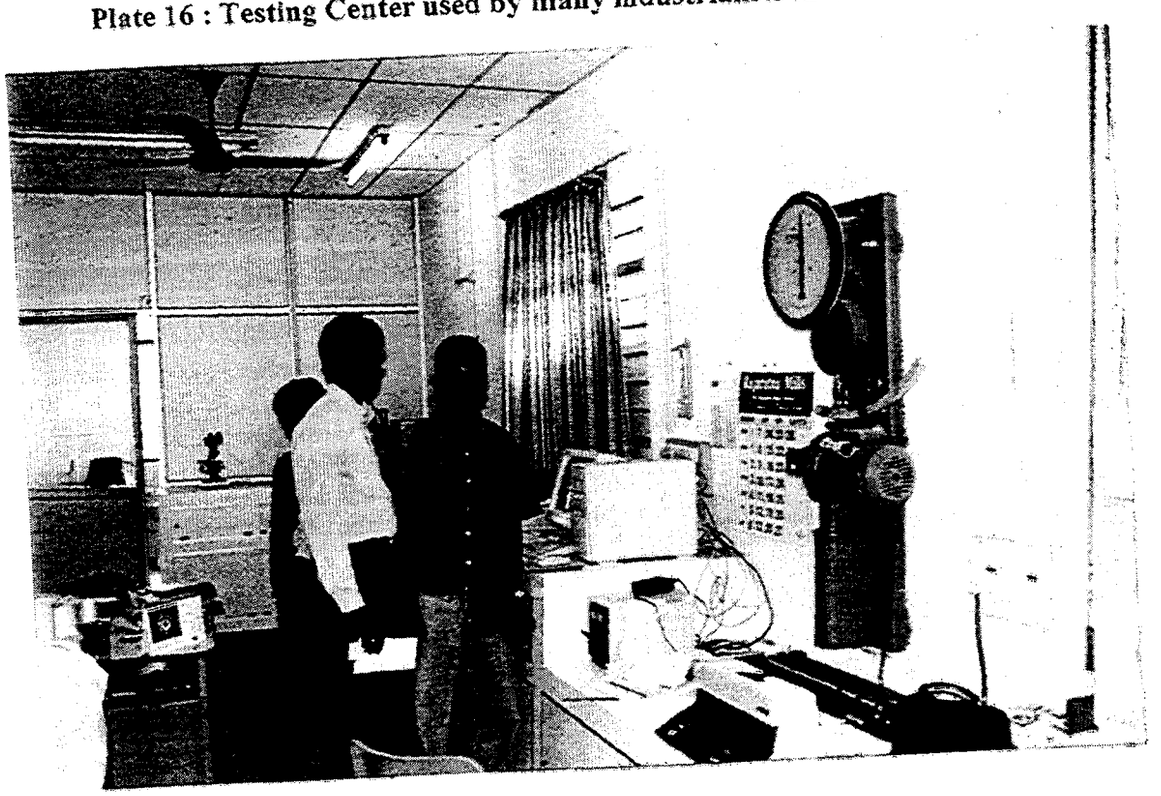


Plate 17 : Teaching at TEA-NIFT

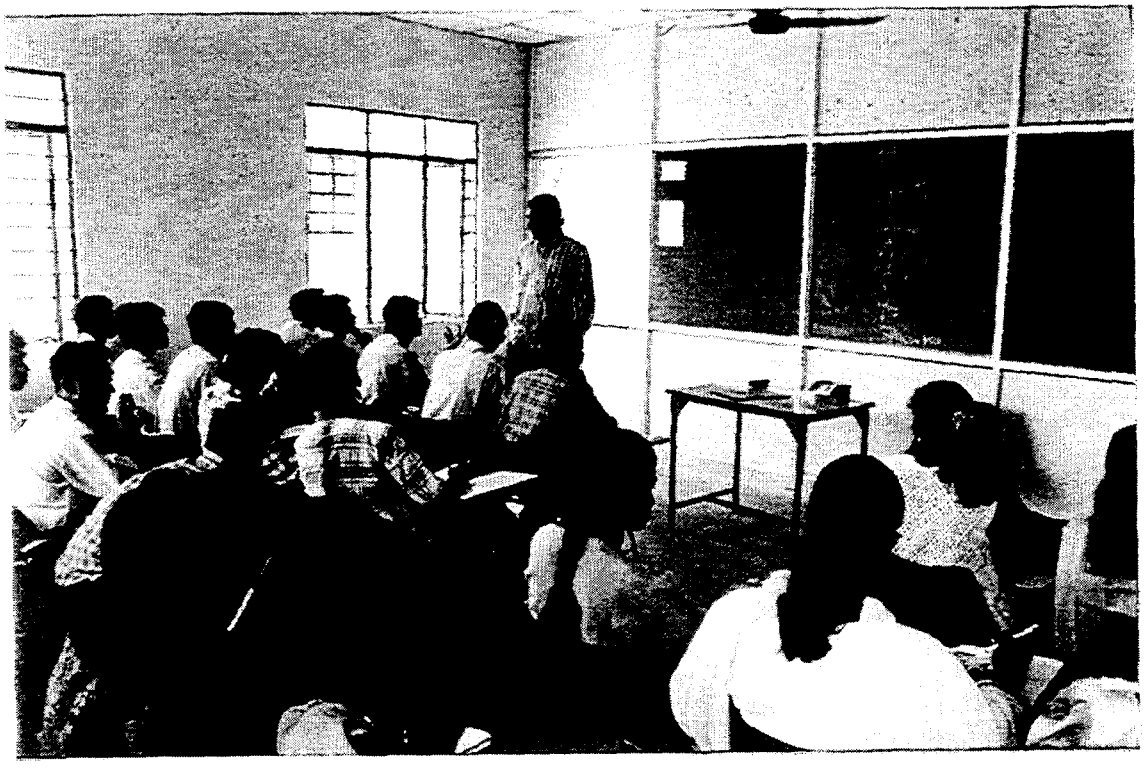


Plate 18 : Large number of girls enroll for courses in TEA-NIFT

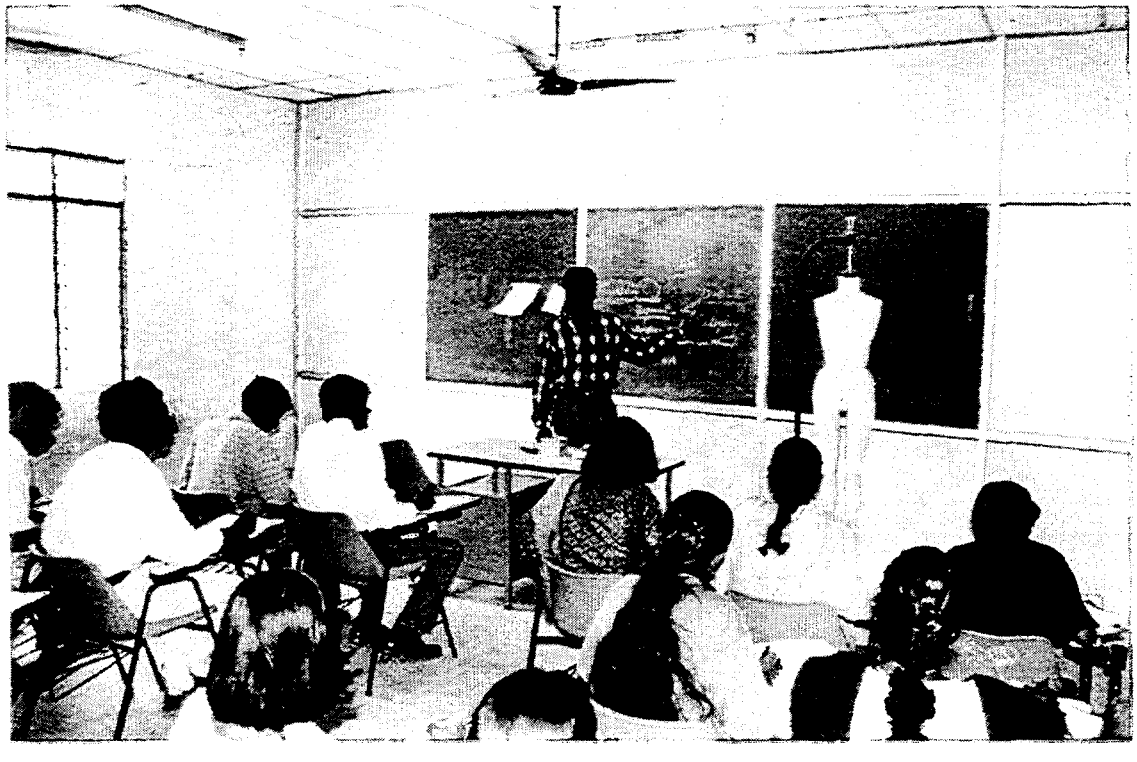


Plate 19 : India Knit Fair Complex

Picture Courtesy: AEPC, Tirupur

(ii) merchandising, and
(iii) knitting technology and knitwear production.

Apart from imparting education, TEA-NIFT also offers number of industrial services. These include testing of yarn and fabrics, computer color matching, computer aided designing, computerized pattern making and marking. The testing laboratory is also equipped with computer color matching system for shade approval, recipe formulation and batch correction (Plate 16).

- **India Knit Fair (IKF)**

In order to promote exports and help buyers select, TEA has been holding jointly with the Apparel Exports Promotion Council (AEPC) a Knitwear Fair since 1995. These are held in Tirupur.

The lack of a purpose-built facility suitable for a trade fair was a major handicap for raising the fair to international standards. TEA and AEPC have jointly promoted a society - India Knit Fair Association - to create a permanent trade fair facility in Tirupur. The society mobilized financial support of leading exporters all over the country to construct a Trade Fair site at Tirupur, and IKF have been held there since then (Plate 19).

6.2 Government

Considering the achievements and its strategic importance to India's foreign exchange earnings, Tirupur has received relatively little attention from the State (Tamil Nadu) as well as from the central government.

The Municipality appears constantly stretched for funds in a town awash with earnings. of. The TEA, realizing that it could not rely on the State, has already taken many initiatives.. It was the TEA's initiation that led to the formation of NTADCL, which will provide water supply to the town and its environs. In fact, NTADCL is a remarkably innovative initiative, with a private business association in effect supersede the municipal administration - and thus providing a striking example for garments industrialists elsewhere.

The New Tirupur Project

Genesis of an Integrated Plan

The Government of Tamil Nadu mandated the Tamil Nadu Corporation for Industrial Infrastructure Development (TACID) to identify infrastructure projects in order to enhance the export and industrial potential of Tirupur. Thus TACID formulated an integrated Tirupur Area Development Plan (TADP) in 1993-94 for the Tirupur Local Planning Area. This envisaged several schemes including those relating to treatment and supply of potable water and offtake, treatment and disposal of sewerage. TEA was strongly in support

The State Government of was unable to commit itself to covering the costs to implement the infrastructure schemes, therefore, approached the Infrastructure Leasing and Financial Services Limited (IL&FS), a non-banking financial institution, having as one of its objectives the finance of commercial infrastructure projects.

TACID and TEA sought IL&FS advice and assistance to develop an appropriate institutional framework for the schemes and determine how far they could executed on a commercial basis, with priority attached to water supply and sewerage, treatment and disposal.

In August 1994, a memorandum was signed between TACID, TEA and IL&FS. This proposed the creation of a public limited company to undertake the work, with equity participation from the Government of Tamil Nadu and the TEA. This was the New Tirupur Area Development Corporation Ltd. (NTADCL).

Project scope

Under the TADP, in the first phase, facilities would be constructed and operated by NTADCL to provide the following services:

a) Treated piped water supply to Tirupur with an estimated population of 650,000 by the year 2030 (currently water is supplied for two hours on alternate days).
b) Treated water supply to 21 adjoining villages and towns, with an estimated population of 710,000 by the year 2030
c) Treated water supply to 550 export-oriented knitwear industrial within the Tirupur Planning Area (currently industry is not provided water through the municipal system and sources it from private water suppliers).
d) Sewerage system for Tirupur Municipal Town (currently Tirupur town does not have a sewerage system nor an organized open drainage system).
e) On site sanitation facilities for slums within the Tirupur municipality (currently the town does not have access to any such facilities).
f) Hazardous sludge collection, treatment and disposal facility.

All assets created by NTADCL would be handed over to the government or its designated agencies, free of charge, at the end of concession period.

Project Implementation

The basic concession period is for 30 years during which, NTADCL will attempt to recover the total project cost along with reasonable returns.

The State Government is to provide the NTADCL with 154 hectares of land for the development of real estate projects (such as industrial parks, housing schemes, township etc.) The proceeds this are to be deployed exclusively in the capital funding and in reducing the delivered price of water to Tirupur municipality and industry.

All investment in the project is to be recovered through the levy of user charges. The project is planned in two phases with priority being given to water supply and sewerage, followed by underground drainage. In the second phase, a new township is planned. The second phase would begin after the year 2001, when phase one is likely to be commissioned.

Global tenders were asked, and after selection, the contract was awarded to a consortium of Mahindra and Mahindra, Bechtel Inc., and International Waters of UK. While Mahindra and Mahindra are the project leaders, Bechtel is the engineering, procurement and construction contractor. The operation and maintenance is to be looked after by International Waters.

The intended important sources of long term borrowing were:

i. *USAID guaranteed floating rate notes.*
ii. *World Bank line of credit to IL&FS.*
iii. *Other Multilateral assistance.*
iv. *Suppliers credit.*
v. *Rupee debt.*

7. Conclusion

For larger firms in the industry, access to export markets has been the driving force to improving their competitiveness. The successful and dramatic expansion which has taken place over the past 15 years has meant many more jobs, limited technological improvement, improved quality in yarn and fabric and an increasingly diverse range of garments. Despite all this, wages remain low and working conditions are poor.

In many ways, Tirupur clearly qualifies for consideration as an example of a successful industrial cluster. But despite the success in creating jobs and penetrating export markets, however, it seems to be a case of what Pyke and Senberger call the "the low road" route to accumulation (sweatshops, or cheap labor strategies, poor working conditions, relatively little innovation and relatively poor quality products).

'Firms in the industry were clearly looking for ways to intensify the work that labor put in (through long working hours); the avoidance of any form of welfare payment and also, in a number of cases, substituting cheaper female labor for more expensive male labor in factories set up outside Tirupur.' (Cawthorne)

Sub-contracting (or job-work) has been an underlying factor for Tirupur's success. But does job-working provide real opportunities for medium-sized firms to develop further, or does it constrain their future prospects? Cawthorne suggest that classically, the subcontracting literature suggests unequal economic relations, where medium and small firms are used as sources of capital accumulation by large firms. However, she argues that the situation in Tirupur does not fit well the classical description, in which a parent company subcontracts other (smaller) firms to produce different component parts the large company needs. On the contrary, there are many variations in the arrangements made by particular firms. Overall it became clear that outcontracting for small and medium sized firms acted to facilitate, rather than constrain, accumulation, and that is why she suggests the usage of the word "outcontracting".

Tirupur is a case of a relatively successful third world industrial cluster and probably the most successful one in India. One can find a number of similarities to the classical industrial cluster suggested by Nadvi and Schmitz. These include: extensive collaborative arrangements in production, informal sharing of information, tools and equipment, well functioning labor markets.

In the future, Tirupur's success will be shaped by how well the town is able to cope up with the existing infrastructure problem. The industry association (TEA)'s led initiatives, most prominent among them being the NTADCL could become a role model for private sector participation in the provision of urban infrastructure in low income countries.

Thus, in the past Tirupur became world famous for the knitted garments, and if things go well with NTADCL, it would make Tirupur again world famous, this time as a model for other developing countries in private sector led urban infrastructure provision.

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